CARNICOM INSTITUTE LEGACY PROJECT

A Release of Internal Original Research Documents

Authored
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Chemistry Vol 5

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5 SUBJECT

180 Sheets

COLLEGE RULED

Mar-09 2014 - On we go!

1. Why did hemoglobin migrate toward the anode when pH of buffer is approx 9.5?
I thought it would be the opposite.

2. What are some other large proteins?
Enzymes? Bromelain 33K

3. What is the molecular wgt of the food dye

4. Use less blue food dye

" a protein is positively charged at pH values below its pI and negatively charged when the pH is above pI

Hemoglobin migrated toward the anode. Blood pI 7.4 < 9.5 buffer migrates negative
Blood has a pI ~ 7.4
Our pH is ~ 9.5
Therefore hemoglobin is positively charged therefore it move toward the anode, which it did.

So ~~if pH of buffer is greater than pI~~
if pI is less than buffer. Goes toward anode (−)
pI " greater than buffer, goes toward cathode (+)

So you need to give dominance to the pH not to buffer! Know the pI relation to buffer. Heads toward same sign as the pI.

buffer
alkaline either either acid

		Size
Casein	pI is 4.6	20K
Hemoglobin	is 7.4	64K
Egg white albumin	7.5 to 6.1	44.5K
Bromelain	9.5	33K
Blue Food Dye	Must be higher	793K

Bromophenol blue is added as a tracky dye.
It is a charged molecule. a slight what charge? Negative charge.
@ moderate pH.
This means it would migrate toward the cathode @ moderate pH.
(It is used because it is the same as DNA)

Bromophenol is negatively charged & migrates at the same rate as 5-7K Da proteins.
SDS is used to turn all proteins negative.
Agarose is only for large proteins.
No wonder only food dye broke.
Agarose gels have larger pores than PAGE gels
This is how proteins can get through agarose.

all negatively charged & large

*	Blue Food 1	PI's of	793K
~~Do Not Have~~	~~Blue Food 2~~	~~food dyes~~	~~466K~~
*	Yellow 5	must be on	534K
*	Red 40	high side	496K
*	Red 3		900K

This is why they move. They are also negatively charged.

With a gel electro what you really should be doing is working w/ DNA.

So forget food dye. One only blood as the dye!

You can try

→ 1 Blood (also as dye)
→ 2 Egg White
3 Bromelain (will not move PI is 9.5
→ 4 Milk
5

1 Blood
2 Blood
3 ~~Egg white~~ Milk
4 ~~Egg white~~ Milk
5 ~~Milk~~ E.W
6 ~~Milk~~ E.W.
7 Bromelain
8 Bromelain

Mar-11 2014

1. Run a blood gel
2. Courtera Work!
   also review the missed lecture
3. EDTA - filament question - NIN
4. A new bar?

It was the residues that grew so well!
How did you get the residues?

1. You precipitated out the proteins @ 75-85°C.
2. You did this in a series of small batches.
3. Every time you saved the liquid residue
   (which had a lot of alcohol in it
   as you understand)
   and you kept repeating it until the sep funnel.

Then must have been acidic, you tried to
neutralize it a little way to far.
Then you went too acidic.
Then you settled on neutral & incubated it.
What you don't know is why you
fed it sugar & water.

Mar 12 2014

1. The tar looks like an important discovery.
We need to replicate it.
There are 3-4 different forms we have seen depending upon chemical treatments.

1. tar
2. original filaments
3. filtered culture - 2nd generation filaments
4. bacteria - most colored aggregates
5. Chromatography runs - significance unknown.
6. gelatinous material in culture
7. precipitates from alcohol method.

Here is what should have happened from Mar 06 14 log
1. Conventional heating of filtered extract to 75°C.
2. Extracted to precipitate.
3. Poured the remainder into the sep funnel & we noticed that it continued to separate, floaty on top. There was a lot of alcohol.
4. Drained what was left & collected it.

Now why was it highly acidic?

5. Subjected it to highly alkaline & it turned black - why?
Then you neutralized it.

Mar 13 2014

1. Order late the afternoon w/ Vincent
2. Coursera work
3. Coomassie stain problem?
4. What is happening w/ bacteria + HCl?
   Gala NIN ? Enzymes?
   Gala Protein ?
5. Yo also have your special approach
   - Do not need it let this go
6. Repeat NIN & Biuret on extract

Bradford:
1x Bradford Reagent
1x Phosphate Buffered Saline

W/ can do protein concentrations
w/ milk as a reference
a dopamine as a reference -

Calibration of mid level extruded pipette

100 drops / 2.3 ml 1 drop / X X = .023 ml = 23 µl

Good.

Use 3 drop $CuSO_4$ $C_1V_1 = C_2V_2$

2 NaOH

[redacted]

3 $CuSO_4$ Need ~~6 ml~~ 2 ml solution

3 NaOH 38 ml H_2O

	mg	ml		
5	33/50	.66	(5) .033	= 1
4	33/100	.33	(4) .0165	= 2
3	33/200	.165	(3) .0083	= 3
2	33/600	.055	(2) .0028	= 4
1	33/1100	.03	(1) .0046	= 5

Peak is @ 664 nm

Solution is terrible here

Dilute by a factor of 10.

Total Volume Wanted 40 ml

$\frac{33mg}{50ml}(x) = \frac{33mg}{500ml}$ $x = 10$

if x = 4 ml we want total volume = 40

So we only add 36 H_2O

38+2

$\frac{X + H_2O}{50 * 20}$

Start w $\frac{1 ml}{5ml}$

Conc = $\frac{20 mg}{5ml}$ ~~20ml~~ 20ml

The Dilution Problem

Orig + added = Total

Orig + Added = Dilution Factor × Original

Your dilution ratio is actually

$\frac{40+2}{2} = 21$ so.

Dilution Factor = $\frac{\text{amt to start with} + \text{amt added}}{\text{original}} = \frac{x+y}{\text{original}}$

Page 10

Try me..

	mg/ml	Diluted Conc mg/ml
1	.03	.0014
2	.055	.0026
3	.165	.0079
4	.33	.0154
5	.66	.0314

Use 1 drop $CuSO_4$ = .023 ml

2 drops NaOH =

3 ml. Solution

2 equations in 2 unknowns

$\frac{4+36}{4} = 10$

$\frac{x+y}{4} = 10$

$x+y = 40$

original + adding

$\frac{x+y}{x} = 10$

$x+y = 40$

$x+y = 10x$

$x = 4$

$y = 36$

$1 = \frac{4}{x}$

$x = 4$

~~$x+y = 20$~~

$C_1V_1 = C_2V_2$ is a lot easier

The Dilution problem

Page 11

~~11 X1~~ (circled)
11 XL
11 XXL

10 X 8 (circled)

large

Xl XL

456-9039

Ag
6 ^ 200

Our current Concentration

	mg/ml	Conc
1	.067	5
2	.033	4
3	.016	3
4	.006	2
5	.003	1

You need to dilute by a factor of 3 instead

$\frac{x+y}{x} = 3$ $x+y = 40$

$x+y = 40$
$\Rightarrow x+y = 3x$

$1 = \frac{40}{3}$

$1 = \frac{40}{3x}$

$x+y = 3x$
$x+y = 40$

$1 =$

$x = \frac{40}{3} = 13.3$ 26.7

~ 13 27
X water

Ma-14 2014

[redacted]

1. The first for approach looks to be producing large quantities of COB.
What did you do?
I think:
1. You took the extract after precipitation.
2. You added extreme NaOH
3. You flipped the scale to acid
4. You recalculated it.
4. There is a sand clone that you added fructose & iron.

Today!
Spectral Analysis Work - Revisit
1. Carrera Course
In progress 2. Methylene blue test on gel
3. Breakdown to COB
Why does it fail NIN & Biuret?
In progress 4. Bio Pad [redacted]

[redacted]

*

Mar 15 2014

1. Course a Class & Test!

Good 2. What is the min level of HCl that has an effect on the CDB?

Good 3. Do other solvents work?

4. What about resumption of the VIS spectral approach?

5. Why can't we get proteins to stain?

Mar 16 2014

Some very good progress today.

1. We definitely have a protein
2. It take Coomassie stain very well
3. Were up to 4 mg/mL
4. We have ramped up the culture process dramatically...
5. We have a positive Biuret test.

Gel lane tests

1. Blue food dye by itself
2. Coomassie Blue by itself
3. ~~Precipitate~~ Solution mixed w/ Coom. Blue
4. Solution only mixed w/ Coom Blue
5. ~~Precipitate only~~ Solution only
6. Solution only
7. ~~Precip w/ Coom Blue~~ Solution only
8. ~~Solution only w/ Coom Blue~~

Mar-M 2014

1. Trying to obtain a gel
2. Tried to dissolve the CDB
   - Isop...p
   - Ethanol
   - Vinegar
   - 20% Acetic Acid
3. Spectral Analysis again?
4. Looked @ cultures

Mar 18 2014

1. IR of CDB would be a good move
~~2. Plan Meeting~~
3. Dipeptide references
   - Aspartame - Concentration
4. Why does sol state not work?
5. Commercial Blue on CDB alone?
6. Carrera Curve!

	Aspatame mg/ml	640 (ABS)	~~645~~ 650
ml			
33	1		1.003
16.5	2		1.099
8.15	4		1.136
66	0.5		.881
132	0.25		.883
264	0.125		.832
528	0.065		.857

3 ml of solution (3 levels on pipette)

2 drops $CiSO_4$ 4 drops NaOH

.9867 .124

$Abs_{Asp} \cong$ ~~1.009~~ + ~~.071~~ ln(Cne)

$r = .94$

$r^2 = .95$

Ma- 19 2014

1. Very good work today w/ IR spectra of Concentrated & evaporated CDB. We essentially have a perfect match w/ the WH paper. Vincent can probably interpret these more capably than me.

2. We must know the amino acids that are involved. How do we get to them?

1 drop HCl in 20 ml H_2O → Some + Meat Tenderizer
Oxiclean
Salt

50° Water Bath.

[redacted]

[redacted]

Anne Ryan

Food proteins - GMO

[redacted]

[redacted]

Mar 20 2014

1. Coursera course - tonight?
2. Break down proteins - how?
3. Vit C test
4. Vacuum testing?
5. Bio Rad 1517

PBS 1X

8gm NaCl
0.2gm KCl
1.44 gms Na_2HPO_4

0.24gms KH_2PO_4

800 ml water
adjust pH to 7.4 w/ HCl
add to make 1 liter

Mar 22 2014

1. [redacted] qualitative bacterial tests
2. Lysis approach w/ Vincent
3. Coursera
   Print out all old exams & identify
   only missed problems
   Study for final

4 Chromatography has many appeals.
   HCl – lisaride
   Vit C sample - does it dissolve also
   Salting out?
   The reference eluate is really important
   254 / 280 nm

Mar 23

1. Coursera downloads
2. Gel work?
   What is the run we can do?
3. Qualitative tests on bacteria Continue
[redacted]
5. Chromatography run?
   What are the opportunities here?
6. Spectral analysis amino acid work –
   don't forsake this –

Gilson 112

254/280 Ratio

$A_1 = AUFS\left(\frac{Readout_1}{100}\right)$

$A_2 = AUFS\left(\frac{Readout\ 2}{100}\right)$

$A = Readout\ 1 / Readout\ 2$

% Protein = Calibration × AUFS $(1.55A_{280} - .76A_{254})$

Estimate

OK Wikipedia = $1.55A_{280} - .76A_{254}$

Mar 26 2014

The method of separation:

1. Grow the culture for approx 1 week.
   Potato
   Liquid Iron
   Fructose
   85-90° F

2. Pipette off rust colored CDS (w fibaments or mold)
3. Centrifuge, rinse, centrifuge & collect solids
4. Add Conc HCl 8.7 min to dissolve
   (yellow color)
5. Dilute to about 1 to 10 water
6. Filter the solution & use it.
7. Neutralize the solution
   typically flips to alkaline range
   & then brings into central range
   Precipitate forms @ this stage
8. Centrifuge & separate liquid from solid

Mar 27 2014

1. Work appt @ 1500

2. Catalase Test
   1. CDB w/ H_2O_2 — Fails
   2. CDB w/ HCl & H_2O_2 — Passes
   3. CDB w/ HCl — Fails

3. Culture variations
   1. Blood
   2. Urine
   3. Biofilm

4. Next Paper: The Progression of Growth

5. Flowchart on [redacted]

6. Supplies for Bio Rad

7. Crystals for IR

8. Gofundme.com IR fundraiser.

9. Hypno-Video

10. Next vacuum test.

11. Charge on Precipitate Test!!! Gel

The precipitation process can be regarded as a purification step. Notice the supernatant appears to be very clear.

We also know that the precipitate dissolves in strong HCl.

At neutral & alkaline pH it forms a deep red precipitate which is insoluble in NaOH, alcohol, & Ethanol.

Gram Stain
Crystal Violet
India Ink

Mar 20 2014

Magnification determination of small scope.
Image width on screen = 18 cm
Image on screen is scaled to @ 56°
so actual image on screen @ 100° is 32.1 cm

Width of 1mm bar = 5.3 cm. @ 56°
∴ Actual width of bar = 9.5 cm

Now use 3 width of 1mm bars already to scale to the point of

∴ 32.1 cm + 2(9.5) (1/2 bar) =

= 41.6 cm total width.
This covers 1mm or 1E6 microns
E-2 m

41.6 cm / 1E6 microns = 1 cm / X X =

= 41.6 cm / 1E6 microns = 1 cm / X X = 24038 μ

1 cm = 1 cm
image actual

Blood

RBC: $\frac{0.3\text{cm}}{7\text{E-6m}} = \frac{.3\text{E-2}}{7\text{E-6}} = \underline{428}$

11.2 m screen. $\frac{11.2}{41.6}(428) = 115$

Low power Logitech is approx 400 X.

Calibration of 10 MB Camera

small mm

1 division = .01 mm = 10 microns

10 divisions = 0.1 = 100 microns

(16 is division)

$\frac{25.75\text{cm}}{60 \text{ divisions small}}$ or $\frac{25.75\text{cm}}{60(10 \text{ microns})} = 600 \text{ microns} = \frac{1\text{cm}}{23.30 \text{ microns}}$

or

1 mm = 2.33 microns @ 4X

= 0.93 microns 10X @ 100%

1 mm = 0.23 microns 40X

Max Mag = $\frac{1\text{E-3}}{.23\text{E-6}} = \underline{4350}$ $\underline{4500}$

Calibration of Small Scope:

1 division = .01 mm
10 divisions = 1 major division = 0.1 mm.

Measure:

$$\frac{2.9\text{ cm}}{10\text{ major (0.1 min)}} = \frac{1\text{ cm}}{X}$$

$X = .048$ mm

1 cm = .048 mm
or 1 mm = .0048 mm
or 1 mm = 4.8E-3 mm
1 mm = 4.8 mil

$$\text{Magnification} = \frac{1E\text{-}3\text{ m}}{4.8E\text{-}6\text{ m}} = \underline{\underline{208}}\text{ perfect.}$$

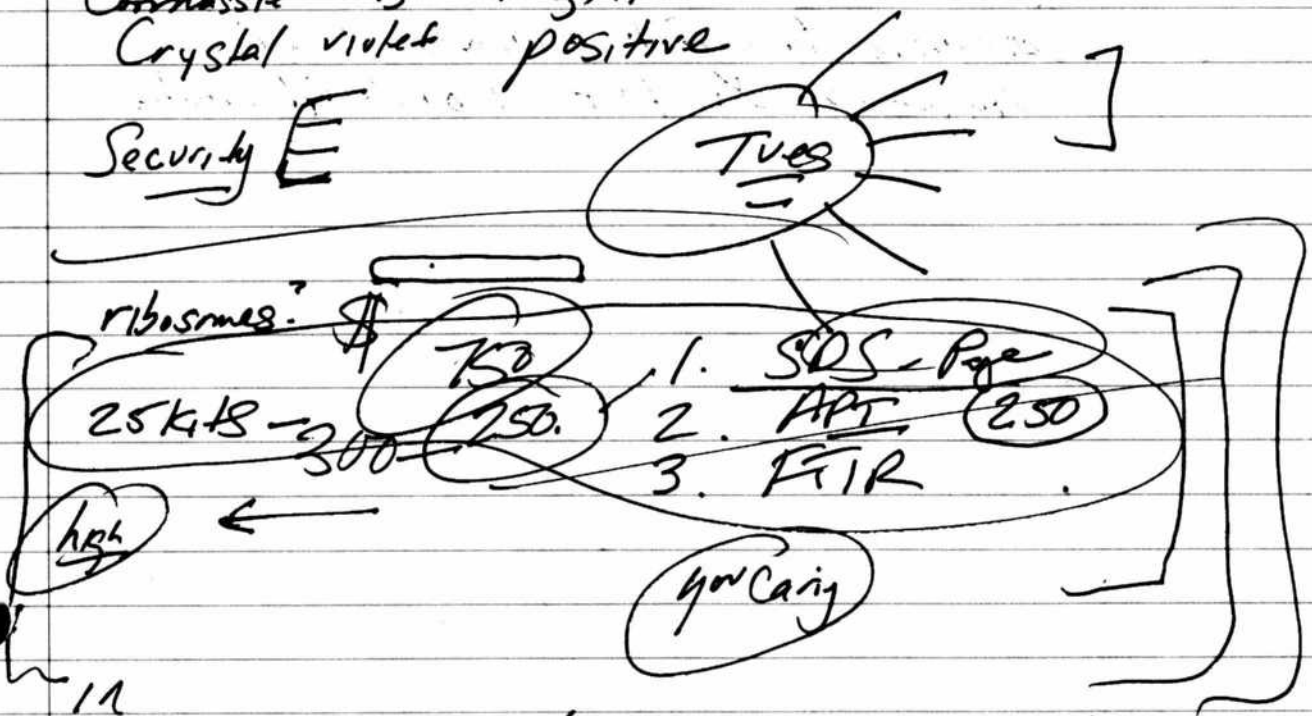
Yon Caring.

[redacted]

[redacted]

Eosin is acidic (negative)
Coomassie is negative
Crystal violet positive

Security E



11

But gram negative has negatively charged cell wall

Apr 01 2014

Images to Post - Internet is down

Coomassie Blue Test - wonderful work
Oxygen - vacuum test - wonderful work

Apr 02 2014 Page 29

1. Stain tests completed today. Good work. Gram stain negative w/out Absolute.

2. New discovery on blue cluster growth w/ either precipitate - liquid separation filament growth. This is also important.

3. Let's move on to the next phase —

4. LPS

0. Characteristics
1. Metals
2. Progression

Size
Aerobic
Coccus
Gram negative
Acidophile
] + IR Spectra

Iron
Lysine
Catalase positive in Conc. HCl
Favored temp approx 85°F?
Lipid based outer membrane???
LPS Lipopolysaccharide
(these are also called endotoxins!)
Biofilm

1. gene spliced hybrid
2. artifact
3. artifact

Electrolysis, Vacuum, H_2 O_2

Red Color is the same between:
1. Biofilm sample > 2,3 days
2. Electrolysis filament sample 2-3 days
3. The precipitate

Magnetic

April 03 2014

Some type of interest is emerging here.

We had:
1. Small amount COB & 2 drops enzyme soap.
2. 4 ml H_2O
3. 1 drop HCl
4. Some enzymes
5. Some salt
6. Heat up to 70°C
7. Sitting overnight

We want to alkalize w/ the solution
We added NIN & we have a brilliant blue reaction.

Burnet test fails miserably.

We need some controls - for NIN

	Neutral	alkaline
1. Soap by itself	None	yellow
2. Enz. by itself	None	None
3 Soap + Enzymes	None	None

Then means that we know that the COB were a factor in the NIN bright blue bold reaction.

Si even after only 10 minutes we can see the HCl reaction is noticeably different, even w/ 1 drop.

(1)
CDB
2 drops detergent
enzymes
salt

(2)
CDB
2 drops detergent
enzymes
salt
HCl (1 drop)

Run another w/ considerably weaker HCl.
Use 1 drop of 1 drop HCl in 10 ml H_2O

(3)
CDB
2 drops detergent
enzymes
salt
2 drops dilute HCl

Apr 04 2012

A busy day as usual.
Lots has happened in AM.

1. Electrolysis showed migration to anode.
   O2 affinity seems evident.
   Charge less so.

2. 2nd purified CDB sample prepared.

3. Precipitate in electrolysis identified time for scope & Comparison.

4. Another liver/elm sample prepared.

5. Lysis by phenol a frequency as in the table.

6. Gel electrophoresis prospect?

7. Jody's draft edits are done - implement them & thank her.

8. [redacted]

9. Lysis w/ acid tests are in place.

10. Major discovery today. Electricity given up the CDB.

Apr 05 2014

[redacted]

2. Electro 2nd version

[redacted]

// how to repeat this..

Inductance

This was DV Voltage	V	f
	6.8	24.0
	~~5.9~~ ~~5.9~~ 6.0	20.0
	5.2	15.0
	4.5	12.0
	4.2	10.0
	3.75	8.0
	3.2	4.0
	2.0	2.0

$I = \frac{E}{R}$

$E = RI$

$R = \frac{E}{I}$

4

~~22.8~~ 22.5 60.0

f=0-60 $f = 2.786V + (-.778)$ ~~r=~~ $r = .98$

f=0-24 $f = 5.45V - 12.92$ $r = .998$

$V = .183f + 2.38$ $r^2 = .997$

V ~~4.0~~ Calc:	f
3.11	4.0
3.84	8.0

Apr-09 2012

Yahoo board atater test

$f = \frac{R}{2\pi L}$ C inductance
inductance

Says voltages not required.

$I = \frac{E}{R}$ for DC

The frequency of DC is zero.

So how do you get frequency of a solution if you are passing DC through it?

When you turn up the voltage you definitely get a change in frequency measured so something is happening.

Sensitivity of Digitech meter is .140V for 4 Hz signal. ~~=~~ ~140 mV seems sort.

This is AC not DC.

Our current solution only has 15 mV AC. This is why digitech will not pick up solution Hz yet.

[redacted]

We can only get up to 35 mV AC in solution even when we increase DC voltage to 40 V. So this is why we cannot pick up Hz yet on DC meter.

Now lets look @ sensitivity of Radio Shack meter

The Radio Shack meter is sensitive to 4Hz @ .068 V or 68 mV.

This is the difference we were seeing!

= 2.06 times.

So the RS meter is twice as sensitive as the Digitech! No wonder.

Need a signal @ 4Hz @ 8 mV @ 35-70 ~~mA~~ mV

and boost it to 80 mV

Apr 10 2014

1. Microscopy Course
2. Any supplies
3. Pico order?
4. Telarge CDB - Electrolysis did not work!
5. MV measurement - Is this noise?
6. Two papers
   CDB - General Characteristics
   CDB - ~~A Growth A Progression~~
   A Growth Progression

YES 7. CDB in a magnet?

Remember you had turned up the voltage very high in the first culture

What if we introduce resonance of 4Hz?

Error! It was DC.

This is interesting.

After I ran it @ 40V for about 10 min max & then settled on 4V vs 3V I am now running @ 60mV +, a almost 10 times greater than it was. Why? It should be close to trippy Fire Hz meter.

Wrong! This was probably DC

There is very interesting. Maybe the high voltage shocked the system

A periodic component has shown up in the mV log.

Wasted AC - DC voltage difference

With 40V on power supply you now have 1.5V DC

but it gets you 35 mV AC

This is why your Hz meter is not kicking in. You must get 70mV AC!

Yes this was the problem
You were ready DC Voltage instead
@ 4V DC, you are ready about 7mV AC.

DC voltage must be what you saw the periodic component. It is also what you used to determine the frequency relatively not AC.

Your problem is that your electrode dissolves!
What can you do here?
We will need to try different leads.
Copper might actually be interesting here.

What about some salt in the water!

SALT! remember you added salt?

Apr-11 2014

1. Home Science Tools
2. We must try to replicate the electrolyze work:
   1. How did we get ELF?
   2. Was salt used? TDS second test is @ ~1600 w/ salt used
   3. Did high voltage for short periods change things?
   4. Introduce AC voltage & freq vs DC voltage & freq
   5. Did ultra sound shielded have an effect?
   6. What about programming life machine?
   7. Need more test leads

So lets recall the steps:

1. You might have used salt
2. You introduced 20K signal - remember
3. You introduced DC spike of up to 45V.

Electrolysis work is getty very interesty.
You have flipped over to AC entirely.
You have added salt. TDS ~ 4600.
Culture is one day old w/ 4V DC.
Nothing seems dramatic except mild migration toward the anode.

However it looks like you have a resonant frequency of the culture @ about 1726 Hz.

AC voltage is a max measurement @ approx 100 mV.

What would this mean?

AC frequency @ about 5 V put in
AC voltage in solution read out.

Fascinating. When we measure freq at the electrodes we set 34.4 Hz.
not 1726 Hz.
We also measure 2V

Why?

Then a clang a activation when maximum AC voltage appears.

1720 Hz measured again later in solution.
34.4 Hz again measured @ electrodes.
1.72 Volts (Coincidence?) measured @ electrodes
95-100 mV measured in solution.
@ ~ 1 uA (that's microamp) measured in solution.

Now we measure 1546 Hz @ electrodes (& in solution!

Ok, we see now that the range of max AC voltage in our band circuit. from about 1400 1600 Hz.

It is not a single point.
Now we are at 1546

What happens if it were 1600 Hz?

$2^n = 1600$

$n \log 2 = 1600$

$n = \frac{\log 1600}{\log 2} = n = 10.64$

$2^{10} = 1024$
$2^{11} = 2048$

What about 4 Hz?

$4^n = 1600$

$n \log 4 = \log 1600$

$4^5 = 1024$
$4^6 = 4096$

$4^n = 1600$

$X \cdot 4^n = 1600$

$X = 4\text{Hz}$

So $4 \cdot 4^n = 1600$

$n \cdot \log 16 = \log 1600$

$n = 2.66$

$n = 5.3$

An intensity problem

$X \cdot 2^n \approx 1600$ $\quad X = 4$ Hz

$4(2^n) = 1600$

$2^n = 400$

$n \log 2 = \log 400 \quad n = 8.64$ yes

$4 \cdot 2^8 = 1024$
$4 \cdot 2^9 = 2048$

Note 1 M HCl

$C_1V_1 = C_2V_2$ $\quad C =$ molar

$8.7M(60ml) = (1M)V_2 \quad V_2 = 522ml$

$1M\ HCl = 1.008gms + 35.453\ gms = 36.533\ gms$ per $1000ml$

So $\frac{36.533gms}{1000ml} = \frac{\quad}{30ml}$

$\frac{60ml}{522ml} = \frac{X}{30ml} \quad X = 3.45ml$ OK

We have reproduced the beginning of
stirred like reaction w/in about 30 hrs.
Conditions were

1. Some salt
2. Wear floppy to AC input.

~ 2V
~ 1600 Hz
~ 100 mV measured in solution
~ 1 uA of current

No ~~EF~~ ELF evident in any way.

Salt water by itself does not
Conduct a current. 0.0 uA.

We have a current flow of
0-20 uA
even in a passive mode.

10000 2502

Apr 12 2014 Page 44

1. Blood spec - rescan
2. Microscopy Course order.
3. Bacteria Study kit - Could be interesting. - Sensitivity tests
4. Fluoride salt question
5. 2nd culture running in parallel?
6. Continue to break down CDB
7. Influence of salt on culture?
8. Negative analysis approach to amino acids?
9. Spectral of the green solution — biofilm - what does it mean.

10. Notice pattern of voltage decreasing overnight
11. Inspect the culture state

Culture is now
1. CDB (TDS estimate about 300)
2. Soya Potato Cubes.
3. Salt
4. Lig Iron 12Hz 8V AC
5. AC in ~~1400-1500Hz, 2V AC~~

It is theorized that the electrolysis establishes the migration path (acidic oxygen) & that this separation causes the potential difference.

What if you put in the other reg circuit that charges up to 10V instead of 2? Did it.

An oscillating DC voltage results.

You are getting a huge amount of AC voltage coming out now.

Like before
8.4 V AC in @ 12Hz.

We now get out 0.06V AC.
And the DC voltage is oscillating all over the place.

There is a totally different activation than before.
You found a local max of AC voltage out near the fuzzy ~ 12Hz.

You added

1. CDB
2. Sgan
3. Sclk
4. Pb to cubes
5. Leg Iron
6. AC in 8.4V; ~ 12Hz.

There is a radically different environment than before.

This means the solution has a ~0.8V AC signal @ ~12 Hz oscillating through it.

For some reason, the current is reversing direction about every second.
What does this mean?

The 8V DC voltage was also oscillating!
So you have changed it to AC voltage!
And it has attached out!

So it absorbs out @ ~260 uA
It has an oscillation component in it of about 8 sec

$C = f \cdot \lambda$ $\quad f = \frac{C}{\lambda}$ $\quad \lambda = \frac{C}{f}$

Frequency vs wavelength.

a block of time cut into the no. of full wavelengths within the block gives you the no. of times it was cut up.

of time a block chopped up into f parts (counts) gives you a wavelength.

Interpret a FFT plot

Example	My Case
$n = 4000$	$n = 862$
$\Delta t = 2E-3$ sec	$\Delta t = 1$ sec
Fundamental Frequency $= 1/2E-3$ $= 500$ Hz	Fundamental freq $= 1/1$ $= 1$ Hz

So the fundamental frequency refers to how often you are collecting the data per second

FFT is useful for analysis of time dependent data

~~Fundamental freq × Sample~~

Fundamental Frequency × Sampling Interval = 1

eg.

Sampling Interval = $\frac{1}{\text{Fund. Freq}}$

eg you sample things 5 times a second (this is the fundamental freq)

$\frac{1}{5} = 0.2$ sec this is the sampling interval

My sampling interval was 1 sec.

If my sampling interval was .25 sec

my fundamental freq is 5.
i.e, I sampled 5 times per second.

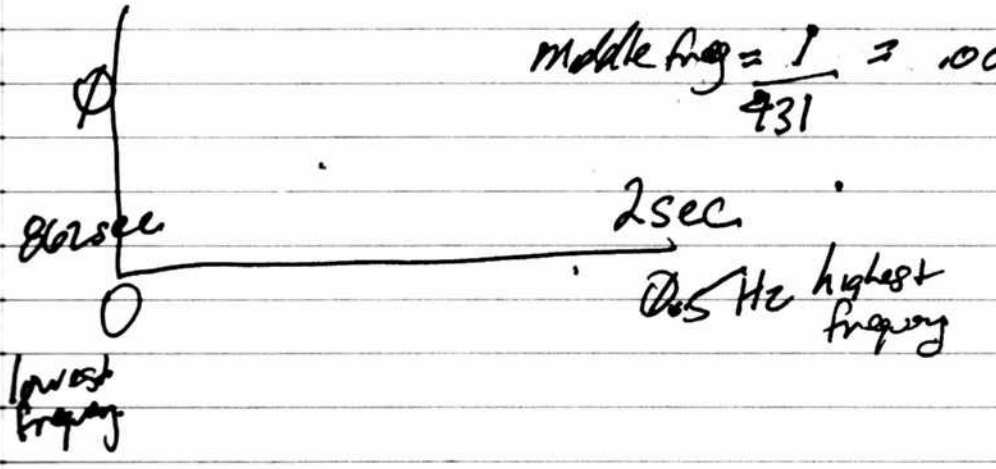
the Highest frequency $= \frac{1}{2\Delta} =$ [illegible]

.5 cycles per second.
its period is $2\Delta = 2$ seconds.
This is our highest frequency & corresponding period.

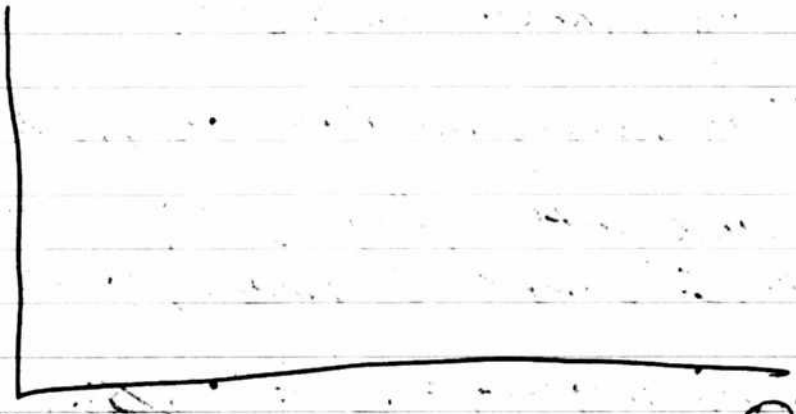
Lowest freq is $\frac{1}{n\Delta} = \frac{1 \text{ cycle}}{862 \cdot 1 \text{ sec}} = .0012 \frac{\text{cycles}}{\text{sec}}$

and its period is $n \cdot \Delta = 862(1 \text{ sec}) = 862 \text{ sec}$
So our DFT covers from 2 secs to 862 secs

Freq $\quad$ period · frequency = 1



Whoa, this is interesting



$y = ax + b$

$y = -1.720 + 862$

Period $= -1720\ Hz + 862$

in sec $= \left(-2(n) + 4\right) Hz + n$

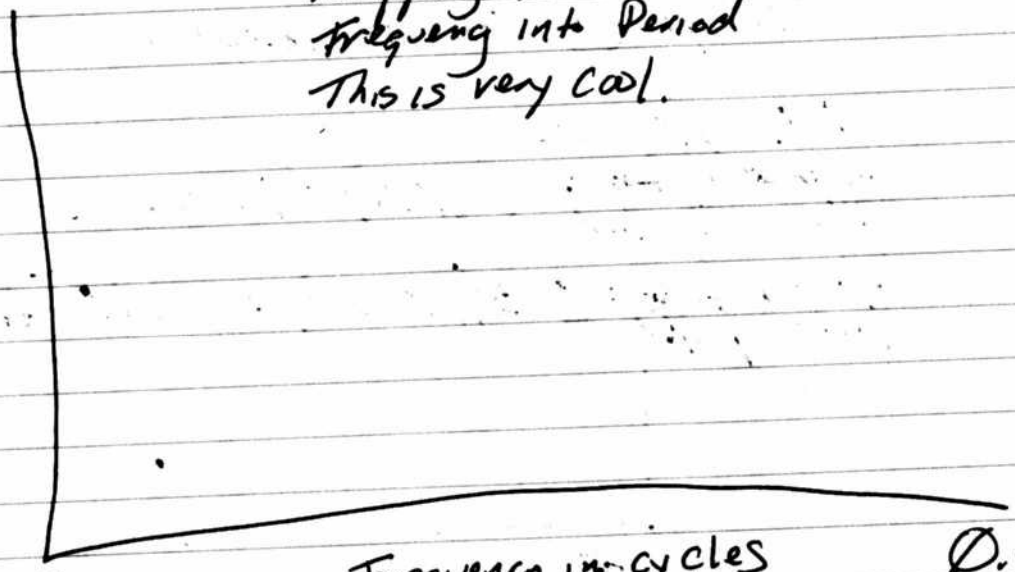
In our case, max frequency is at $\emptyset.3$

so $Period_{max} = -1720(.3) + 862 = \underline{346 sec}$

Close to 6 min

This is fascinating.

FFT Graph
Mapping from frequency into Period
This is very cool.



Hz 0 — Frequency in cycles — Ø.5

Period $(n \cdot \Delta t)$ — can be mapped into Period in secs — $(2 \cdot \Delta t)$

Example

862(1sec)
= 862sec

2 · 1sec
= 2sec

This can always be mapped in a linear fashion.
In this case
Period = $-1720(Hz) + 862$

Hz Y	X Period
~~X~~	~~X~~
Ø	862
.5	2

So, imagine another example

523 pts @ 1/2 sec intervals

$\Delta t = 0.5$ sec

~~highest freq~~ = $2(0.5) = 1$ sec
shortest period

~~lowest freq~~ = $523(0.5 \text{ sec}) = 261.5$ ~~Hz~~ sec
longest period

So

~~0 to 1.5 Hz~~

0 Hz — 0.5 Hz

Period: 261.5 sec — 1 sec

Hz	Period
0	261.5
.5	1

Period = $-521 \cdot Hz + 261.5$

So to map the FFT from 0 to 0.5
we use

~~Period = $(n-2)$ * Hz + $n \cdot \Delta t$~~

Period = $(2-n)$ * Hz + $n \cdot \Delta t$

This is the mapping

This is great!

This is it. Map a FFT from 0.0 to 0.5 Hz to Period in secs

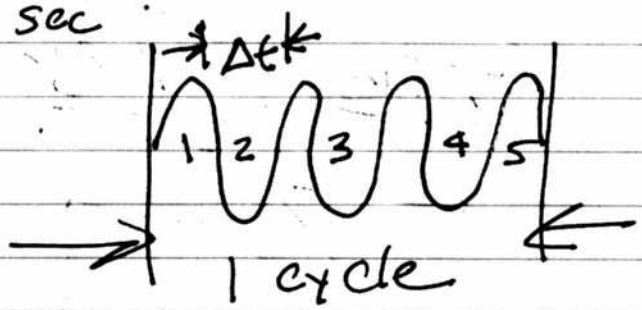
~~$2 \cdot \pi \cdot \Delta t$~~

$$\text{Period in secs} = -\left(2 \cdot (n-2) \cdot \Delta t\right) * Hz + n \cdot \Delta t$$

(Hz here ranges from 0 to 0.5)
n is the no. of data pts
Δt is the sampling interval in secs.

Fundamental Frequency * Sampling Interval = 1 cycle

$\frac{\text{cycles}}{\text{sec}}$ $\qquad$ sec



Notice $n \cdot \Delta t = 1$ cycle?

Highest frequency $= \frac{1}{2\Delta t}$ $\qquad$ Highest period $= 2 \cdot \Delta t$

Lowest frequency is $\frac{1}{n \cdot \Delta t}$ $\qquad$ Lowest period $= n \cdot \Delta t$

Frequency * Period $= 1$

.00113

3.3KΩ

$f_o = \frac{1}{2\pi (LC)^{1/2}}$

LC estimate = .00018

$(LC)^{1/2} = \frac{1}{2\pi f_o}$

$LC = \left(\frac{1}{2\pi f_o}\right)^2$

= .00018
= .0002
=

$f_o = \frac{1}{4\pi^2 LC}$ $\frac{1}{2\pi (LC)^{1/2}}$

$LC = \frac{1}{4\pi^2 f_o^2}$ = .00018

Estimate Capacitance to be very high @ 1E6 uF
Inductance estimated to be very low @ .18 mH

1E6 uF = 1F

04/16/14.

1. Food Colory spectra to [redacted]

2. Dual logging is now available.

3. Need controls in EM work.
Variable emerging are
1. DC vs AC
2. Resonance questions
3. Control questions
Wow!
1. Wake alone
2. Wake w/ salt
3. Wake w/ salt, sugar
4. Wake w/ salt, sugar, iron
5. Wake w/ salt, sugar, iron, COB
6. Wake w/ salt, sugar, iron, COB, potato

4. Is there a potential when cultures are passive?

4. Resistance of pencils is about 30Ω
5. Purchase electronic kit?
6. Purchase some components, instead?
7. Find the gauss meter!
8. The nail - inductor gauss meter test?
9. Do magnets have any effect?
10. We want to break down COB - remember

11. You also have DNA & enzyme studies coming in.

12. Circuit Simulation Software
Do Circuit

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You are going to have to simplify a primitive.

A main question:
Is there a resonant frequency or not?

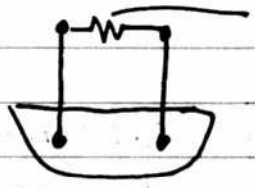
Also Control tests

Tap H_2O: Resistance $\approx$ 250 KΩ

If we feed 5V into graphite leads we get Ø.24V in solution.

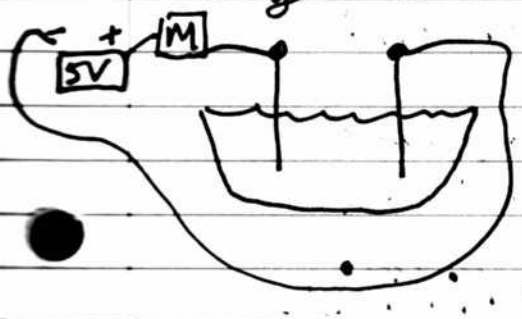
$I = \frac{E}{R} = \frac{.24V}{250E3\Omega} = Ø.96uA$ so this is a very small current through the solution as expected.

Now let's measure through the graphite rods.
We measure Ø.83uA so this is a match.



We measure infinite resistance here. So the basic water alone solution can not conduct electricity.

This means no current should be flowing through it.
Now if we run 5V through the solution we get 140uA of current.



We measure ~105uA here and infinite resistance through the leads. So all in all a small current limit does exist.

Now what happens if we insert a AC signal into it. Is there resonance?

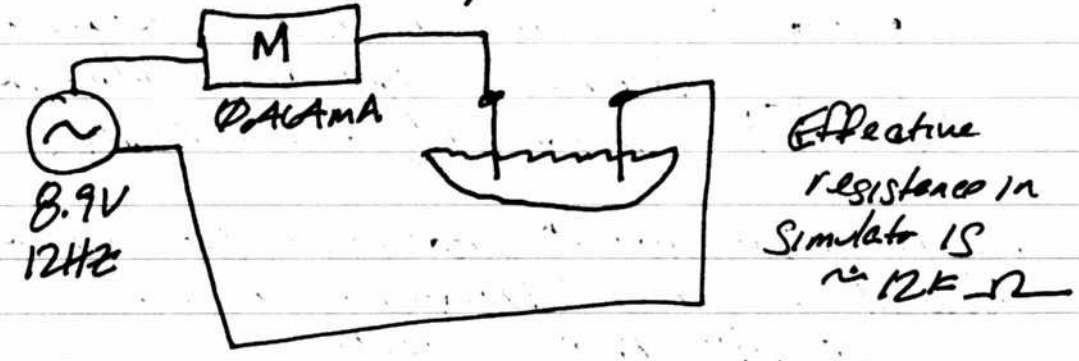
Now we are feeding a 8.9V signal AC into the water alone. @ 12Hz.

Current should also be? $\frac{8.9V}{250E3\Omega} = .036mA$

We are measuring
$-.06mA$ to $+.06mA$ NO! This is DC!
& it is oscillating.

~~In the solution, we are measuring.~~

You were measuring the wrong way. You were measuring DC current vs AC current.
AC current = 0.464 mA



What is the resistance of this circuit?

I don't see any way that you could have measured or determined this.

Water RMS vs Peak $I = \frac{E}{R}$ $R = \frac{E}{I}$ = $R = 19181\Omega$
$= 19.2K\Omega$

Notice $19.2(\sqrt{2}) \cong 13.6\text{k}\Omega$
which is more close.

Is your 8.9 V. Peak or RMS?

You are measuring .464 mA RMS

We see in our graph

Ibeat Peak Current = $\frac{\text{RMS Current}}{\sqrt{2}}$

464 mA RMS $\cong$ 656 mA Peak
which is close to our simulation

OK, I have to circuit simulator to
Work in DC mode!
Now let see if we can get it to work in AC mode.

Now I have QUCS working in AC mode!
Graph displays peak.
13.5 kΩ
We solve for theoretical resistance @ ~~BE~~Ω.

Theoretical was 13.6K. Excellent.

So we have an equivalent resistance
of BE Ω.

That is very interesting. That is much
less than pure water.

Superb work.

Now we add

1. Salt
2. Sugar
3. Liq Iron
4. Potato

Make sure that you measure current in AC!
RMS
= 6.9 mA

We measure ~8.4 V directly from signal generator.

But we only measure 4.7 when we hook up to the graphite rods.

We then measure about 290 mV in the solution.
And we measure about 4.5 kΩ in the solution.

Now lets go back to the regular water solution.

There is some question about the Potential in Solution measurements

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	H_2O	H_2O + Iron + Sugar + Salt
Sig Gen Output	8.9 VAC	8.4 V AC (9.4V)
Graphite Terminals	8.4 VAC	4.7 VAC
VAC Current in Solution	Ø.9 VAC	290 mV
Ω in Solution		4.5 KΩ
Current through probes		6.9 mA
Current in Solution		

Totally different results by each meter.
You must use the new meter for better msmts

		H_2O	H_2O + Sug + Salt + Iron
AC V	SigGen Output VAC RMS	9.4 VAC	9.4 VAC RMS
(energized)	Graphite Terminals VAC RMS	9.2 VAC	5.3 V AC RMS
(energized)	Probes in Solution VAC RMS	Ø.860 VAC RMS	? Ø.248 VAC RMS
	Ω in Solution (Not energized!)	250 KΩ	7.06 KΩ
RMS AC!	Current in Solution AC RMS	0.00 mA AC RMS	Ø.180 mA AC RMS!
RMS AC!	Current thru Probes AC RMS	0.00 mA AC RMS	7.43 mA AC RMS!
	f	12 Hz	12 Hz
	~~Ω in Solution (Energized)~~		2030 04/16
3 day CDB:		H_2O + Sug + Salt + Iron + Potato	+ CDB
9.4	SigGen Output VAC RMS	9.4 V AC RMS	9.4 V AC RMS
~~3.70 V~~	Graphite Term. VAC RMS	4.6 V AC RMS	4.46 V AC RMS
~~0.00~~ (energized)	Probes in Solution VAC RMS	? .211 V AC RMS	? Ø.270 AC RMS
~110 KΩ	Ω in Solution (not energized)	10.9 KΩ	22.5+ KΩ
0.00	Current in Solution AC RMS	.325 mA AC RMS	0.270 ~~0.00~~ mA AC RMS
* 9.62 mA	Current thru Probes AC RMS	6.55 mA AC RMS	* 9.15 mA AC RMS
12 Hz	f	12 Hz	12 Hz

Ec

Some important work going on here.
We do appear to have resonance & increased growth rate @ 4Hz.
We also see oxygen in the culture.

We have a data file

$n = 45107$
$\Delta t = 1\,sec$

We have learned that FFT period is:

$$-\left[2(n-2)\Delta t\right] Hz + n\Delta t$$

or in this case

Period = $-.90210\,Hz + 45107$

We have a peak near 0.3 Hz

Period $\approx$ 18044 sec = 5.01 hrs

Longest Period = 45107 (1sec) = 12.52 hrs
Shortest Period = 2 (1sec) = 2sec

1. Logged Voltage AC: (RMS or peak?)
2. Subtracted the mean (= 1.391V)
3. FFT
4. There is some power coming in @ a 5-7hr period.

You have some great Circuit Software now.
Screw the online interactive software.

Today

1. Set up a spreadsheet for solution electromagnetic data
2. ELF meter - inductor - circuit analyzer
3. Read on SOS prep & lyses
4. Food Dye test for Direct
5. MW Research call
6. Microscope of 4Hz culture - 24hrs
7. Read the gauss meter
8. DNA & enzyme studies
9. Circuit analysis software

On an 4 Hz resonant circuit
we are

$f_0 = 4$ Hz
$V = 1.391$ V (the average) or the peak
or RMS (Radio Shack Meter)

Then we need a current measurement
to determine the resistance.
or just measure the resistance.

with Digital DC meter, measure V_{RMS} + R − to I
on leads.

We get 1.93 – 2.3 V_{RMS}. Peak Voltage =
This average is 2.115 V_{RMS} = 2.99 V_{Peak}

2.91 – 3.03 mA RMS Check Meter Cables,
$\bar{X}$ = 2.97 mA RMS & Settings!

Resistance measured – this just keeps increasing

$I_{peak} = 2.97(\sqrt{2}) = 4.20$ mA = .0042 A
= 4.2E-3

$I = \frac{E}{R} = \frac{2.97E-3}{}$

$\frac{2.115}{4.20E-3} = 503\,\Omega$ ↑ to get peak voltage

$R = \frac{E}{I} = \frac{2.115\ V_{RMS}}{2.97E-3\ A_{RMS}} = 712\ \Omega_{RMS}$

(You needed to use I peak here
to generate the peak voltage.)

You are seeing now that you do not need all the other measurements to determine a resonant circuit. The measured values of voltage rms & current rms are sufficient to determine the equivalent resistance of the circuit.

Low resistance indicates resonance.
Max voltage indicates a resonant circuit.
Giant increase indicates a resonant circuit.

You now only need to measure:

@ 4Hz:

Input 4.0Hz 4.5V
Check Meter.

Vrms
Current rms

for	Vrms	Vpeak	Irms	Ipeak	Rpeak
Water	4.5V	6.4	Ø	Ø	
Culture Medium					
~~DI~~ Culture					

Theoretical Input is 4.5V AC RMS 4Hz

Ω		Peak	V RMS	I RMS	Peak
∞	∞ Water	6.4V	4.5V	Ø	Ø
914	639 Liq Iron, Sugar Salt	3.2V	2.30V	2.55mA	3.6mA
1295	919 Liq Iron, Sugar, Salt, Potato	4.0V	2.85V	2.2mA	3.1mA
11	8 Liq Iron, Sugar, Salt, Potato, CDB	.04V	.025V	2.25mA	3.2mA
			Cells have been AC		
100	493 CDB 12hrs	3.0V	2.12V	3.03mA	4.3mA

To get equivalent R @ peak use

Check on this. $\frac{V_{RMS}}{I_{peak}}$

Voltage means energy per electron.

A potential drop, ie a voltage drop, measures energy that has been lost or expended or released between 2 pts.

$V_{battery} + V_{resistor} = Ø$

Voltage drop means that that power from the source battery IS going somewhere.
Ie, in this case, the CDB.
They absorbed this energy.

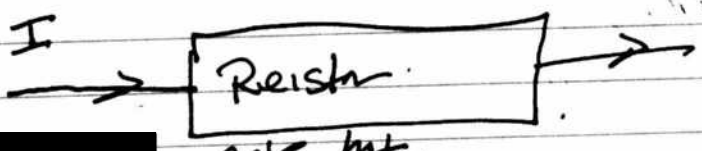
[redacted]

What happens if you short a battery?
The voltage decreases and it releases a lot of energy as sparks & heat!

DC (unenergized) Notes

.040 – Ø in ~10 min (acting like a capacitor, it is discharging from .035 to Ø.)
.036 V Steady potential (reliable as can be)
Possible .18V !!! 24hrs to

A change in voltage ultimately means a change in the energy of the system. In the case of a resistor it usually means heat given off.



gets hot opposes flow of electrons energy is being transformed to heat.

If suddenly there is no heat & less resistance then that energy went into something else. ie the CDB absorbed it.

[redacted]

$V = \frac{E}{C_{ref}}$

$\frac{dV}{dE} = \frac{1}{C_{ref}}$

$dV = \frac{dE}{C_{ref}}$

$V = \frac{\text{Potential Energy}}{q}$

or $V = \frac{PE}{q}$

$\frac{\Delta V}{\Delta PE} = \frac{1}{q}$

Voltage is the amount of energy per unit charge.

So voltage is actually a ratio.

$\Delta V = \frac{\Delta PE}{q}$

Apr 18 2014

[redacted]

2. Aga. culture prep – Penicillin Discs? Colloidal Silver?
3. Theory of Conductivity + resistance
4. Inductor or Capacitor into the AC Circuit?
5. DNA + Enzyme Kit Study
[redacted]
7. Electromagnetic Controls, repeat + spreadsheet
8. Time lapse photography w/ut light.
9. Capacitive Circuit Study
10. Find the gauss meter
11. [redacted]
12. Confirm the voltage drop!

Current Simulations w/ Inductor:

	I_{max}	t	V_{max}	t
1nH	.00420	.0608	2.11	.0606-.0657
10H	.00379	.0808	1.91	.0808
100H	.00128	.111-.116	.643	.111
1000H	same idea			

but @ 100H the peaks take a decidedly different picture -

It actually makes sense that our voltage oscillates since polarity reverses in AC. The same goes for current.
Our voltage or oscillator appears to be at a maximum but a closer would correspond w/ current being a maximum. But we also have an offset? Why and how?

We have a range from ~~-1.00~~ -2.02 to 0.62
$\Delta = 1.40V$
$\bar{X} = 1.32V$ Now why is this?
Why isn't the mean @ zero zero? Why the offset?

So an offset is a DC signal that is being added to the sine wave. Why & how?

Test the source directly.

Thresholds of meter sensitivity.

When we look @ the source, with the RS meter at lowest setting 2.02V & 0.62V
This is Strange.

When we use the Digitech meter at lowest setting ~~4.40 and~~ 4.5V and .45
Actually it is a ranging problem of some kind & thereal answer is 4.5V.
But here also the meter is having a hard time
Coping with the signal. Why?

You want this spectrum analyzer.
75% of time meter is correct. other time, 25% it is having range problem.

The false reading has to do w/ the frequency of the signal. When you changed 4Hz to 400Hz the problem went away on the Digitech.

It also went away @ 40Hz.
The frequency generator is at 1V & peak to peak voltage! It is working fine.

The ranging problem disappears @ ~~4Hz~~ 10Hz.
In the Digitech. So the oscillation is an artifact of sensitivity of the meter.
It still looks like the better meter to use for sensitive measurements.

RS meter threshold is @ ~~15Hz~~ 16.5Hz.

So now we are learning how to interpret the RS AC voltage @ low frequencies which introduces artifacts.

@ 4 Hz
RS meter oscillates between roughly 1.8 - 2.0 and 0.6 V. AC RMS.

The correct interpretation is that the voltage @ low frequencies (ie when it oscillates like this) is twice the max voltage that appears on the log.

Example. Max now is 1.8V with oscillation down to 0.6 V AC
So the actual voltage is
$2(1.8) \cong 3.6V + \frac{1}{2}(0.6) = 3.9V$
which agrees perfectly w/ Dr Steck.

This is empirical but I think it will work.
Radio Shack meter @ < 16 Hz
AC Voltage is actually $= 2(\text{High}) + \frac{1}{2}(\text{Low})$

Now what we are learning here is that the voltage is not as important as the VOLTAGE drop when we introduce the COB. This is the remarkable observation.

* *

The represents a change in energy state

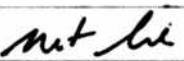
Lets Study the change in energy state further & then repeat the test.

We measure potential w/ RS meter 36 hrs into the culture & .131 V ~ 131 mV.
This is not entirely consistent w/ yesterdays results.
Indeed the culture becomes a little lattey.

Lets check w/ Digital meter.

RS Capacitance spec is only to 40uF

A 40uF capacitor @ 25V is 3/16" x 7/16"

This would not be  about out of bounds.

We could simulate our circuit w/ a capacitor.

It charges from
~ 370 mV to 130 mV in ~ 7 to 8 sec

$Q = CV$ only one we know is voltage

Coulombs ↑ Charge in Farads. ↖ Voltage

No, this method is for charge, not discharge.
~ 2/3 of 200sec is the time = ≈ 133 sec
required to discharge from 370mV to 234mV

$\frac{234mV}{370mV}$ = 63.2% of original value

Two time constants:

So @ ~133 sec we discharge to 234 mV = 63.2%

@ 2(133) = 267 sec we discharge to ~ 190 mV

Discharge looks to be @ about 45% of original voltage.
This is the inverse of above:
100 - 63.2 = 36.8%

370 mV leads to 1300

RC(1)	100 - 63.2	= 36.8%	136 mV ~ ~~1300~~ sec
RC(2)	100 - 86.5	= 13.5%	50mV
RC(3)	100 - 95	= 5%	18mV
RC(4)			
RC(5)	100 - 99.24	= .76%	3 mV

This gives us an estimate of RC

Reaches 100 mV @ approx 1800 sec
This gives us a time constant of about 1300 sec

3100 sec = 80mV

Estimated discharge curve

$mV \approx 370 e^{-t/2500}$ t in sec

estimated RC constant is 2500 sec

Resistance is very high. 100K Ω+ ??

$R \cdot C = RC \approx 2500$ sec $\quad 2500 = RC$

$C = \frac{2500}{R}$ $\quad R = 88.5$K Ω now very steady.

$C = \frac{2500 \text{ sec}}{88.5E3\ \Omega} = .02825\ F \approx 28.2\ mF$ This is huge

---

We now have new values.

$\approx$ ~~40 mV @~~ 80 mV @ 3700 sec.

$V_0 = 200$ mV ~~$RC \approx (.368)2$~~

$RC: .368(200mV) = 74mV$

This occurs @ $t \approx 6000$ sec.
So the estimate of RC is on the order of 6000 sec!

During our 4Hz signal we are getting current on the order of 10uA.

$RC \approx 6000$

$C = \frac{6000}{R}$

R is estimated @ 88.5 kΩ

so $C = .067\,F = 68\,mF$

So we have this circuit with
$V_o \approx 200\text{-}300\,mV$ RMS
$RC \approx 6000$ sec
$C \approx 30\text{-}70\,mF$
$R \approx 90k\,\Omega$
$I = 10\,uA$ AC RMS - goes up to 28uA
$f_o = 4$ Hz when connected
$L = ?$

When the circuit discharged it dropped to about 60 ~~with AC hum~~ mV. Now you are charging it again. It has increased from about 8 uA to about 28 uA now. It has ~~bleeded~~ bleeded out here and it took 4500 sec to reach this point.

Apr 19 2014

1. Photos up on page
2. AC analysis starts today [redacted]

4. Inductor Capacitor RC - RCL Circuits
How about Charge Circuit.
You have some data here
8 uA to ~ 35uA in 12,500 sec
then Plat
More like 35
0 / 12,500

If you turn AC off no current flows after disconnecting to AC, there is no potential now. This indicates that the culture has peaked.

The solution remains highly conductive but it is not conducting.
Wasn't you add sugar again?
What if we tested for sugar first?

Benedict's test came out yellow - yellow brown which I regard as a positive test. This indicates sugar still present in solution.

All signs say that the culture has peaked

5. Verify the CDB Voltage drop!
6. DNA & Enzyme
7. [redacted]
8. Time lapse photography w/ nt light
7. EM CDB Spreadsheet?
9. Find the same meter
10. Verify resonant frequencies 4, 6, 12 —
11. [redacted]

Mega = 6
Giga = 9
Tera = 12

15-21

3 hrs later a culture was done

6:20:00	t=0	700 mV
6:..		108
		80
		54
		4

n=1	
n=2	225
	292
	430
	662

Really a very smooth curve..

R Voltage $= 700\,mV\,e^{-t/140}$

The work does seem to be panning out, you have a very good capacitor developing. Also the culture is developing differently. Radial formation.

OK, we know that we have promotion of growth @ 4Hz & we believe resonance.

Now go after destruction.

Assume 0.6 E-6 microns diameter
Assume error of ± ~~0.4~~ 0.2 μ

1st estimate: $C = f \cdot \lambda$ or $f = \frac{C}{\lambda}$

$f \cong \frac{C}{2\pi(0.6E\text{-}6m)} = \frac{3E8\ m/sec}{2\pi(0.6E\text{-}6m)} = 7.958E13\ Hz$

~~= 79.6 THz this is in the near infrared range.~~

Now lets look @ harmonics error

$f = C\lambda^{-1}$ $\quad \Delta f = -1C \cdot \lambda^{-2} \Delta\lambda = \frac{-C}{\lambda^2}\Delta\lambda$

$= -\frac{3E8}{(7.958E13)^2} \cdot 2\pi(0.2E\text{-}6)$

$= 0.$

$y = 5x^2$

$\frac{dy}{dx} = 2(5)x$

Now for harmonics:

7.95 78E13 Hz = 79.578 ~~MHz~~ ~~GHz~~ THz

This is ~~or~~ infrared.

= 79578 GHz = 79518000 MHz

Λ^{27} = .5929 MHz = 592.9 KHz

= 593 KHz This is a medium frequency radio wave.

OK

~~[illegible]~~

AM Radio 540 to 1600 KHz.

The RS meter is OK. I thought I blew it up again. The problem is that the output voltage of the AC generator radically decreases at powers above X100 Hz on the scale. You must use X100 or less to give sufficient voltage.

So now we are back to the 5K range. to get enough output power.

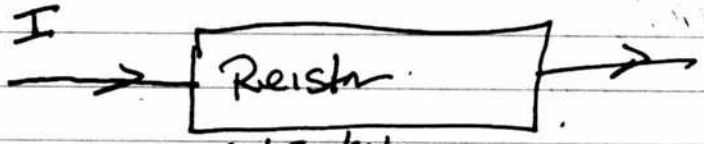
Also what about something out of phase at the same frequency?

What happens if you short a battery?
The voltage decreases and it releases a lot of energy as sparks & heat!

DC (unenergized) Notes

.040 – Ø (acting like a capacitor, it is discharging from .035 to Ø.)
in ~10 min
.036 V Steady potential (reliable as can be)
Possible .18 V !!!
24 hrs to

A change in voltage ultimately means a change in the energy of the system.
In the case of a resistor it usually means heat given off.



gets hot
opposes flow of electrons
energy is being transformed to heat.
If suddenly there is no heat, a lower resistance than that energy went into something else. ie the CDB absorbed it.

$V = \frac{E}{Coul}$

$\frac{dV}{dE} = \frac{1}{Coul}$

$dV = \frac{dE}{Coul}$

$V = \frac{Potential\ Energy}{q}$

$V = \frac{PE}{q}$

$\frac{\Delta V}{\Delta PE} \quad \frac{q}{q} = \frac{1}{q}$

Voltage is the amount of energy per unit charge.

So voltage is actually a ratio.

$\Delta V = \frac{\Delta PE}{q}$

$2^3 = 9.95E12$ ok

592.90 kHz

→ 4.6320 kHz = 4632 Hz

Ok we have 4630 Hz into the system but only 2.9V are going in.?

$f = \frac{3E8\ m/s.}{2\pi (0.6E-6\ m)} = 7.96EB$

$2^n \cdot f$

$1000 < f < 10{,}000\ Hz$

find n. Choose $f = 5000\ Hz$

$2^n = \frac{fres}{5000}$

$n \cdot \log 2 = \frac{fres}{5000}$ $\quad n = \left(\frac{\log\left(\frac{fr}{5000}\right)}{\log 2}\right)$ $\quad n = 10.7$

$n \cdot \log 2 = \frac{7.96E13}{5000} \Rightarrow n = \frac{\log\left(\frac{7.96E13}{5000}\right)}{\log 2} = 33.89$

≈ 34

yes. $\frac{fr}{2^{34}} = 4633\ Hz$ OK

$= 9.264\ kHz$

Work a try. Also 9264.1 Hz should work

square wave

3 orders:
CI -Pico 1. Pico
CI Amazon 2. Tri Meter & Cell Sensor
~~Amazon 3 Tracker & Antenna~~
Signalllink - USB Card

We do have a better curve now.
for RC

t=0	1.5426 V	10 = .2289
30	.0626	
100	.0178	
210	.0103	
260	.0090	
350	.0077	
510	.0056	
1000	.0034	
2000	.0021	

It is discharging too quickly to match a capacitor exactly.

Apr 22 2014

1. Test Capacitance of circuit under UM metal circumstances.

n=1 V= .2113 : n=1000 .1119 V
500 .1414
1658 .0852
Model is:

$$\text{Voltage mV} = .211.3e^{-t/1800}$$

Today

1. Post pictures soon
2. Biofilm paper is done.

Notice that we had to keep flattening out the RC decay curve as more data was collected. Why is this? Inductive influence?

Lets try and estimate inductance.

Assume we have a resonant circuit @ 4Hz
Assume R = 90kΩ
Assume C = 50mF

What is L?

$f_0 = \frac{1}{2\pi (LC)^{1/2}}$ $\quad (LC)^{1/2} = \frac{1}{2\pi f_0}$

$LC = \left(\frac{1}{2\pi f_0}\right)^2$ $\quad L = \frac{\left(\frac{1}{2\pi f_0}\right)^2}{C}$

$= .03146H \cong 31.5mH$

Max current flow here is 4.44e-6A @ t = .186s
3Hz 4.44e-6 t = .253sec
5Hz: 4.44e-6 @ t = .152sec
6Hz 4.4e-6 t = .124
~~4.42e-6 4.35e-6~~
10Hz 4.28e-6 t = .0707

$\cong 4.4\mu A$

We measured approx 10μA DC upon switch to DC mode.

This woneam we modify our circuit values slightly
(Peak = .3V)

Vo 211.3mV

RC 1800sec

Calc. C 16mF (~~Com~~ 110K ~~105~~ Ω

R ~~85K~~ ~~85E~~ Ω

I 1.93uA RMS 2.73uA Pe

fo 4Hz

Calc L ~ 100 mH

Power =

[redacted]

Fa. energy

RC ≅ 1800 sec

$P = I^2_{RMS} R = \emptyset.40$ microwatts

37% of 211.3 = 78.5mV OK

Measured a peak of 22 uA

C Computed = $RC = 1800\text{sec} \cdot .016\text{F} = 16\text{mF}$

$C = \frac{1800}{85E3\ \Omega} =$ ~~.021F~~

L = .099 H

≅ 100 mH

Peak Current = 2.73~~E-6~~A ≅ 1.93uA RMS

Power

Apr 23 2014

1. Photos on Gen Characteristic paper!
2. Two important notes Corey in ~~transcript~~ today.
3. There is an observation of possible diminished growth in the high frequency culture
4. We want measurements in the circuit!
   - Vo — Vmax as a fxn of f!
   - RC — Is it indeed resonant?
   - R
   - C
   - I
   - L
   - fo
   - Power
5. Study on Circuits
6. ART Strips
7. You found a good 2 meter radio? new!
8. Monitor the DC response esp potential of the ~~EM~~ developed culture
9. DNA & Enzyme kits
10. Dissection
11. Time lapse photography w/ut light on Stage
12. EM .COM worksheet is useful A a lot.
[redacted]
14. Look @ the filament based evolved culture under scope
15. We could get the RTFE machine working!

We have the safe machine out.

We now flipped the audio generator to a square wave.

We have the oscilloscope out.
A nice square wave!
How to interpret reader?
We seem to get some noise on the signal.

I have picked up to 4Hz - 8Hz signal!
I have logged it for a short session.

RAG 101 Result 7.5V AC 194mV DC

Ride Machine Puts out 200mV AC, 7.5V DC
So they are switched from one another.

Oscilloscope does not seem very sensitive to vertical gain. Pico may be much better all around.

The oscilloscope actually works very well & responds to changes down at the millivolt level.

Calibration of oscilloscope Tennax

We can easily detect a signal under

1. No attenuation
2. Max vertical gain
3. 1-~~0K~~ position 10k - perfect. Our signal is ~4.5K.
4. 4.7 mV
   Very sad

5. Peak to peak on a square wave is 1 division @ 5 mV.

10 mV is 4 ~~dis~~ divisions.
It is very sensitive

AC So we can detect a 5mV signal w/ no problem w/ our tennax scope.

AC A 1 V peak signal requires 1/10 Vertical gain attenuation w/ no vertical gain a occupies 5 divisions.
A square wave occupies only 2.5 divisions and the voltage for it is .737V (notice RMS)

So Square wave on multimeter measures RMS
Sine wave measure peak voltage.

VM meter says RMS & it is measuring Volts sine wave also.

10V requires 1/100 attenuation

Apr 25 2012

You can zoom in to control any graph

Hz	Voltage
4 (3.991)	1.744
3.689	1.76
2	1.55

Error ≈ 0.1V

$$\Delta f^2 = \left[\frac{.07136(\text{---})}{2.441} + .2772(.1)\right]^2$$

$\Delta f = .01$ Hz ??

Hz	Peak
1.528Hz	2.237V
2.812	~~2.8Hz~~ 2.417
? ~~3.053~~	~~2.508V~~
~~3.695~~ 2.913	2.441
3.615	2.441
3.695	~~2.508~~ 2.417
3.775	2.441
4.417	2.441
4.518	2.417
5.22	2.357
5.624	2.327
6.343	2.267

11 data points

$\frac{df}{dV} = f'(x)$

$df = f'(x)dV$

$\Delta f = f'(V)dV$

(f) $y = -.03568V^2 + .2772V + 1.914$

$r = .961$

$y' = -.01136V + .2772$

$.2772 = .01136V$

$V = 3.9$ Hz f_0

Repeat test

Hz	V peak
~~1.515~~	
~~1.436~~	~~2.027~~
1.913	2.327
2.629	~~2.414~~ 2.477
3.585	~~2.447~~ 2.471
4.54	2.417
5.176	2.357
5.972	2.327
~~7.007~~	~~2.237~~

$y_2 = 2.03 + .234V - .03168V^2$

$y_1 = 1.914 + .277V - .03568V^2$

$y = 1.91 + .255V - .034V^2$

$y' = .255 - .068V$

$.255 = .068V$ ~~10k~~ $y = 3.75$ Hz

Apr 26 2014

Ok !!!
Ok, better
1. Put rice machine on spare ~~oo~~ culture
2. What happens when you mix two AC signals?
3. What is the red material - gels?
4. Back to DNA work?
~~5~~ Study Enzyme & DNA Kits
6. Set up antibiotic cultures
Ok better
7. Cook like we simulate it.
8. ~~Some~~ Some significant plots are up.

Combining two AC signals in QUCS is very instructive. 4Hz & 12Hz.

The freq. seems to be always 12 Hz.
Wonder how the largest voltage was if the voltage are equal, the final voltage is still greater than one original voltage.

I have connected this of the AC source AC in series. How about parallel?

AC Sources in parallel do not work.

To set the views you want

Views
Grid Layout
Custom Layout

Setups:

Globe @ 4Hz.

Range 0-2MHz

We have an interesting artifact in here.
Peak Voltage AC is about 4.2V
4Hz this is much higher than what you took your culture measurements.
Also it is 4Hz & then 12Hz Harmonic that is strong, not 8Hz

Peak 3.3V
12hrs later

RAG101

Range 0-1MHz

Peak Voltage is about 8.5 Volts
So it is roughly double the voltage.
the 12Hz & 36Hz is also stronger than the 24Hz so they are below the same.

6V Peak
12hrs later

Ryle machine is set on Sweep
First off it is a square wave, not a sine wave.
Peak Voltage is also on the order of 8V
It is pretty on sweep
100kHz, 200kHz, ... etc

6V Peak
12hrs later

Sweep runs until you turn it off.
Range of this instrument is
0-1MHz

So there is a 25% voltage drop approx 12hrs later

This made 18 cultures
which was perfect.

Apr 27 2014

1. Lets plan on what we want to put in the culture for antibiotic testing:

1. Agar 0.5% will suffice
375ml
.005 (500ml) = 2.5gms Used ~~2.25~~ 3.5gms
2gms

So. we will use
2.5gms agar
. Sugar (how much)
Salt (how much)
liq iron (how much)
Mashed up potato - in blender
Dilute bacteria on top in solution.
50 ml solution - pipette on 2ml

+125 ml potato whipped broth
375ml

1. Heat up water to 90°C (MP=85°C)
2. Dissolve 3.25gms
3. Add 125 ml potato strained broth and heat back to 90°C.
4. add 10 ml liq iron. (the new version)
5. add 40gms fructose
6. add 10gms salt
7. Pour into dishes

Keep the temp of the mix near 90°C
>85°C @ all times

1. You should now have a perfect set of agar cultures ready for the antibiotic cards. You want to develop the cultures now. You could use an innoculation needle in a solution? How about some of both?

Projects:
~~Protein analysis of set?~~
OK 1. ~~Sensitivity Testing~~ Cultures set up.
2. Photos on paper
3. DNA & enzyme ~~test~~ study on kits
4. DNA extracts repeated?
OK 5. ~~Voltage drop~~ indicate an energy state change in the culture.
6. [redacted]
7. Dissection

Resistors in AC circuits behave pretty much like resistors in a DC circuit.

Definition of Voltage: $\frac{\text{Joules}}{\text{per Coulomb}}$ (unit of work or energy)

$V = \frac{\text{Energy}}{\text{Unit Charge}}$ $\quad V = \frac{E}{C}$ $\quad \frac{dV}{dE} = \frac{1}{C}$

$dV = \frac{1}{C} dE$ $\quad \Delta V = \frac{1}{C} \Delta E$

So a change in voltage means a change in energy. A voltage drop in the terminals means an increase in voltage in the cultures since the sum of the voltages equals the source voltage.

$C_1 R_1 + C_2 R_2 = 3V$

$R_1 = 110K$

$C_1 \frac{V_1}{I} + \frac{C_2 \cdot V_2}{II} = 3$

We measure V_1 & V_2

unknown known

So $X_1 \cdot a + X_2 b = 3$

$\left(\frac{C_1}{II}\right)(V_1) \quad \left(\frac{C_2}{I}\right)$

need to measure currents. We know I.

$\frac{35K}{110+35K} = 25\%$

This is all there is to it.

$\frac{X}{X+y} = .25$ or $X = .25(x+y)$

$X+y = 110E3$

$.25(x+y) = X$

$\frac{1}{.25} = \frac{110E3}{X}$ $X =$

Ex $I = \frac{E}{R}$

$E = IR$

but the current is a constant also.

or $R = \frac{E}{I}$

$I = \frac{E}{R}$

$\frac{X}{X+Y} = .25$ $\quad X = .25(X+Y)$

$110E3 = (X+Y)$

$X+Y = 110E3$

$\frac{X}{110E3} = .25$ $\quad X = .25(110E3)$

$X = 27.5K$

$Y = 82.5K$

You understand why what a dc offset AC circuit is now. It just moves the wave up or down but it is still a wave.

100% Positive offset means the bottom of the combined DC signal + AC is now well set on the zero line.

You now also understand why the oscilloscope has both DC & an AC measurement! They are both important & they are separate @ least within PICO. If you want to look at it from a DC offset perspective put it in DC mode! The data seems best as it shows both aspects.

Page 103

The 200t generator has a DC offset switch built into it.
This means that it is a combined DC-AC generator.

Apr 28 2014

[redacted]

[redacted]

3. 4Hz Culture was started of overnight.
4. Started w/ enzyme workflow
5. For the enzyme kit - don't make up the whole thing!
6. Enzyme kit
   Apparently I don't know Stacie?
   But what about potato?
7. Find the streamer CDB Plot & Include it.
   Drop the resolution of the images
8. Made a great plasmid solution.

Page 105

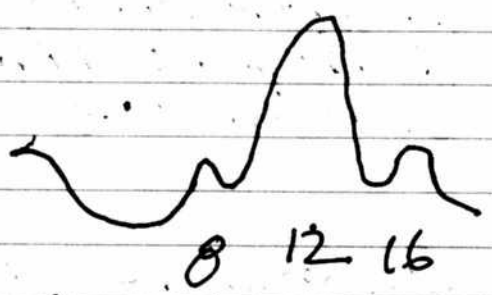
Notes
1. Image marker
2 - ELF

1. Freq. Pitfalls
2. Characteristics
3. Growth Progressions
4. Evolution
5. CO3 Isolation
6. Growth Inhibition
7. DNA
8. New Biology

Apr 29 2014

1. The agar cultures are already showing success
2. The 12 Hz cultures lobe is increasing and broadening. It is also overwhelming the DC Ø signal.

What is also very interesting is that we all subtabs at Ø & 16 Hz. Sound familiar.



There is another way of showing that you have the 4Hz fundamental.

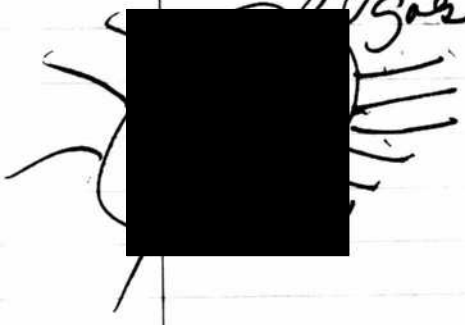
You now have 2 methods of showing this & you probably will have 3 when the EF meter arrives

Apr 30 2014 Page 107

1. Continues the EF work
   2 Hz or 4 Hz
   Use AWG as the signal generator
2. Photos on Gen Chem Paper
3. Antibiotic sensitivity test
4. Open air circulator shaker
5. Agar culture monitory
6. Website meeting tonight
7. Enzyme & DNA testing
8. Forensic Course is Comp?

Oscilloscope DC means everything goes in, not just DC signals.

The DC offset knob on the global generator goes both negative and positive.



May 01 2014 Page 108

1. Test Capacitance of culture
   How?
   Can an oscilloscope be used?
   Is there a way to make a capacitor
   Ebay electronic kit?

Failed ~~2. Time lapse photography of aga cultures~~
~~3. Antibiotic testing~~ ?
4. Next cultures less potato
5. Compare meters - 60 Hz reference?
6. Enzyme & DNA testing - study
~~7. Photos & video on page~~
8. Forensic course coming?
~~9. Staff meeting tonight~~
10. Continue to study oscilloscope & theory -
11. Culture up Vitamin C on top -

12. How to determine the value of an inductor

[redacted]

~~14 Vacuum test on culture~~!

We have something very strange taking place,
after a short cooled up the sept machine
we disconnected the probe.
Stand alone, you now have some type of
resonant frequency being generated (stand alone!)
of 67kHz.

May 02 2014

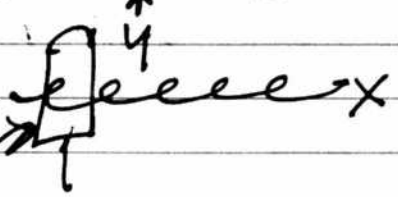
[redacted]

2 Our measurement is @ 66E.67K.
As Close as is possible.
666 !?? Strange here.
3. Sensitivity process has started.
4. I want to Examine a Capacitor in the Scope.
5. Enzyme & DNA testing
6. Forensic course is coming.
7. Make a culture w/ Vit C
8. Determine the value of an inductor
9. Compare meters on 60Hz. reference

Discovered solar on mural

1. You had a probe set @ 10X so you were missing the entire signal, especially the PICO AWG!

2. You have found that the EM field is strongest at the ends of the inductor and at 90° and vertical



Also you are setting up to to 130 mV on the new culture as no offset and it is also pulsing @ 67K.

Interesting that the AWG is not working w/ respect to the spectrum at all!

I have no idea. Maybe it is the probes???

Yes it is the probes!!!!

The probes are knocking out the 60Hz signal!

They have filters with them to reduce that all together

Even the BNC cable fails here. Not seriously.

Use only voltage measurements w/ the AWG.

It was because you had 1kHz set instead of 1Hz. BNC works fine!

It was fine. You had the signal generator set up improperly.

Very interesting. if AWG signal falls below 400 mV the oscillation of the meter becomes very slow but remains large!

The needle can actually behave both ways both long period and short period oscillations are possible.

AWG has a mean voltage of 250 mV but very easy to detect.

The cell senses up for superior to the Earth Field

Believe it or not, the strongest signal look like it was at 20 Hz. This could explain why the cultures didn't do well.

You can pick up the 60 Hz signal all by itself w/ a simple inductor.

What we know now is that the signal @ 20 Hz is actually very strong but that they exist @ 2 Hz intervals. The cultured @ 20 Hz grew took off.

SIN RAGS is best for growing - 20Hz

Global Rate is best for killing 67kHz

PULSE DC offset

On the potato culture we are down to 30mV now. We were @ 40.

The culture w/out the potatoes went up to 120mV.

We now have two positive offset clocks @ 67K. Good

We have one grower @ 20Hz.

We should probably run a test on the RIFE culture.

You have a significant diff occurring between the two cultures.

The kill test was with a potato culture that was up and running. 67K Hz DC offset should a noticeable effect upon the potato aspect of the culture.

Also the potential on the culture is on the order of 30 mV; At one point it was 40 mV.

The of the culture has no potato but was allowed to flavour and it did. You seemed to have a potential of up to 140 mV @ that time.

Now you are subjecting it to the Global @ 67K w/ DC offset. The potential seem to have Globrabically reduced to on the order of 10 mV. There is however, no noticeable diff in the culture.

The 20Hz Ext culture, no potato yeast took off & completed w/in 24 hrs. You have reset, but not redone, this culture, once again @ 20Hz.

The 67KHz seems to be an ambient frequency, however??!?

May 03 2014

1. First observations:
   1. Vacuum Chamber culture appears to be on hold, non vacuum continues to develop

2. 67kHz ~~non offset~~ offset Global
   We have a parallel alignment taking place vs a radial alignment.
   It is a ~~NE-SW~~ NW-SE alignment
   No idea why at this point other than it parallels the inert probes?

3. 20Hz non offset RAG non offset culture
   A dedicated ELF culture
   2nd generation, replenished but not rotated
   Appears to be developing modestly well.

4. 67kHz Rife Offset
   Culture inhibition appears to have stabilized. We have a yellowish tint that has been taken in solution.
   This strongly passed a NIH test under more moderate alkaline conditions. Potatoes are clear & we seem to show protein degradation.
   The potential still measures at 180.5 mV but this does show a marked decrease (it may decrease anyway).

1. Time to get the enzyme project going again. Also looking for proteases!
2. Need the potentials of all cultures.
3. There is a huge spike on the 61kHz signal. Where does it come from?
4. Why is the 20Hz signal so strong? What is its relation to the 2, 4 Hz even and odd harmonics?
5. Is a reset vs replenished GLF culture for experiments? Notice no potato juice needed for rapid production.
6. Antibiotic testing is really important: You only get 2 chances.
7. Time lapse would be valuable.

(1) Three different electrical cultures are running.

#1. An existing culture that is well developed. Developed under conditions of 67kHz Pulse WITH NO OFFSET. No Potato.

Subsequently you have applied an offset to it w/ the Global Pulse.

#2. A raw EF culture @ 20Hz Sine Wave. Brand new. No Potato.

#3. A new culture w/ Potato Subjected to 67kHz Rife w/ offset Pulse, Watching for inhibition of culture growth esp. the potato which is included.

Record pertinent potentials & observations @ 24hr intervals.

(2) You have more photographs up on Characteristics paper.

3. You examined resistivity tests.

@500X : 1 pixel = .054 microns.
@500X : 1 pixel ≅ 0.54 microns

Filament Growth Rate Estimates.

Magnification

$$\frac{2740 \text{ pixels}}{(14\text{cm}/.19)} = \frac{1 \text{ pixel}}{X} \qquad X =$$

or $\frac{2740 \text{ pixels}}{73.68\text{cm}} = \frac{1 \text{ pixel}}{X}$ $X = .0269$ cm $= 268.9$ um

but this assumes 1 to 1 magnification

but in fact magnification is 500

so $\frac{1 \text{ pixel}}{(268.9\text{ um}/500)}$ $\frac{1 \text{ pixel}}{0.54 \text{ microns}}$

926 − 584 ≅ 184 microns in 69 minutes

$\frac{184 \text{ microns}}{69 \text{ min}} = \frac{X}{1}$ $X = \frac{2.7 \text{ u/minute}}{160}$

$= .5$ microns / hour

$= \frac{3854}{115625}$ microns / day

$= .9$ microns / month

$= \frac{138750}{100187}$ u / year.

$= 1.4$ m / year

$= 4.43$ inches / year

$= 43.4$ inches / year.

$\cong 4.5''$ / month

~ 200 μM per hour

More Accurate Crude Estimate

x	y
736,	~~+315~~ 1368
473 /	673

Δ = 263 695 d = 743 pixels

@ Mg = 500 x

1 pixel = 0.54 μm

So d = 743 (.54 μm) = 401.3 μm

in 2 hrs ~ 200.6 μm/hr

~ ~~200~~ 200 / 144 microns / hour

= ~~.192~~ E3 μm / month

.14 ≈ ~~.012~~ miles / month

≈ ~~2.03~~ inches / month

5.5" per month

---

1 tsp = 4.93 ml 1 tbsp = 14.79 ml

1/8 tsp ≈ .62 ml
1/4 = 1.23 ml
1/2 = 2.5 ml
1 = 5 ml
1 1/2 tbsp = 7.4 ml
1 tbsp = 14.8 ml

@5000X : 1 pixel ≅ .054 microns.
@500X : 1 pixel ≅ 0.54 microns

Filament Growth Rate Estimates.

Magnification

$\frac{2740 \text{ pixels}}{(14\text{cm}/.19)} = \frac{1 \text{ pixel}}{X}$ $X =$

or $\frac{2740 \text{ pixels}}{73.68\text{cm}} = \frac{1 \text{ pixel}}{X}$ $X = .0269\text{ cm}$

$= 268.9\ \mu m$

but this assumes 1 to 1 magnification

but in fact magnification is 5000

so $\frac{1 \text{ pixel}}{(268.9\ \mu m / 500)}$ $\frac{1 \text{ pixel}}{0.54 \text{ microns}}$

500 0.54 184 microns

926 − 584 ≅ 342 microns in 69 minutes

$\frac{184 \text{ microns}}{69 \text{ min}} = \frac{X}{1}$ $X = \frac{2.7\ \mu/\text{minute}}{160}$

$= 45$ microns / hour

3854

$= 315$ microns / day

115625

$= 9015$ microns / month

1387508

$= 10818\ \mu$ / year.

1.4

$= 11\ m$ / year

$= 443$ inches / year

$= 43.4$ inches / year.

$\cong 4.5''$ / month

May 4 2014 Page 121

1. Only 1 hr left today, leave Camping
2. We have a letter Rebuttal for the cultures
3. Measure potential of cultures
4. How to measure the inductance
5. Examine Sensitivity Culture
6. Examine a Capacitor on Scope
7. Try out the new inductor
8. Forensic Course is coming
9. Make a Culture of Vitae

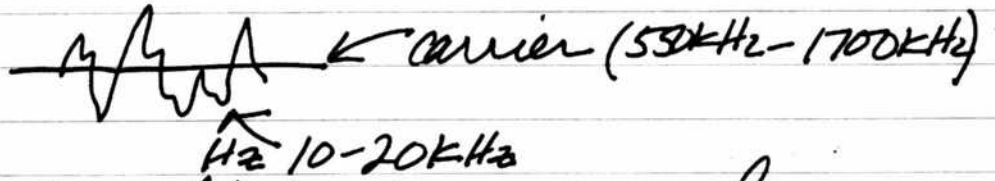
1. 12 & 20 Hz verified easily. W/ new Coil.

May 06 2014 Fish Creek

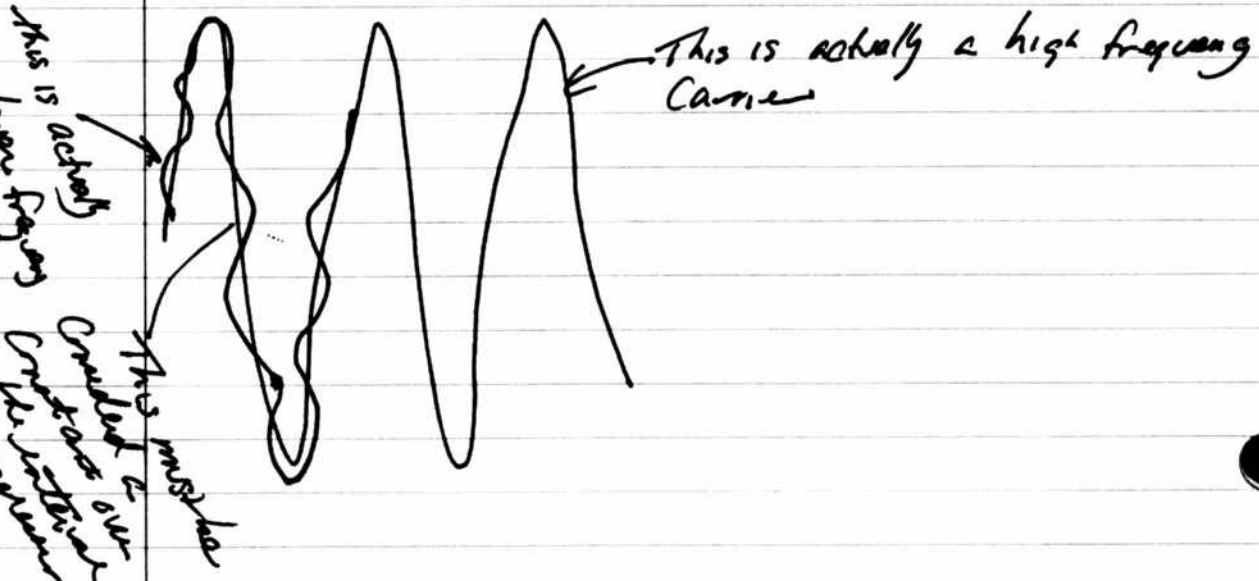
You understand radio now. This is great.
But you still have a question.
If you "impress" or modulate a lower frequency signal on a higher frequency signal how can the wave form be made jiggly?

See p 419 Scherz.

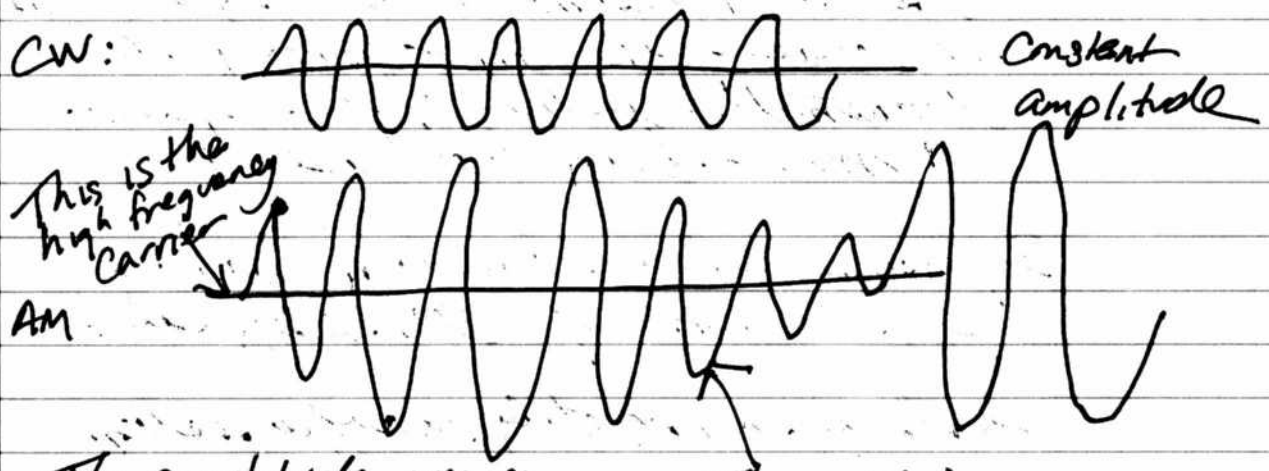
The answer lies in the fact that the high frequency signal is considered essentially to be a constant over the time interval of impression or modulation.



Also the amplitude of the carrier is large relative to the modulated signal.
In reality it should be something like



The picture you have is not exactly accurate



The amplitude varies

This is the low frequency audio signal

P83 & P419 Scherz
illustrate exactly my question.
Ie the role of the high frequency carrier
vs the low frequency "impression"

Remember the audio frequencies in radio are
constantly changing between 10-20kHz.
They are not constant at all

So ELF modulation, by definition, would change also.

What you need to see is an animation of
a AM signal

Notice
Radio & Electromagnetics are NOT Chemistry
but they are just as important.

Harris:

"An AM transmitter literally increases and decreases the output power of the transmitter in time w/ the speech & music being broadcast."

So, assume we have a very strong carrier eg a SW station w/ 500kW signal.

So this is an incredibly powerful & strong signal.
But it nevertheless is a frequency & a fairly high freq @ that, ie several MHz.

But now you are going to impose a constantly changing lower frequency of music, lower amplitude.

* What does the waveform look like?

It will, somehow, look like an AM signal —

May 07 2014 Page 125

[redacted]

2. Inspect all cultures!
   1. ~~Vacuum & Aircraft~~
   2. ~~Hovabator Status~~
   3. Open Air Cultures
      Potential Mgmts
      ~~Broths @ bottom~~
   4. ~~Sensitivity Test~~
3. ELF work
   Simulate AM sideband
   FM transmission
   VLF paper
   Schumann
4. How to measure inductance of a Coil
5. Examine a capacitor on the Scope
6. Forensic course coming in 11 days
7. Make agar culture w/ Vit C
8. ELF verified daily @ 12 & 20 Hz
   Now for 4 Hz?

~~9. EPA HF Spectra posted~~
10. Bio feedback

[redacted]

40x @ 5000x /pixel = .054 um
10x @ 1250x " ~~.0135um~~ .216um
4x @ 500x " = .54 um

500x:
1503, 1279 Δ =
1578, 1401

Δ 75 122 d = 143.21 pix
143.21(~~.216um~~) = ~~30.9um~~
≈ ~~31um~~ .54 = 77 um

@ 1250x =
1559, 1459
1706, 1726
Δ 147, 267 d = 304.8 px
304.8(.216) = 66 um

@ 5000
~~1112, 1090~~
1022, 1144
1750, 2258
Δ = 728, 1114 d = 1331 pix (2) = 2662 px
~~2662~~ 2662(.054) =

Distortion

@ 5000 again?

932, 1280
1664, 2330
Δ 732, 1050 d = 1279

but 50% reduction means d = 2559 px

2559(.054) = 138 microns.

There is a problem here. Yes, see below

100%:

1541, 914
1908, 2157
Δ = 367, 1243 d = 1296

1296(.054) = 70 microns.

You cannot use the 50% reduction factor – why?

5000X 100%
Δx 3655
Δy 2740 px

50% reduction:
Δx = 3655
Δy = 2740

So even @ a reduction level the no. of pixels in the picture is the same –

71
66
70

x = 71 μm

Start May 07 2014 0715

1. We now have 3 cultures in place.
No potatoes

(1)	(2)	(3)
Soya	"	"
Salt	"	"
CDB	"	"
Lg Iron	"	"
Heat		
67kHz	12Hz	67ckHz
offset	AC	offset-
Global	RAG	Rate
Pulse	Sine	Exp Pulse Decay
Potential ~ Ø	~ Ø	~ Ø

May 08 2014

~~1. Check cultures status & potentials~~
2. ELF work
    1. Simulate sideband
        YouTube
        QUCS
[redacted]
4. How to measure inductance
5. Examine a capacitor on telescope
6. Forensic course coming in 10 days
7. Make agar culture w/ VitC
8. ELF verified, 60kHz FM or AM?
    Information content of sideband?
9. Purchase Antenna? Keyer?
10. Purchase AC-DC meter, pipette
11. DNA extraction & enzyme
12. Electromagnetic work & VitC on agar culture

"

Modulation is manipulating" the carrier wave to carry useful data.

AM is one type, there are many.

In AM, ~~the amp~~ variation in use the amplitude of the voice wave will be to vary the amplitude of the carrier wave.

The carrier wave is what is effected.

If we zoom in on the AM signal (ie combined) it will stretch the band upon the carrier wave.

The general outline of the combined wave is the audio wave but if you look @ it zoomed in ya will see that the carrier wave dominates it. The whole wave is actually a single frequency (ie the carrier wave)

1. What is the LC circuit for a 67kHz signal?

2. How do we amplify a signal?

67kHz signal
Inductor 150 H
Capacitor = .04 pF
= ~~40~~ nF
= ~~40,000~~ uF
Ratio of capacitance = 260 to 1.

4Hz
150Hz
10.5 uF
This seems very doable.

Our smallest
Capacitor is .001 uF
= 1 nF vs 40 so not terrible
Ratio = 10,500 to 1
off by a factor of 40 to 1
Let's try it.

We seemed to have turned into the 67kHz signal but we used a 10 uF instead? that is backwards. I do not understand that behavior.

Let's try the resonance code @ 67kHz

Notice the Rife machine is also a pulsed wave form, apparently with an exponential decay.

There is something called a ~~EDFL~~ ETDFL frequency

Harmonic Waveform

May 09 2014

1. Record potentials of circuit
2. Monitor temperatures
3. Enzyme & DNA study
   Can we identify protein from tissue?
4. Impulse wave? Study sideband, simulate sidebands?
5. Measure inductance
6. View Capacitance
7. Forensic course in 9 days
8. Agar culture of Vitc & electromagnetics on culture
9. Purchase Antenna, keyer
10. Purchase AC-DC machine, pipette
11. DNA extraction kit

$$f_r = \frac{1}{2\pi (LC)^{1/2}}$$

$$(LC)^{1/2} = \frac{1}{2\pi f_r}$$

$$LC = \frac{1}{4\pi^2 f_r^2}$$

$$C = \frac{1}{4\pi^2 f_r^2 L}$$

$f_r = 4\,Hz$
$L = 1SD\,H$
$C = 10.5\,\mu F$ Check

Which is essentially no capacitance at all.

$f_r = 6.7E3\,Hz$
$L = 1SD\,H$
$C = .04\,pF$

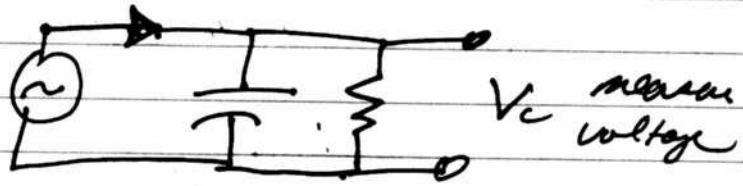
How would you convert a high frequency to a lower frequency to be called heat?

On our 67KHz the modulation index appears to be at least 50% if not greater.

Bandwidth = $2F_m$

∴ So @ most we think this is 2(20Hz) = 40Hz

"Envelope Detector"



$$\text{Bandwidth} \ll \frac{1}{2\pi RC} \ll f_c \quad c = \text{Carrier}$$

$$40\text{Hz} = \frac{.1}{2\pi RC}$$

$$\therefore RC = \frac{.1}{2\pi \cdot 40} = .0004\text{ sec} = .4\text{ mS}$$

$$= 4\text{E-}3\text{ sec} \quad (= 2500\text{ Hz}) = 2.5\text{KHz}$$

This would seem to work.
I have a 1000 uF Capacitor.

$$RC = 4\text{E-}3\text{ sec}$$

$$R = \frac{4\text{E-}3}{1000\text{ uF}} = 4\ \Omega$$

We have a 220 uF & a 22 Ω

So RC = .005 S = 5 ms Lets perfect.

$$40\,Hz \overset{?}{\ll} \frac{.1}{2\pi RC} \overset{?}{=} \frac{.1}{2\pi(220E\text{-}6)(22)}$$

$$= 3.29$$

No, 40 is not $\ll \frac{1}{2\pi RC}$

Choose a smaller Capacitor 10 uF

$$\frac{1}{2\pi(22)(10E\text{-}6)} = 722.6$$

40 Hz $\ll$ 722.6 $\ll$ 6.7 KHz

So yes this is true.

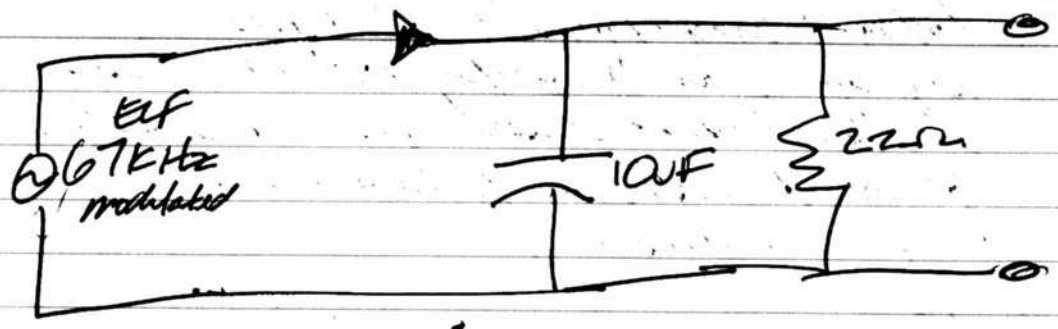
Now test his case.

$$\frac{1}{2\pi(500)(1E\text{-}12)} = 318\,MHz.$$

B = 60 MHz $\ll$ 318 MHz $\ll$ fc (unknown)

So our approach is a
Diode
22 Ω resistor
10 uF Capacitor

I used a Silicon Diode



I made this. and detected a clean 25 MHz signal. by looking closely @ the 67 K Hz signal.

You got exceptionally clean pulses by

But I set. equally good results with.

Nail 150

This is tuned to 4Hz?
I set 67KHz well

AM Radio picks it up. harmonics 603

I have done an incredibly good job today of amplifying the 67kHz signal w/ the amplifier circuit than I have built based upon a transistor. You could never ask for more than I have done.

The signal is very real & has a wavelength of approx 280 miles. It should cover the globe and easily the country.

Now a very big question. Can you apply the amplifier circuit to ELF detection?

We have done some very good work here today. It was slow but you see a little more of the puzzle.

You have 3 components.

1. It looks like there is a 25 MHz carrier
2. It looks like it is modulated by a 67kHz impulse AM
3. It looks like ambient ELF of fundamental of 4Hz.

You have also learned how to amplify a signal which is marvelous.

Page 141

EduTek

Electronics For Students, Teachers & Engineers

CIRCUIT BRICKS

Audio Transistor Amplifier

PROCESS

UPDATED: 20:55 21 October 2013

FUNCTION BLOCK

DESCRIPTION

- An audio amplifier will amplify an low voltage AC signal. The output will be a larger version of the input signal.
- The difference between these 2 signals is called the Gain.
- This is a general purpose amplifier that will work at most voltages and gives a Gain of about 75.

This worked fantastic on the 67kHz signal and amplified it approx 6x from 20mV to 120mV

CIRCUIT DETAILS

The gain of the amplifier can be calculated as

G = (R1/R3) x *hfe*

You can alter the values to adjust the gain but do not exceed more than 150 as this can cause the circuit to become unstable. The values chosen in this case are to give an all round performance at most voltage levels.

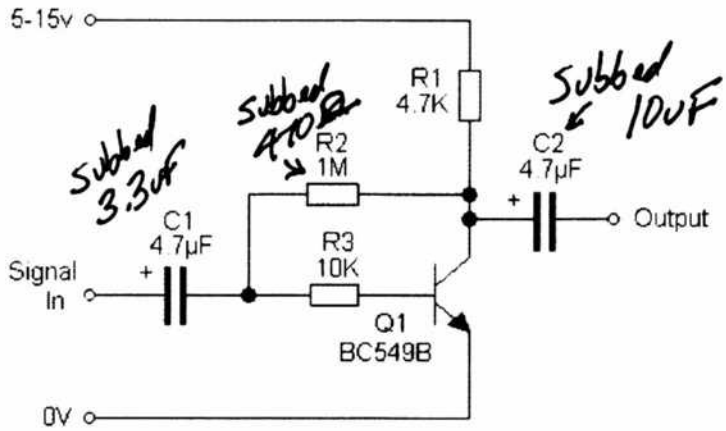
Input

Signal In
This is the input signal and should not really be greater than about 100mV (0.1v), otherwise the output could be distorted
C1 decouples the input from any DC signal. It should be removed if the circuit you are connecting to also has a decoupling capacitor on its output.

Output

The output will be an amplified version of the input and inverted (ie. when the input goes positive, the output will go negative - and vice versa).

Circuit Diagram



Subbed 3.3uF
Subbed 470R
Subbed 10uF

Page 141A

DESIGN POINTS

Shown right is a graph comparing input and output signals. The gain is set at -10 for better illustration, (the minus means it's inverted)

If the signal sounds distorted, it is likely that the wave is clipping. This is when the top and bottom of the sound wave are lost, clipped. This is because the amplifier cannot produce large enough output voltages due to the supply voltage being too low.

If viewed on an oscilloscope it might look something like the lower graph.

There are a few ways to get around a clipping output. Try the following:

1. Increase the power supply voltage - but do not go above 18 volts.
2. Reduce the input signal using a volume control (preset or potentiometer).

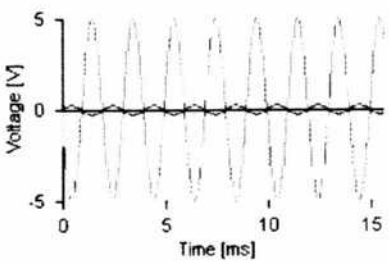
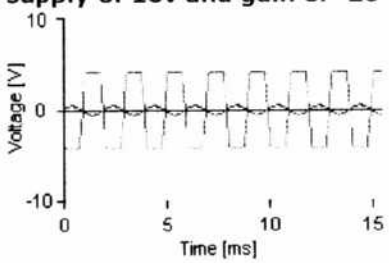


Illustration of 'clipping' with supply of 10v and gain of -20



COMPONENT DETAILS

NPN Transistor

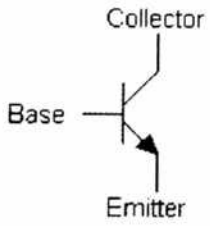
This can be any general purpose type such as one of the following:

- BC184
- BC108
- BC109
- BC549

Pin connections

C B E

Symbol connections



For more transistor options, go to the NPN Transistor Specifications page

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Written by Phil Townshend - 2008

Return to CIRCUIT BRICKS Menu

Return to top of page

ECE 2111 Signals and Systems
Spring 2009, UMD
Experiment 8: Modulation

Objective: Students will gain understanding on the concept of modulation, and the visualization of modulation signals.

Equipment and Material

- Rohde & Schwarz FSH3 Spectrum analyzer
- 2-Function Generators
- Oscilloscope
- Power supply: +18v, -18v
- LF356 operational amplifier
- VCR2N JFET
- Diode 1N4148
- Capacitors and resistors
- Breadboard

Background

Before going to the lab carefully read the following section, and answer the pre-lab questions. Be sure that you understand all the material presented here. From the textbook read Chapter 6: sections 6.1 and 6.2.

1. - Modulation

Modulation is a process that causes a shift in the range of frequencies in a signal. Before discussing modulation, it is important to distinguish between communication that does not use modulation: **"Baseband communication"**, & communication that uses modulation: **"Carrier communication"**.

The term baseband is used to designate the band of frequencies of the signal delivered by the source. For example, in telephony the baseband is the audio band (voice signals): 0 to 3.5 KHz. In television, the baseband is the video band occupying 0 to 4.3 MHz.

In baseband communication, baseband signals are transmitted without modulation, that is, without any shift in the range of frequencies on the signal. Because power can not be transmitted over long distances, the baseband signals cannot be transmitted over a radio link but are suitable for transmission over a pair of wires, coaxial cables, or optical fibers.

By modulating several baseband signals and shifting their spectra to non-overlapping bands, one can use the vast spectrum of frequencies available.

Communication that uses modulation to shift the frequency spectrum of a signal in known as **Carrier Communication.** In this mode, one of the basic parameters: **amplitude, frequency**, or **phase** of a **sinusoidal carrier** of high frequency ω_c is varied in proportion to the baseband signal **m(t).** This results in amplitude modulation (**AM**), frequency modulation (**FM**), or phase modulation (**PM**), respectively.

2. Amplitude Modulation

Amplitude modulation (**AM**) is characterized by the fact that the amplitude of the **carrier**, **$\cos(\omega_c t)$**, is varied in proportion to the **baseband signal (message) m(t),** the **modulating signal**. The frequency ω_c is constant.

In **AM** signals, the amplitude of a carrier is modulated by a signal **m(t)**, and the information content of **m(t)** is in the amplitude variations of the carrier. If the carrier amplitude is made directly proportional to the modulating signal **m(t),** the modulated signal is:

A m(t) cos(ω_c t). Then the **AM** modulation shifts the spectrum of **m(t)** to the carrier frequency, as represented in the following expressions:

- time domain -		- frequency domain -
$m(t)$	$\longleftrightarrow$	$M(\omega)$
$A\, m(t) \cos \omega_c t$	$\longleftrightarrow$	$\frac{A}{2}\left[M(\omega+\omega_c) + M(\omega-\omega_c)\right]$

The term $\mathbf{M(\omega - \omega_c)}$ means that $\mathbf{M(\omega)}$ has been shifted to the right by ω_c, and in the term $\mathbf{M(\omega + \omega_c)}$ the spectrum $\mathbf{M(\omega)}$ has been shifted to the left by ω_c. Then the process of modulation shifts the spectrum of the modulating signal to the left and to the right by ω_c. Also if the bandwidth of **m(t)** is **B Hz**, then, as seen in Fig. 1, the bandwidth of the modulated signal is **2 B Hz**. Also in Fig. 1 it is shown that the modulated signal spectrum centered at ω_c is composed of two parts: a portion that lies above ω_c, known as the upper sideband **(USB),** and a portion that lies below ω_c known as the lower sideband **(LSB).** This is called a modulation scheme with double sidebands.

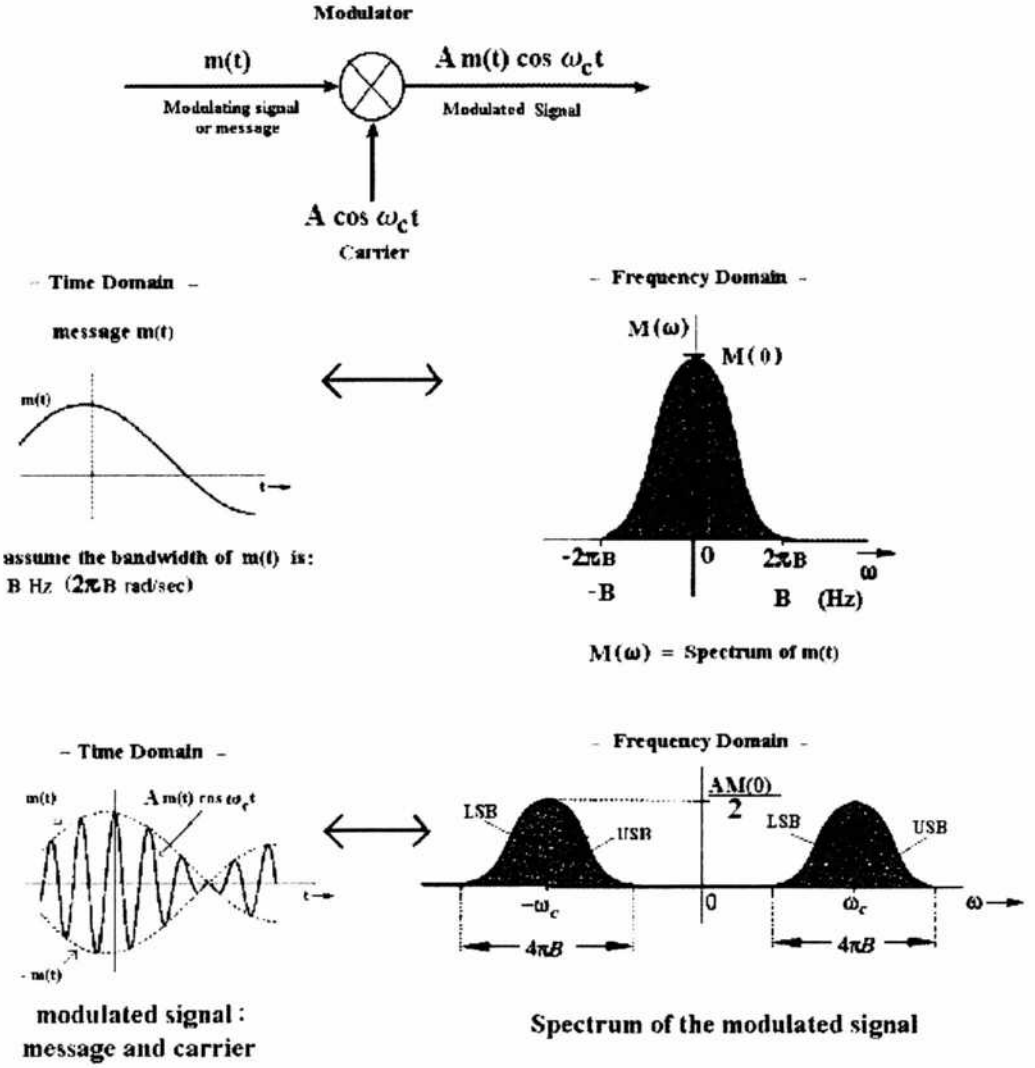

Fig. 1. Amplitude Modulation: Double Sideband

or 2πfc Page 142 B

The relationship of **B** to ω_c is very important. Fig. 1 shows that ω_c has to be greater than (**2*Pi*B**) in order to avoid the overlap of the spectra centered at ω_c and $-\omega_c$. If ω_c is less than (**2*Pi* B**), then these spectra overlap and the information of **m(t)** is lost in the process of modulation.

3. Demodulation of AM Signals.

The simplest method to demodulate an AM signal is using an **Envelop Detector**. In an envelop detector, the output of the detector follows the envelop of the modulated signal.

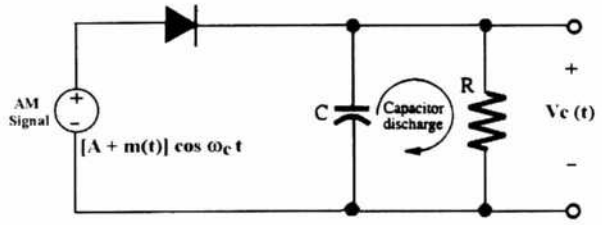

Fig. 3. Envelop Detector Circuit

The circuit shown in Fig. 3 functions as an envelop detector. On the positive cycle of the input signal, the diode conducts and the capacitor **C** charges up to the peak voltage of the input signal. As the input signal falls below this peak value, the diode is cut off. The capacitor now discharges through the resistor **R** at a slow rate, with a time constant **RC**. During the next positive cycle, the same action happens. During each positive cycle when the input signal becomes greater that the capacitor voltage, the diode conducts again. The capacitor again charges to the peak value of this new cycle. The capacitor discharges slowly during the cutoff period, thus changing the capacitor voltage very slightly.

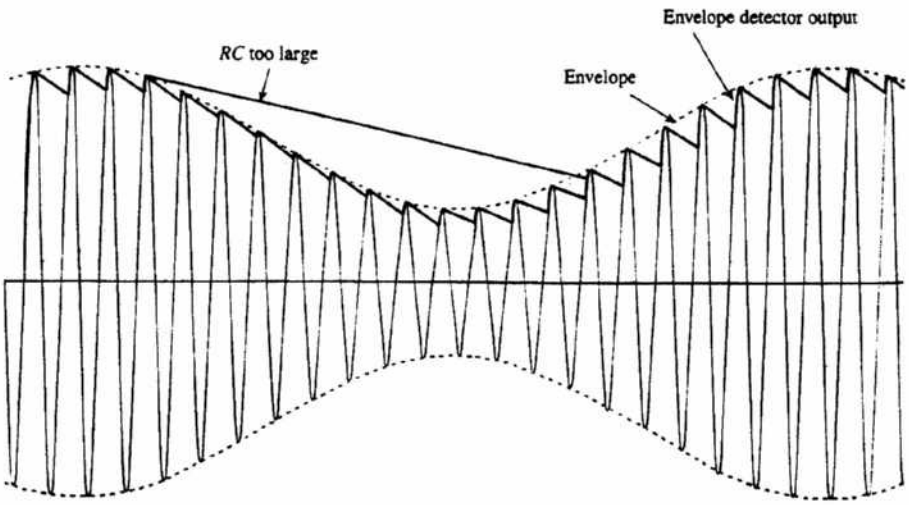

Fig. 4. Envelop Detector for AM

During each positive cycle, the capacitor charges up to the peak voltage of the input signal and then decays slowly until the next positive cycle as shown in Fig. 4. The output voltage $\mathbf{v_c(t)}$ closely follows the envelop of the input. The discharge of the capacitor between positive peaks causes a ripple signal of frequency ω_c in the output. This ripple can be reduced by increasing the time constant **RC** so that the capacitor discharges very little between the positive peaks ($\mathbf{RC >> 1 / \omega_c}$) .

However, making **RC** too large, would make it impossible for the capacitor voltage to follow the envelop. Then **RC** should be large compared to **1 / ω_c**, but should be small compared to **1 / 2 π B**, where **B** is the highest frequency in the message **m(t).** This requires that $\omega_c >> 2\pi B$, a condition that is necessary for a well-defined envelope. The output of the envelop detector is $v_c(t) = A + m(t)$ with a ripple of frequency ω_c. The DC term **A** can be blocked out by a capacitor or a simple RC high-pass filter. The ripple may be reduced further by another low-pass RC filter.

PRE LAB

Before going to the lab answer the following questions.

AM Modulation

1.-Consider the message **m(t)** given by a triangular wave with frequency **500Hz**, and amplitude **A**. Assume that you modulate this message using the carrier: $\cos(\omega_c t)$, where $\omega_c = 2\pi(15\text{ kHz})$

a) Sketch the modulated signal in the time domain
b) Sketch the modulated signal in the frequency domain

2.-Consider the message **m(t)** given by a square wave with frequency **500Hz**, and amplitude **A**. Assume that you modulate this message using the carrier: $\cos(\omega_c t)$, where $\omega_c = 2\pi(15\text{ kHz})$

a).- Sketch the modulated signal in time domain
b).- Sketch the modulated signal in frequency domain

3.-Consider the message **m(t)** given by a sinusoidal wave with frequency **500Hz**, and amplitude **A**. Assume that you modulate this message using the carrier: $\cos(\omega_c t)$, where $\omega_c = 2\pi(15\text{kHz})$

a).- Sketch the modulated signal in time domain
b).- Sketch the modulated signal in frequency domain

LAB PROCEDURE

General Instructions

- To avoid damage to the electronic components, keep the power supply off during the assembling of the circuits.
- After each part of the experiment is done, make sure that you show to your TA or instructor the performance of your circuit to verify that your results are correct. This also serves to monitor your progress and performance.

1. A simple AM modulator

The circuit diagram of a simple AM modulator is shown in Fig. 5. This circuit implements a two-quadrant multiplier using a n-channel junction FET, the VCR2N, that works as a voltage-controlled resistor (VCR), and an operational amplifier, the LF356.

1.1. Prepare circuit of Fig. 5:

Keeping the power supply off, assemble the circuit of Fig.5. To generate the carrier and the message you will need two signal generators. For the carrier use a sine wave, 100mVpp, 15 kHz, no DC component. For the message you will use three types of waveforms: sine, square and triangular. Each signal having amplitude of 5Vpp, and a frequency of 500Hz.

Carrier = 100mVpp, 15 kHz, sine wave, no DC component
Messages:
i) $m_1(t)$ = 5Vpp, 500Hz, sine wave, -2.5V DC component
ii) $m_2(t)$ = 5Vpp, 500Hz, square wave, -2.5V DC component
iii) $m_3(t)$ = 5Vpp, 500Hz, triangular wave, -2.5V DC component

You will report the results of the modulation, in the time domain, and in the frequency domain, for each message.
Time Domain (oscilloscope):
Sketch and measure: Carrier (t), m(t), and Output (t)
Frequency Domain (spectrum analyzer):
Sketch and measure: Carrier (f), M(f), and Output (f) up to 50kHz

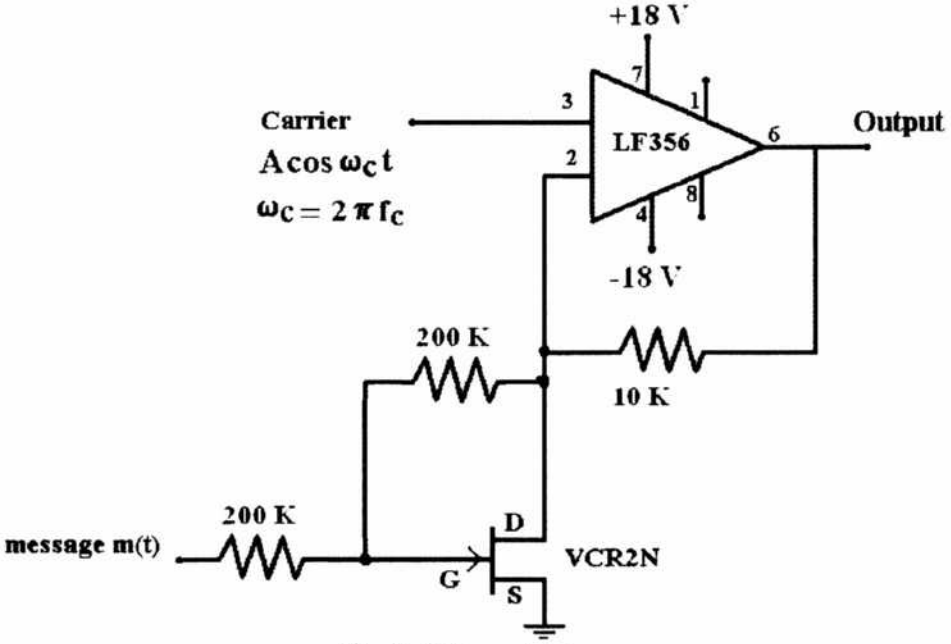

Fig.5. AM modulator

Page 142 E

2. Envelop Detector

2.1. Prepare circuit of Fig. 6:

Fig. 6 shows an envelop detector circuit. The design equation for this circuit is : $fco = 1/(2\pi R_1 C_1)$ where fco is the cut-off frequency of the low-pass filter R_1C_1. The capacitor C_2 is a coupling capacitor, chosen such as $C_2 > C_1$

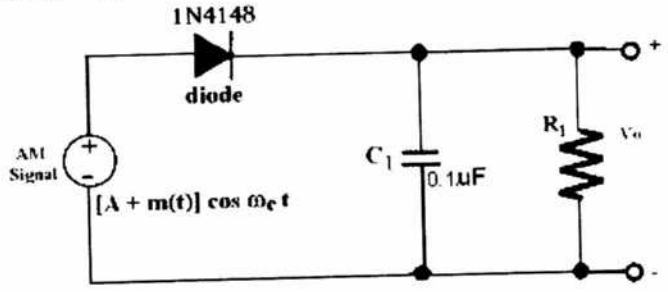

Fig. 6. Envelop Detector Circuit

Connect this envelop detector to the output of your modulator (circuit in Fig. 5). The signal at Vo(t) should be your recovered message.

Report the results of the envelop detector circuit, in the time domain, and in the frequency domain.

- Time Domain (oscilloscope):
  Sketch and measure: AM signal(t), and Vo(t)

- Frequency Domain (spectrum analyzer):
  Sketch and measure: AM signal(f), and Vo(f) up to 50kHz ?

POST LAB

For each case compare the theoretical plots with the experimental plots and discuss the differences.

Post Experiment (Report) Requirements:

1- Every student must have his own individual lab report.

2- The report should include the following:
   a) Results with detailed explanations are needed.
   b) Answer the questions if there are any.
   c) Conclusion - what did you learn in this experiment? Please write only a few lines.

3- All reports should be word processed and should also have the assigned cover page.

Inductance ✓ 15 mH

N32W

OK it is getting close to move on other than wait for a [redacted] & collect more info on [illegible]

Wallace 47.4741 N
115.9279 W

67·2^n

67.2
67·10

67.n

n=10

60.3 KHz
60.7

670
674

67.0
vs 67.4

Gakona
62.3047N
145.2733W

Gakona

DC Amp 8.3mA

Bearing is 322° 47′ 06′ (initial) = 322.785°
Distance = 2460 km (1529 mi)
(1528.515 mi)

= N37°W

I measure close to N35°W

15H Coil

15DH

150mH

15H

Note: After 2 days, the ELF culture in (RAS) 20 Hz produces a potential of 2000 mV.

The Global 67 KHz DC offset is producing a potential of 0.

The Rife 67 KHz offset exp. decay is producing a potential of 20 mV.
These appear to be important differences.

May 10 2014.

1. Enzyme & DNA study - gel?
2. Forensic course in 8 days
3. Purchase AC-DC machine, pipette
4. Purchase antenna, keyer
5. DNA extraction kit
6. measure inductance
7. Measure Capacitance
8. Agar culture w/ VitC & electromagnetics
9. Protein analysis of filtrate

[redacted]

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1. Typo
2. It is allowances —

2. insect-like form requires best more complete observation & recording —

the spots I saw, I regard as perhaps normal as well as the surface swelling material

pink fluorescence is actually of great interest since it can be correlated to pickings
I just posted

3. had time w/ some scalebugs on Choice of Size
fig 6-1

4 spherical forms that formed root like ob
Do you think these are different
from images on growth progression paper

We notice today that filaments of "protein" are forming in the RITG culture dish 46 hrs after inception w/ incubation. @ V=200mV

Notice the culture Rufe may be developing differently w/ the potato combined w/ the frequency VS the frequency alone!

This could end up being important. The potato might be releasing something that is making the frequency beneficial.

Here is what we learn next. AM audio output test on the scope went perfectly. You also learn that a radio DOES NOT output the carrier frequency. You don't want it. So it stays out. That is why a radio is so cool.

The would imply that your 67kHz signal is what? Is it a modulated signal or a carrier?

On the cultures you learn that

1. Global clean pulse offset @ what voltage appears to produce the most COB and turn potential to zero very quickly.

2. The 67kHz type seems to produce the most advanced growth the quickest. ie filaments or lost electrodes

3. ELF culture w/ sine wave seems to be a modest level in between

4. What does the 67kHz output from the radio look like? Good, look this again

PASSIVE MODE:
On culture # 1 we are seeing something interesting
There is a: 22.47 22.45 22.47 22.44 kHz
strong signal AVG = 22.45 KHz signal
that is strong.

This in addition to a very broad peak @ 67kHz.
Actually it ranges from ~~50~~ 61-67 kHz.

We also have the 1st harmonic of 22.45 kHz
@ 44.90 kHz last week.

Essentially we have a lot happening. but a very
broad peak @ 64 61-67 kHz

Notice this culture produced the greatest growth.

Question was the DC offset on scope line? What about the first shot it was a pulsed wave just like you are detecting a analyte ???

What about the first shot appears to be modulating? and if so with what?

It appears as if it is being modulated with the 22.45 KHz signal

GOT IT.
We have a broad pulse modulated by a 22.45 KHz signal.

So
Carrier ≅ 63.5 KHz
AM Modulated by ~~22.45~~ KHz 41.05
leads to USB & LSB @
@ 22.45 + 104.55 KHz

But there is a difference w/ the leads from the Global generator disconnected!!!

We must disconnect all leads!

Culture No 1: Passive

When you disconnect the leads it is a straight 61KHz signal clear as can be.

There is a slight potential of about 7mV.

Something is happening when you hook up the lead that it is acting as an antenna too.

Notice the leads to the globe may not have any impedence like probes can?

Yes a probe hookup behaves the same way.

It matters whether the signal generator is plugged in or not. Something is acting as an antenna.

Culture #1 Global Notice that this culture is really cooking also

The Rife machine is putting out a voltage even when it is turned off.

There are so many signals going on it is hard to keep track of them all.
~~We have, from the previous~~

The Rife machine is putting out a

70 740kHz local interference signal.

Possibly interference.

Also a massive set of 60Hz harmonic spikes.

It generates 60 Hz 1
180 3
300 5

60Hz This means a square wave w/ fundamental being generated even when it is turned off as well as 740kHz interference signal.

Not clean @ all.

The Rife machine generates all kinds of harmonics ~~60Hz~~ 60Hz + 70 740 kHz signal!

Very sloppy!

The Global machine looks much cleaner.

We are seeing waves of ELF come across culture #1.

We have a way of showing ELF modulated now on a 67 kHz carrier.

Global must be on. Injecting 67 kHz signal into culture.

Ok we have ELF capture on PicoScope

The is amazing, must work alone in duty a a tunable circuit.

Sequence is

1. Set up a culture dish, water only.
2. Inject a 67 kHz pulse pulse, no offset RAGE
3. Read output on ELF range, it will tunable

What you set w/ water a harmonic series @ 29 Hz w/ harmonics, this is not the same

The culture immediately started to change when I added small COB + iron.

COB | Soya-
Salt
Liq Iron

Input

	Culture 1	Culture 2	Culture 3
Source	Global	Rags	Rifle
	~~67 kHz~~	~~67 kHz~~	~~67 kHz~~
	Pulse	Pulse	Harmonic
	~~Offset~~	No Offset	~~Offset~~
	~~Blue~~	~~Red~~	

Output

Channel 1 (Attenuate) Channel 2 (Attenuate)

~~Culture 2~~ ~~Rifle~~ ~~Rifle~~

Culture 1 Culture 2
Blue Red

Enzyme Lab: This will be good —

Amylase break down Carbohydrates.
It is in saliva. Starch breaks down to sugars.
Amylase does not work in acid.

Gastric juice in stomach.
Has HCl + pepsin.
Acid breaks down proteins.
Pepsin breaks down proteins
* Pepsin only works in an acidic environment.

Now @ the small intestine: Liver, pancreas, gall bladder
Liver produces bile. Bile is not an enzyme
but it does break down fats.

Pancreas secretes more amylase
Lipase and lipases (fat digesting enzymes)
also secretes trypsin
trypsin digests proteins

Our tests:

Lipids - We test for pH
the enzyme is Lipase

Carbohydrates: Amylase is the enzyme
Iodine - potassium iodide
(sounds like Lugol's!)
Proteins in acid should break down to peptides

Proteins - Biuret violet to blue

Peptides - Biuret lavender to pink

Biuret is a BUST Do not heat!

Dissolve $CuSO_4$ first. No heat! Then $NaOH$! Then 6 gms tartrate

Biuret Reagent (for Protein Detection)

$962.5\ gms\ H_2O$ / citrate X / 60

$X = .31\ gms$ citrate

We now have an alternative recipe!

60 ml | 60 ml H_2O

1.87 gms | 6 gms $NaOH$

0.20 gms | 0.18 gms $CuSO_4$

.37 gms | 1.8 gms Sodium Citrate

$30\ gms\ NaOH$ / $962.5\ H_2O$ X / $30\ ml$ / $60\ ml$

$X = 1.87\ gms\ NaOH$

You might need to make this twice as concentrated next time

Another step

$\frac{3\ gms}{600\ ml} = 0.5\%$ not 0.3%

so $.005(60\ ml) = .30\ gms$

vs $.18\ gms$

$\Delta = .12\ gms$ added

$962.5\ gms\ H_2O$

You want

~~1000 ml~~ H_2O ~~990.5 ml H_2O~~ $968\ ml\ H_2O$

1.5 gms $CuSO_4$

30 gms $NaOH$

6 gms sodium citrate

$1.5\ gms\ CuSO_4$ / $962.5\ gms\ H_2O$ X / $60\ ml\ H_2O$

$X = .09\ gms\ CuSO_4$

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Page 155

See my recipe on page 3!

Reagents

Barfoed's Reagent: This looks like Benedict's but differs somewhat. The reagent is prepared by dissolving 70 g copper acetate monohydrate and 9 mL glacial acetic acid in water to a final volume of one liter. The reagent is stable for years.

When 1 mL of reagent is heated with 5 drops of sample in a boiling water bath, a positive test for monosaccharides is formation of a brick-red precipitate within five minutes. Disaccharides generally don't give any reaction even for ten minutes. The precipitate isn't nearly as voluminous as that seen with Benedict's test and tends to adhere to the walls of the test tube.

Benedict's Reagent: We generally use a commercial reagent, but to make it from scratch, first dissolve 100 g sodium carbonate and 173 g sodium citrate dihydrate in a final volume of 850 mL water. Slowly, with stirring, add a solution of 17.3 g copper sulfate pentahydrate in 100 mL of water. Bring the final volume to one liter. The commercial reagent, at least, seems to be stable for years.

When 1 mL of reagent is heated with 5 drops of sample in a boiling water bath, a positive test for reducing sugars is formation of a precipitate within five minutes. The color ranges from green to yellow to orange to brick-red depending on the amount of reducing sugar in the sample; with a sample containing 1% glucose, the precipitate is usually brick-red.

Bial's Reagent: Dissolve 3 g orcinol in 500 mL concentrated HCl, add 2.5 mL of a 10% solution of ferric chloride hexahydrate, and dilute to one liter with water; this is approximately 6 M HCl. The reagent is stable for months, but its yellow color gradually darkens and some precipitate forms; this doesn't seem to affect its reactivity. The "classical" Bial's reagent is made with a liter of concentrated HCl, undiluted with water. It gives a slightly stronger reaction, and considerably faster (30-60 seconds), but is much less stable than the recipe we've come up with, and the fumes are much more a problem with concentrated than with 6 M HCl. The reaction even seems to work, more slowly and with less intense color, if the final HCl concentration is only 4 M.

When 1 mL of reagent is heated with 5 drops of sample in a boiling water bath, a positive test for pentoses is formation of a green to blue color (not precipitate) in less than five minutes.

Use ~3x as much sodium citrate instead of tartrate

Biuret Reagent: Add, with stirring, 300 mL of 10% (w/v) NaOH to 500 mL of a solution containing 0.3% copper sulfate pentahydrate and 1.2% sodium potassium tartrate, then dilute to one liter. The reagent is stable for a few months but not a year. Adding one gram of potassium iodide per liter and storing in the dark makes it stable indefinitely.

"Stabilizes the cupric ions" I have an alternative!

The reagent can be used either qualitatively or quantitatively. In a typical reaction, one volume of sample is mixed with two to five volumes of reagent; the optimal ratio depends on the maximum protein concentrations you want to be able to resolve. The presence of protein gives a violet color with maximum absorbance around 550-555 nm; we typically read absorbances at 540 nm.

Sodium citrate!

Bradford's Reagent: The original published recipe [see *Analyt. Biochem.* 72, 248-254 (1976)] calls for dissolving 100 mg Coomassie Blue G-250 in 50 mL of 95% ethanol, add 100 mL of 85% phosphoric acid,

Page 155A

and dilute to one liter. The reagent needs to be filtered at least once and perhaps more, since it seems to precipitate dye over time. "Bradford reagents" are available commercially that use more stable formulations. I heard from someone that Sigma's formula uses 40 mL of methanol (final 4%) in place of ethanol and about 120 mL of phosphoric acid (final 10%); I tried this and I couldn't say it worked any better than the original. This reagent is said to be unstable, but I think I've used the same batch over a year or two without any problems.

To quantify protein, mix 0.25 mL of sample with 2.5 mL of Bradford reagent. After 5 minutes, measure the absorbance at 595 nm. One disadvantage to the reagent is that it gives a high blank which may affect subsequent readings because some reagent adheres to the cuvette. Another is that it is very sensitive to the presence of detergent, either from poorly-rinsed glassware or, heaven forbid, in the event you are studying detergent-solubilized membrane proteins.

DNSA Reagent: This reagent detects reducing ends of carbohydrates and I find it useful in many experiments. Its composition is 1% 3,5-dinitrosalicylic acid (DNSA), 30% sodium potassium tartrate, and 0.4 M NaOH. It appears to be stable for a year or so; there is some darkening on longer storage, though older reagent still seems to function adequately.

In a typical reaction, equal volumes of sample and the reagent are mixed and heated in a boiling water bath for 10 minutes. The resulting solution is cooled and diluted with about ten volumes of water, and absorbance is determined at 540 nm. I typically use about 0.4 mL each of sample and DNSA reagent, then dilute after heating with 4 mL of water, giving a reasonable volume for absorbance determination. When there are no reducing ends present, the final color is yellow and the absorbance ranges from 0.03 to 0.05. A positive result is formation of a red color with absorbances that may range upward to well over 1.0.

Lowry Reagents: Reagent 1: Mix one volume of reagent B (0.5% copper sulfate pentahydrate, 1% sodium or potassium tartrate) with 50 volumes of reagent A (2% sodium carbonate, 0.4% NaOH). Both reagents A and B are supposed to be stable for a long time but I have had a problem with precipitation in reagent B that seems to be remedied by adding a little NaOH.

Reagent 2: Dilute commercial Folin-Ciocalteu phenol reagent with an equal volume of water. Stable for a few days or weeks.

To quantify protein, mix 0.25 mL of protein with 2.5 mL of Lowry reagent 1. After 10 minutes, add 0.25 mL of Lowry reagent 2 and mix well immediately. After 30 minutes, measure the absorbance at 750 nm (if you're using a Spectronic 20 with a normal phototube, 750 is too long; 600 nm gives lower absorbances but works okay).

Seliwanoff's Reagent: Dissolve 1 g resorcinol in 330 mL concentrated HCl, dilute to one liter (approx. 4 M HCl final). This reagent seems to be stable for more than a year, though we usually make less than the recipe specifies.

When 1 mL of reagent is heated with 5 drops of sample in a boiling water bath, a positive test for ketoses (sucrose works, too) is formation of an orange to red color (not precipitate) within five minutes. Some sources say an apricot color is negative, but it's a judgment call. It depends on the concentration in the sample, and sugars like glucose give essentially no color even after ten minutes.

This reaction is also quantitative; absorbances can be read at around 480 nm. I haven't carefully documented the linear ranges in terms of amount of ketose and incubation times.

Page 155 B

Alternative in biuret reagent sodium citrate

Register to reply

biuret reagent question

by jkost
Tags: biuret, reagent

jkost Nov29-09, 05:28 PM #1

P: 7

Hello

i'm trying to make buiret reagant, but probably i'm not mixing the chemicals in the correct way because at first the buiret reagant is blue then it turns dark and if you leave it alone it becomes clear with a black precipitate, it's obvious that i'm doing something wrong while mixing the chemicals, because i don't have a scale i'm dissolving aproximately 1g CuSo4 and 2g NaOH into 50ml water maybe i'm mixing too much or too little amount of chemicals?

thanks!

chemisttree Nov30-09, 04:23 PM #2

Sci Advisor
HW Helper
PF Gold

P: 3,724

Where is the tartrate in your recipe?

Borek Nov30-09, 05:01 PM #3

Admin

P: 22,818

I think there are many recipes - some use tartrate, some don't. From what I understand in the presence of tartrate reagent seems to be more stable, otherwise it has to prepared fresh. In both cases it works.

--

Biuret Recipe
60ml H_2O
6gms NaOH
.18gms $CuSO_4$
1.0 gm sodium citrate

Biuret Recipe
30 ml H_2O
3gms NaOH
.09gm $CuSO_4$
0.9 gms sodium citrate

Page 155C

chemisttree Nov30-09, 05:09 PM #4

Sci Advisor HW Helper PF Gold

P: 3,724

biuret reagent question

Tartrate chelates the copper and helps prevent the copper hydroxide/copper oxide from forming. Copper hydroxide forms pretty fast when you add copper sulfate and sodium hydroxide together.

I've read that citrate can be used as well.

jkost Dec1-09, 10:21 AM #5

P: 7

sodium potassium tartrate is not available... i solved the problem by keeping both chemicals copper sulfate and sodium hydroxide into seperate bottles and only mix them together when i'm trying a protein test...

you said something about citrate, what do you mean? can i repalce sodium potassium tartrate with something else so i can keep the biuret reagent in one bottle and not it two??

chemisttree Dec1-09, 01:52 PM #6

Sci Advisor HW Helper PF Gold

P: 3,724

Yes, use sodium citrate (tribasic) dihydrate. The citrate should be used at a rate of about 10:1 (grams:grams) relative to copper sulfate.

jkost Dec1-09, 05:11 PM #7

P: 7

also hard to find...

from what i understand it needs an alkalizing agent, is there something else i can use which is readily available? unless if i can react citric acid possibly from lemons? with sodium hydroxide.. can i do that?

Borek Dec1-09, 05:25 PM #8

Admin

P: 22,818

Citrate - just like tartrate - is there to complex copper. You may take citric acid (should be not difficult to find - I remember it being sold in groceries) and mix it with hydroxide - that will give you citrate.

--

jkost Dec2-09, 05:21 AM #9

P: 7

indeed...citric acid is very common it can be used instead of lemon so you can find it anywhere...

could you please tell me how i should mix it with sodium hydroxide?

Borek Dec2-09, 05:51 AM #10

Admin

P: 22,818

Where is the problem? In water, just follow neutralization stoichiometry (citric acid is triprotic). Small excess of base won't hurt, as you want final solution to be basic.

--

chemisttree Dec2-09, 10:24 AM #11

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Sci Advisor
HW Helper
PF Gold

P: 3,724

Quote by **jkost**

also hard to find...

from what i understand it needs an alkalizing agent, is there something else i can use which is readily available? unless if i can react citric acid possibly from lemons? with sodium hydroxide.. can i do that?

Tartrate is not hard to find. Look in your spice isle in your local grocer. Use "Cream of Tartar". Its potassium hydrogen tartrate. Pure citrate is much more difficult to find unadulterated.

jkost Dec2-09, 02:04 PM **#12**

P: 7

chemisttree maybe it's funny but i wasn't aware that i can find citric acid and cream of tartar so easily... though in the past my family used citric acid in the kitchen... i had totaly forgotten about it!

now i got the citric acid...but can you tell me how can i use the cream of tartar? so i can try both ways?

Borek Dec2-09, 02:10 PM **#13**

Admin

P: 22,818

Creat of tartar is potassium HYDROGE tartrate - that means it still has one acidic proton to neutralize. That's not different (qualitatively) from neutralization of citrate, just molar ratio must be different.

--

jkost Dec2-09, 02:23 PM **#14**

P: 7

means i can use sodium hydroxide for both receipes? looks like NaOH goes with everything..

chemisttree Dec2-09, 02:34 PM **#15**

Sci Advisor
HW Helper
PF Gold

P: 3,724

From a helpful website.

> Biuret Reagent: Add, with stirring, 300 mL of 10% (w/v) NaOH to 500 mL of a solution containing 0.3% copper sulfate pentahydrate and 1.2% sodium potassium tartrate, then dilute to one liter. The reagent is stable for a few months but not a year. Adding one gram of potassium iodide per liter and storing in the dark makes it stable indefinitely.
> The reagent can be used either qualitatively or quantitatively. In a typical reaction, one volume of sample is mixed with two to five volumes of reagent; the optimal ratio depends on the maximum protein concentrations you want to be able to resolve. The presence of protein gives a violet color with maximum absorbance around 550-555 nm; we typically read absorbances at 540 nm.

Notice that the amount of NaOH dwarfs the amount of tartrate! Just substitute cream of tartar and get on with it!

jkost Dec2-09, 02:51 PM **#16**

P: 7

chemisttree and Borek great guys both of you! thanks... i kinda learned interesting things since i joined the forums!

now i was wondering can i also make the potassium iodide easily? hehehhe...

Register to reply

Related Discussions

limiting reagent	Chemistry	1

Biuret is a bust

You are making progress.

You have a Biuret solution that looks like it will work.

My recommendation is to double the strength to:

50ml ~~40~~

~~100~~ ml H_2O
3.5 gms NaOH
0.40 gms $CuSO_4$
0.80 gms Sodium citrate

} recommend this now.

FIRST!!!

then add water to 60 ml.
Do not heat!
Dissolve $CuSO_4$ first.
Then add NaOH
Then add sodium citrate.

Some good work today w/ controls now available

The Color takes some time to develop if the protein concentration is low.

30 ml Trial

30 ml H_2O (20 ml first)
1.6 gms NaOH Try 1.0 looks fine.
FIRST. 0.2 gms $CuSO_4$
1.0 gms sodium citrate

Mayer's Lab No.

[redacted]

[redacted]

We have now succeeded on detecting proteins w/ our own biuret solution.

We have also successfully broken milk down into peptides w/ our own enzymes!!!

And we have detected them w/ our own Biuret reagent.
Because it was more pinkish.
But now it is going back to more purple again

So the pink color reaction appears to have been short lived.

Fisher

D 1.800 766 7000 543.52
05/02
D4115 6809

Biuret Reagent
Latest Version

This looks really good

30 ml H_2O (Start w/ 20 ml)
0.25 g $CuSO_4$ dissolve first
1.0 gm. $NaOH$ then add
2.0 gms sodium citrate then add

Biuret is a Base

Ap May 13 2014

1. Newsletter set up
2. Membrane potentials
   Voltaic Cells - Clorox electrodes?

3. Enzyme study has great promise

4. Samples coming in
   1. Ryan
   2. Judy
   3. Leaves
   4. 2 Env. Fil Samples

5. Forensic Course Study Soon 6 days May 19
6. DNA Study course
7. Purchase antenna, keyer
8. Measure conductance & capacitance
9. Asa Culture - Vitc, electromagnetics
10. Protein analysis of filtrate
11. Do to sga test on the starch test

Do not expect to see proteins any more w/out Cheeky enzyme, HCl & incubation method!

1130:

~~Exp3 Set 3 is in for 30 minutes - Time A~~ Fails, But sugar passes

~~Exp2 Filtrate - E2 " " " + HCl. 60 minutes~~ FAILS.

1145

~~Exp1 Set 1 for 60 min Timer~~ B. Fails, Need to strong?

1200

Exp2 ~~Get E2 HCl in @ 1200~~. Need 60 min Passed
~~on Timer A for 60 min~~

Exp3 Timer B - 30 min
Start

One lesson so far is that the Benedict test is superior to detect sugar than the Iodide test. The Iodine test is suited to the detection of starches.

Exp 3 Starch → Sugar.

3-1 Light brown-amber
3-2 A very dark color.

What test happened here?
The seems backward again.
The light color means no starch. It should mean sugar.
The seems all backward again
But the sugar - Benedict test (test tube #3 provided as a backup) worked!

Yellow means low amount of sugar but you have it.

Benedict: Test for sugar
Blue - none
Green - trace
* Yellow - low ... You are here, good work.
Orange - Moderate
Red Orange - High

One of the big problems is now evident.

Biuret (home made is highly unstable)
You must make it fresh until you
figure out how to stabilize it.

Sodium citrate didn't work yet.

What we know now is that some
combination of enzyme broke it down
but we do not know which yet.
It still could be a protein or a lipid outer
layer.

Sure enough, the enzyme test comes out
as a positive Biuret result.
Seems the only way you could know it works
is if the color gets markedly more intense.
There is a real weakness not disclosed
in the lab I am working on.

~~Some~~ not all proteins are created equal.

Whey
Casein ~~Gelatin~~ } immediately dissolve
Milk

Rice Powder
Hemp } ~~Don't dissolve~~

You now seem to have a perfect Biuret homemade solution ~~that~~ is very sensitive. It is reacting w/ both dissolved & solid proteins. If there is not enough protein in solution to precipitate out on the bottom of the tube.

You now have extremely sad results with the Biuret - HCl - enzyme test for both milk & rice powder.
You definitely have the pink color clearly for the first time.

The COB on the other hand, look to be very difficult but not necessarily impossible.

Electromagnetics:

What in the deal? A fresh water culture, by itself, w/ nothing added has only a 0.15 mV potential. In DC mode.

In AC mode, it looks quite different.
The 67kHz signal is very pronounced, and then the potential drops to zero.

Also it matters a lot where the Global output cable is plugged in or not.
If it is, in AC mode you are getting a huge 67kHz signal, 160 mV peak. like a Sine wave. In DC mode you are getting the same thing but there is a huge offset.

Now if you turn on the 67kHz pulse this is what you see. A very clean pulse signal.

for the spatial mode w/ Global on, DC mode, cable connected, 67kHz going out ~~cuttters~~ water only you are not
getting ELF defined peaks
you see some activity ELF, but it is much less definable.
The spectrum is more ambiguous.
But there is some activity. Broader peaks, no sharp peaks.

With the global turned off the spectrum power drops way off

May 14 2012 Page 165

It is learned today that the Biuret solution must be made fresh each day.
It degrades quickly, even w/ sodium citrate

Actually it did work after settling down for 20 min. or so and the Cent- centrifuge gave a perfect lavender color w/ milk

But I can see that the Cu is still unstable.

May 15 2014 Page 166

~~1. Final Brunet test~~
2. Go on to Bradford
[redacted]
4. Forensic course Starts in 4 days
5. DNA Study course
6. The electromagnetic issue
   67 kHz?
   Potentiate?
   Modulation?
   ELF?
   Resonance?
7. Aqua active w/ Vite
8. Nausiate
9. Agenda

Conclusion today:

There is no discernible enzyme effect upon CDB that can be separated from the effects upon the enzyme themselves, as determined from a Brunet test.

Oil + Lipid Test

Control	Tube 1	Tube 2	Tube 3	Tube 4
	2ml Bile	2ml Bile	2ml Bile	2ml Bile
	3 drops NaOH (0.1M)	3 drops NaOH	3 drops NaOH	3 drops NaOH
	3 drops Ph.	3 Ph	3 Ph.	3 Ph.
		8 drops oil	CDB	CDB

Major progress here w/ the test.

We have emulsification + a lighter pink color.

This makes the case for a lipid outer layer at least in part.

Lets revisit the 67kHz signal ~~filter~~ circuit:

$C = \frac{1}{4\pi^2 f_r^2 L}$

$f_r = 67E3$ Hz

$L = 150$ H

$C = $ ~~.04pF~~ .11pF

$f = 20$ Hz

$L = 150$ H

$C = .422$ uF $= 422$ nF

We have something very interesting going on.

Notice that we did not only have a peak @ 67kHz.
We also had a secondary peak @ @ about 49 kHz

$\Delta = 18$ Hz.

~~49 + 18 = 67~~
~~49 - 18 = 31~~

Now when you introduce a resonant signal by inductance into the inductance circuit to sync with @ 67 kHz nothing dramatic happen.

But @ the very broad peak @ 48k Hz when you introduce resonance, something dramatic happen.
You get a very strong peak @ 48.8 kHz
Our instrument is not sensitive enough & it may just be 49 kHz

It is somewhere between 48.8 & 49 kHz.

May ever more unlikely than otherwise
When the resonance is attained you
see ELF energy come into the picture.

48.6 is on the measurement.

For now we assume 49 kHz is sufficient.

The list:

Started 1. Go on to Bradford
[redacted]
3. Forensic study course,
Vital signs study course,
4. DNA Study course
5. Agar culture w/ Vite
6. Test COB for starch
7. Directions of pg —

So if we want
30 ml of Bradford
.003 ml = 3 microliters
~~.03~~ .14 ml ethanol
~~phosphoric acid 140 microliters~~
= 140 ul ethanol
2.55 ml phosphoric
acid.
(Looks like about 20 drops
Coom. Blue Stain)

Bradford's reagent:
.01% w/v Coom. Blue G-250
4.7% w/volume ethanol,
8.5% w/v phosphoric acid.

Even sample must be made highly acidic!!

I ended up using about
15ml ~~20 ml~~ Coomassie
20 ml phosphoric acid
10 ml H_2O
5 ml ethanol

I think it
works fine
from what
I see.

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67.4 kHz

It looks like the real freq is

48.650 kHz

n 48650 Hz

48.8 kHz
reversed

48800

48.65 · n

n	f
12	583.8
13	632.4
14	681.1
15	729.75
16	778.4
17	827.05
18	875.7
19	924.35
* 20	973.00
21	1021.65
22	1070.3
23	1118.95
24	1167.6
25	1216.25
26	1264.9
27	1313.5
28	1362.2
29	1410.85
30	1459.5
31	1508.1
32	1556.8
33	1605.4
34	1654.1
35	1702.75
36	1751.4
37	1800.05

It looks to be

48.8 kHz

48730

looks like the actual value.

May 17 2014

Sigma
Selt
Iron
COB.

1. Culture #1
   48.650 KHz
   DC offset
   Global
   Pulse

2. Culture #2 24hrs later
   Nothing

3. Culture #3
   48.650 KHz
   No offset
   RAGG
   Pulse

We notice 24hrs in & over four hegemony Resonance peak is broad & prodigal w/ the offset pulse signal.
The RAGG no offset is a more sharper resonable peak.

We have learned today that pancreatic bile salts low proteases & therefore we cannot test COB w/ in bile solution for proteins.

To List:

1. ~~The lipid test looks highly successful.~~
   ~~Let's test ptt~~
2. ~~Run a Bradford test on the lipid result~~
3. ~~Keep working on the Bradford test~~
4. ~~Run a blank test of the lipid test~~
5. ~~Use your new ptt idea~~
6. Forensic course carry up quickly - Vital Signs
7. SD Card needed for Coursera transcript (Mini SD)
8. [redacted]
9. DNA Study Course
10. Agar culture w/ VitC & COB
11. Dissecta-Frog.
12. Coursera Course with me.

You had a little problem w/ your upscaling of the bule solution. You had to add a ton of NaOH to keep in the pink color.
Why?
Did the bule solution become highly alkalic? Test it.

You had immediate success w/ the second lipid test. You did not need to incubate.

Study bacterial membrane

48.6 kHz is best freq. estimate
05-10-14

May 18 2014: Page 174

1. Forensic Course starts tomorrow.
2. Vital signs also starts tomorrow.
3. [redacted] DNA Study Course
5. Agar culture w/ Vit C & CDS
6. Dissection of pig
7. Plan material for testing
8. Test blood for protein

May 21 2014 Page 175

1. Record Potential Change after removal of signal injection

2. Forensic course
   Nano course
   Vital signs are all normal.

[redacted]

4. DNA Course
5. Try oxbile
6. Agar culture w/ Urine
7. Dissection of pig

8. The papers are now a priority

May 22 2014.

1. Potential msmts very interesting.
AC&DC offset 67 kHz potential shows decline to zero.
AC&DC no offset shows no decline but slowe growth.
We have supplied additional nutrients to offset culture.
So there is a relationship between
growth rate, resonant frequency, offset
& no offset & potential fluctuation.
The question now is whether the potential
will increase again or not.

2. Make potential time lapse movie.
3. Forensic course
Nano course
Vital signs course

[redacted] DNA Course

In place 6. Try Ox bile & pancreatin!
7. Agar culture w/ vit C
8. Dissection of pig
9. Tie paper/area pricing.

10. ~~Heterocycles Steals~~
11. What is pancreatin?

12. Make an IC amplifier circuit!

We now have a bile / pancreatin ~~test~~ in place. We know the control result so we skip that for now.

Tube1	Tube2	Tube3
2ml bile	2ml Pancreatin	1ml bile / 1ml Panc.
2ml H_2O	2ml H_2O	2ml H_2O
6 drops Phenolphthalein	6 drops Phenolphthalein	6 drops Phenolpht.
10 drops .1M NaOH	5 drops .1M NaOH	7 drops .1M NaOH
1 stem COB	1 stem COB	1 stem COB
Incubate		
Success	Little to no success	Mid Level Success
Xylenol added Suds galore. Pink pigments.		

GOOD THAT YOU RECORDED THIS.

May 23 2014

1. Coursework!
   Forensics
   Vital Signs
   Nano

great ~~2 Build reserve Circuit~~

3. Bile tests look very productive.
   Look @ to pH issue further.

4. Potential insults continue
5. DNA lab
[redacted]
7. Agar culture w/ Vibe
8. Dissection of pig
9. Papers are a priority - no new topics until complete
10. New cultures created.

Here is what we learn on the potential examination.

Channel 2, even in air is introducing interference. Somehow the probes are acting as an antenna.

Let's try to find out why.
Channel 2 potential measurements are likely erroneous.
Our readings are @ the +0.6V level, Blue is clean at 0 V.

The problem WAS INDEED The Probe!

You must use the grey probe to reduce the interference. Don't ask me why.

1401 air passive (P)
1402 Water passive (P)
1405 sugar (P) (2.2 mL)
1408 Sugar Stirred (P)
1409 Salt (P)
1410 Notice red has kicked up to 0.6V w/addition of salt before stirring. No known reason why. Also pulses show up. Why?
AC is 0V
DC is 0.6V
1415 Stirred.

I have no idea what the is coming from but it is erroneous.
Not a problem with the probes.

For whatever reason you can only use one channel @ a time.
You are getting erroneous results.
Turn off channel B.

Yellow is going to be culture 1
Red is going to be culture 3
Black probe is going to be culture 2 (grey cord)

From now on,
One Passive Probe @ a time, Channel A only DC.

	#1	#2	#3
1426	Ø V	Ø V	Ø V
	Water, Sugar, Salt		
1430	Ø V		
	Water, Suga, Satt, Liq Fe		
1432	0.02 V but 67 KHz spikes barely visible		Solution does turn Cloudy
	Water, Sugar, Salt, Liq Fe, EDB,		
1440	0.02 V	0.0 V	Ø.02 V
	Set Global DC offset Pulse to 48.65 KHz		RMS Ø.66 V
*	Set Reg No Offset Pulse to it		RMS Ø.94 V
	Set Reg No offset Pulse to 48.65Hz		Ø.66 V
	Voltages now matched up. only variable is offsets.		
1452	Ø.01 V no apparent signal or potential		
	48.65 kHz	offset	No offset
1453	AC Signals introduced to Cultures #1 & #3		

1455 Global input signal is being recorded.

1458 Rogg Input signal is being recorded.

1500 Global Input being recorded again

1502 Spectral Global

1503 Resonant freqency on Global being dialed in.

1507 Resonant freq RAG dialed in.

ELF shows up very clearly.
Incubator Constant @ 55°C.
Broad weaker peak 60-67kHz
~~1510~~ is also visible.

1511 Global Resonant reset & fine tuned, Culture #1 appears to be locking into frequency.

~~1516 Back to RAGG to record ELF activity~~

1515 Return Global

1516 Zero in on ELF activity 15sec intervals
ELF now being recorded

1535 ELF Segment ends.
Back to 40.65 Peak on Global
Switch to 5 minute intervals

1750 Start disconnect input & record potential on all circuits

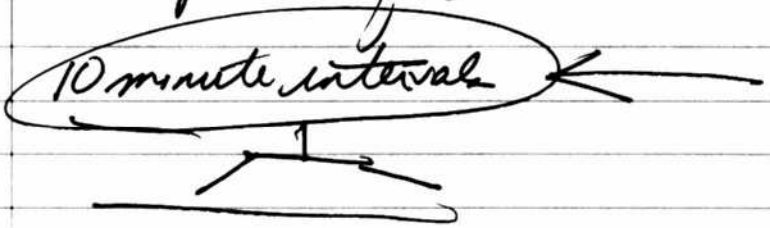
Begin w/ circuit #1

Potential remains @ zero

1752 Go to Culture #2.
Spectrum is flat (no input)
Potential is zero.

1755 Go to Culture #3
Potential is zero.

1757
Reset all inputs
& set timer to 10 minutes on
spectrum of Culture #1



We find a major peak @

48.8	49	D = 5.5
39.0	43.5	
27.9	39	

Peak is higher @ (27.9) kHz

w/ very strong ELF @ 49Hz
48
46

This signal is
Causing the heater circuit to vary
now @ 14KHz

Here is what we see.

All cultures resonate after a few hours @ 67kHz and 48.65 Hz

67kHz is the primary pulse &
48.6 is a secondary pulse.

However if you input 48.6 kHz, into the system you get massive resonance & extremely rapid growth.

We will also water to potential.

Also w/ the new circuit you can pick up the 48.6 kHz signal w/ a 100 uF capacitor across the inductor.

If you take the capacitor off you get much better resonance w/ the 48.6 kHz signal even though the circuit is not detecting it.

Continuing the time log: recording to potential

1550 Turn off Culture # Spectrum
Flip to Injected 48.65 Pulse Signal
Set to DC
Turn off injected signal
& disconnect cable
Record Potential for Culture #1

The potential is only about 8 mV
but it is highly resonant to both
67 & 48.6 KHz signals
up to the 40 mV level.
This is completely efficient train
the Stabt.

1558 Flip to spectrum view.
No visible spectrum is available.
Range 97.66 KHz

1559 Flip to ELF spectrum 190.7 Hz.
No spectrum available

1601 Flip back to potential
Notice that it is decreasing.
Down from 8 mV to about 3 mV
Pulses still up to 40 mV

1615 Potential of culture #1 has stabilized @ a 2mV. We flip signal injector back on and go to culture #2 (with no signal from daily injector)

1616 Flip to Culture #2 No signal We have 0 potential and the 69 kHz pulse have a max of approx 20mV VS 40mV. Growth of this culture is less

1620 Flip to input on Culture #3 (No offset, pulse)

1623 Turn off signal, disconnect cables & record potential Culture #3 Notice the DC component is also approx 8 mV. But also notice the peaks for both 67 & 46.5 kHz signals are pretty much even w/ a max y = 20 mV. DC Component is up to ~ 9mV.

1630 Notice the DC component is holding very steady. No decline in DC potential after 10 minutes.

1635 Turn RAG signal back on. Stop screen capture

1645 Down to 1mV.

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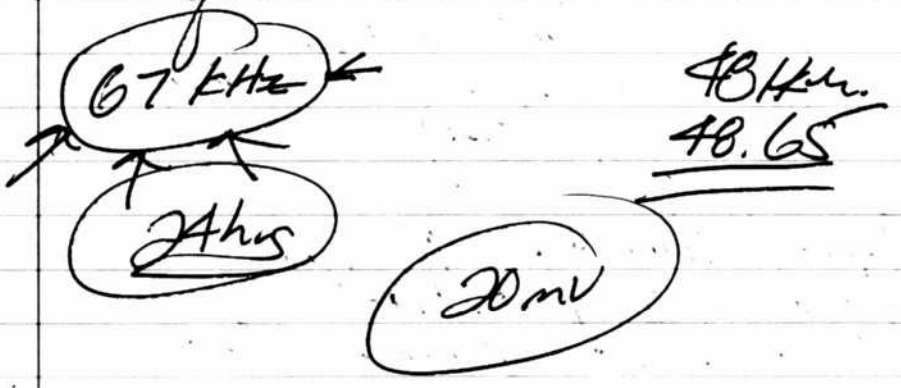
Let's try to work the circuit through using an op amp instead of a transistor.



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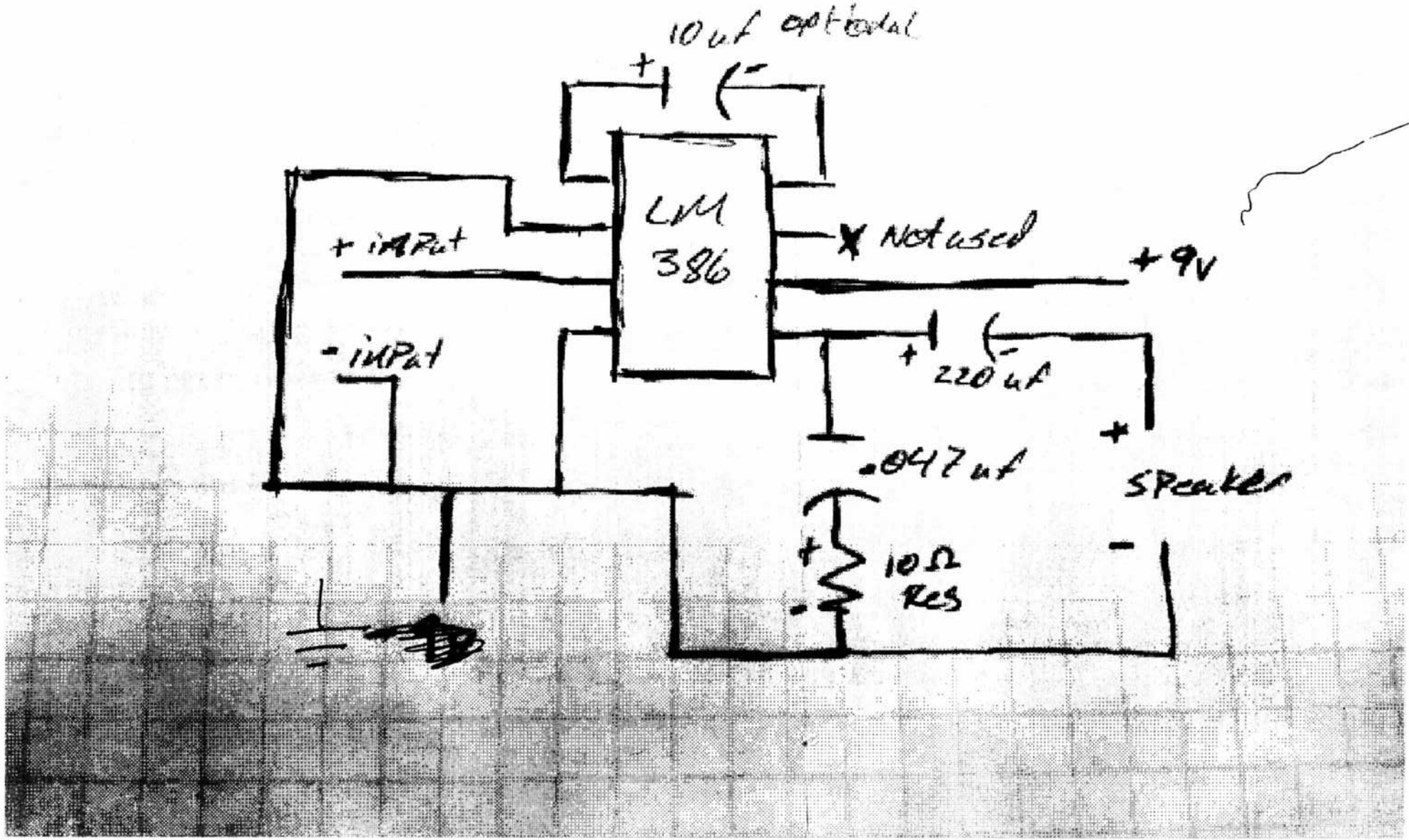
10 uf optional
+
-
LM
386
+ INPut
- INPut
X Not used
+9V
+
220 uf
-
.047 uf
+
Speaker
-
+
10Ω
Res
-

May 25 2014

1. Store video capture & recad potentials.

1050 Start screen capture - 1 min intervals
1052 Flip from spectrum to voltage view
1053 Notice we have 0 mV again. Culture #1
But notice we have much more activity
in the waveform w/ a new signal
showing up @ 450 kHz
1056 DC drops from 8 mV to 5 mV
67 kHz signal are approx 32 mV
1058 Flip to spectral domain.
We do indeed have a visible peak @ 48.8 kHz
Visible now for the first time.
Some increase also @ ELF & 98 kHz

Lets amplify this.

@1104 We are now amplifying the circuit
in the spectral domain.
Notice the dominant peak @ 67 kHz.
There also appear to be a series of harmonics
In addition the 49 kHz signal is visible
You are noticing the human body is
resonating also
1108 You have extended spectral range
from 97 kHz to 195 kHz
Notice the 67 kHz signal is the
fundamental w/ a strong harmonic
@ 134 kHz.

Notice the increase also in the ELF portion.

1110 You are now in the ELF section from 0 - 200 Hz. You are now picking up ELF from the culture itself w/ no extraginal influence or connections.
A very strong peak @ almost 86 Hz
As we do have other peaks as well.
33 Hz; 122 Hz, 88 Hz

1116 Now we flip to 780 KHz on spectral
67 KHz is very dominant.
As the fundamental w/ numerous harmonics

1118 We have flopped over to the time domain of the op amplifier.
Quite amazing.
The 67 KHz signal is very apparent.
Then is a very definite biased waveform. It ranges from 1 to -3V.
The amplifier is maybe then visible.
The freq is indeed 67 KHz as you have proven in the spectral domain.

1126 A wider view of the waveform in the time domain.

1130 Let's go to culture #2. (No injected signal)
OK we have it.
We have an 18 mV signal
We see the same type of reagnant activity.
The culture do have a direction in
the current. Lets try to measure
the current flow.
By the way, the pulses have a magnitude (Δ)
of approx 20 mV.

The current meter says .02 uA.
It shows the resistance
as being .93 MΩ

1138 Now lets amplify the circuit.
But before we do this, lets look @
unamplified circuit in the ~~time domain~~ spectral
domain. Notice that we indeed once again
have the 49 kHz signal as a spectral peak.
(No. 67 kHz signal visible unamplified).

1140 Before we turn the amplifier on we indeed
now see the peak @ 67 and not 49.
So it is a delicate ~~situation~~ observation.

1141 The amplifier is on.

Continuing w/ Culture #2.

1142 We see the same effect.
Major spectral spikes @ 67KHz.
The signal @ 49 is also visible but weak.

We also have a fairly strong peak @ 7KHz (new) w/ demonstrable harmonics. This is new to me.

1144 ~~Time Domain.~~ Lets stay in spectral.
ELF range
Peaks @ 22 Hz & 98 Hz.
Actually a whole series of peaks occurring here.
38, 44, 12, 88, 20 Hz.
There is a fair amount of activity here.

I believe for the first time we are able to demonstrate the emission resource of ELF in the culture. We have very definite peaks @ 22 Hz & 99 Hz.
98 Hz signal is quite strong w/ the amplifier.

1200 Time Domain Culture #2
We have exactly the same result.
Extreme resonance @ 67 KHz. B. Negative sine waveform.

1222 We have a DC bias. Why?:
This DC bias is on the order of 50-60mV after it is amplified.
It can go as high as 100 mV.
The peak value is about 3.6V after amplification.

The frequency measured quite accurately as an average value is 67.3 kHz
This complete @ 1230

1230 Now let's go to Culture #3 (49k, no offset)
Fast up on amplification

1234 We have a potential on the order of 5mV.
Now it is Closer to 8 mV.
The peaks go up to about 28mV.
Screen capture stopped @ 1230

1238 Restart screen capture
1240 Spectral domain 97kHz range
Unamplified.
Small peak visible @ 49 kHz
but very weak.
1242 ~~Now amplify the signal.~~ Without the amplifier
~~Before the amplify this~~ we do see
both peaks @ 67 & 49 kHz

1246 Amplifier On - Spectral domain.
Same results. 67 kHz, 49 kHz & 7 kHz

1240 ~~Fischman~~ Spectral Domain of
197 Hz Range
We see ELF again.

1252 Time Domain. Same result.
AC Biased waveform 67 kHz.

1255 The work is done.

Next two weeks.

1. Photograph the culture
Resonant frequencies of
49 kHz & 67 kHz appear
to increase growth.

2. The human body appears to resonate
@ 49 & 67 also.
This could be a diagnostic tool.

Individual Spectral Analysis 30 sec intervals

~~1310~~

1314 [redacted] Spectral 97.7 KHz range

1316 195 KHz range
Notice increase in ELF range area also.

1318 390 KHz range

1320 1.5 MHz range

1322 Back to 97.7 range KHz
Show peaks @ 39 KHz
49 KHz
67 KHz.
7 KHz
Just like the cultures.

1324 Back to 191 Hz range:
60 Hz is very strong
Noticeable peaks @ 121 Hz – 122 Hz
107 – 104
81
38
19 – 20 – 22
91 Hz – 94 Hz – 96 Hz
141 Hz
26
136 Hz
8 Hz

1331 Amplify Screen: 12 7.3 60 Strong
38
81 – 83 – 87 36
103 38
124 7.9 81, 85
132 6.0
178

Δ=280 μW 840 μW mostly ~, not amplified
560 μW body —
Amplified.

(Page 196)

1346 Power measurements now taking place

		Range
ELF range:	~ 740 mW	191 Hz
VLF:	285 mW	97.1 kHz
	(315 mW)	

1350 Done 285 mW

310 mW

[redacted]

Δ=2.21W 2.49 Watts w/out anything 2.63 W

Sitting	Standing
315	445
299	400

SNR 33 dBc

dBc is decibels relative to the carrier

It is the power ratio of a signal to a carrier

$$S/N = 20 \log_{10}\left(\frac{V_s}{V_n}\right)$$

V_s = Voltage of signal
V_n = Voltage of noise

$V_s/V_n \cong 40$ this is very good.

$$\log_{10}\left(\frac{V_s}{V_n}\right) = \frac{SN}{20}$$

$$\frac{V_s}{V_n} = 10^{\frac{SN}{20}}$$

This is even a more useful equation

$$\frac{\text{Signal}}{\text{Noise}} \text{ Ratio} = 10^{\left(\frac{\text{SN Ratio in dCb}}{20}\right)}$$

This is more practical

Formal definition is $S/N = 20 \log_{10}\left(\frac{Vs}{Vn}\right)$

Vs = Voltage of signal
Vn = Voltage of noise

I say you need a SNR of 10 dCB to have any chance to hear it. Ratio = $10^{\frac{.5}{2}} = 3.2$

We have dCB of 33 so $10^{\frac{33}{20}} = 44$ Superb

We get dBc of 41.2 in Culture #1
This is huge! $= 10^{\frac{41.2}{20}} = 114$

Means a very clear signal from the culture

~~Culture #1 spectrum 97 kHz range is totally different from culture #2. Culture #1 is extremely well defined @ 67 kHz~~

Culture #2: dBC = 41.4 = 117
Culture #3 dBC 29.5 = 30

Now there is a big question coming up.

The circuit measures 40Ω with nothing connected! So this is the background measurement!

It is the 0 long from the background that should mean something.

		dBc	
Background	40Ω	40.2	Not defined
Culture #1		41.2	67 defined
Culture #2		41.4	Not defined
Culture #3		29.5	67 defined
[redacted]	(1)	33	Not defined
	(2)	36.3	Not defined
	(3)	31	
		25	

There is a problem here. The first would seem to be the difference between the normal culture & the all defined culture.

most significant

1. CSV = [redacted] 1-2
2. CSV = background
3. CSV = Culture #1 3-2

$y_1 - y_3$ has the greatest difference from $y_1 - y_2$

$\Delta_{max} = (y_1 - y_3) - (y_1 - y_2) = y_1 - y_3 - y_1 + y_2$

$\Delta_{max} = y_2 - y_3$ = background - culture

	x
$y_1 - y_2$	25.46
$y_3 - y_2$	18.1
$y_1 - y_3$	7.4

1	~~blue green~~	black	−55.1	[redacted]
2	~~red~~ ~~28.7~~	~~red orange~~	−28.7	Background
3		orange	−41.4	Culture #1

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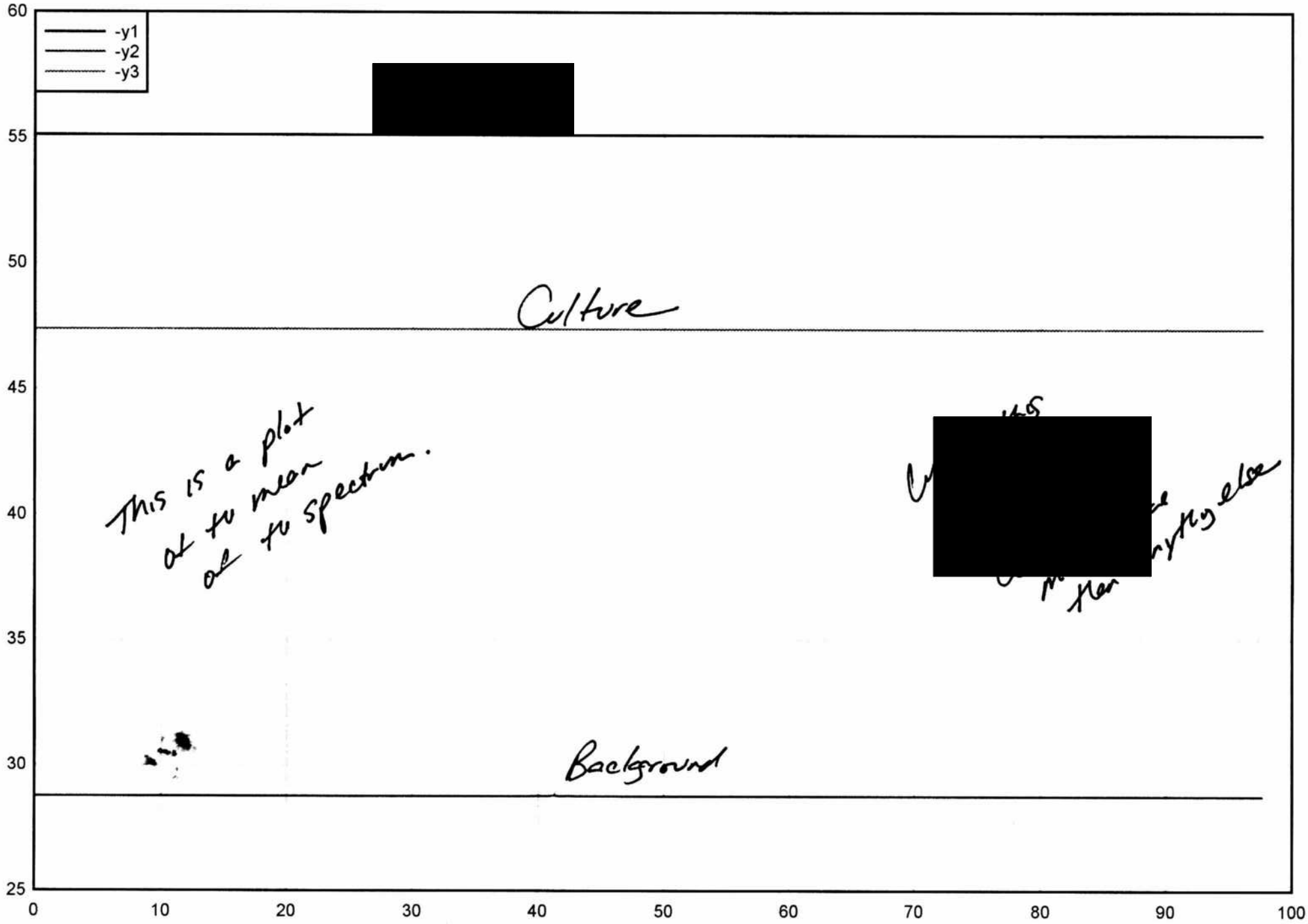
[redacted] - Black (55)
Background - Magenta (29)
Orange - Culture 1 (47)



What we are saying and seeing here is that the Electromagnetic RF spectrum of the culture is unique and identifiable.

You are suggesting that the RF frequency response of the individual may also be unique.

Maybe the average power is a good marker.

		Average Power
Culture #1		1.20 W, 1.19 W
Culture 2	1.41	~~1.31 to 40 to 11~~
Culture #3		0.926 W

Not unique.
What makes the culture unique is the 67 kHz sig and the 6.7 kHz fundamental

Notice this!! This really Strange.
A 6.7 (F Hz) fundamental.

We have a fundamental @ 6.75 kHz?

The harmonics @ divisions of 67.5 seems to be what makes it unique.

Big News Here

OK.

Big discovery.

Salt water generates the same VLF frequency response.

NOT. just CPB!
What does this mean?

The next thing you learn is that you are picking up the signals in dead air from the probes, even though it's -100 decibels you are nevertheless picking it up.

And the 49 is actually the better defined signal:
you actually are picking it up in real time dynamic well.

Question: What do you want for controls:

Left	49 kHz	No offset	Voltage	Sine wave
Right	67 kHz	No Offset	the same	—
~~20 Hz~~	Nothing			

We know now that salt water (outside of amp) is more than sufficient to shield the 49 & 67 signals. We have even done it w/ the probes alone in air. Therefore the signal is ambient & strong.

We now have no offsets Voltage is clean & set the same.

Culture 1: 49 kHz
Culture 2: Nothing
Culture 3: 67 kHz

Since the signal seems to be on everything it seems like now the main question is how does it affect growth?

Also how is EMF going to affect the growth

Also we have 3 layered layers now.

May 26 2019

Bring?:
Small Chem Set?

1. Measure potentials
2. Work on paper
3. Forensics course & download! Verification?
4. Bile tests
   pH reinvestigated
   lipid separation?
   identify lipids?
5. DNA lab
[redacted]
7. Gram culture w/ Vibe
8. Dissection of pig
9. Papers are a priority

24 hours old.

1334 Culture #1, 49 kHz in. No offset
We do indeed have a potential of 15 mV +.

I have reset the input signal to try to get maximum output. This is a sine wave w/ no offset.
So we learn that at close field a charge.

1336 It comes in @ 10 mV. Let it settle
I have -18 mV recorded w/ the first image

We can now amplify the output as we would like to. @ 1344 it is about 8 mV.

1341 We have now amplified the image.
The freq is 66.8 kHz.

Amplified The voltage DC offset appear to be about 200 mV.
This represents a gain of 200/8 ≈ 25
Also we have a peak voltage of about 2 volts
RMS ≈ 0.7 V
We have peaks of about 20-30 mV.
.7 V / 25 mV = Gain of ~28
So this looks to be reasonably accurate!

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1351 Culture 1. Amplified: Spectral Domain.

Curve very sharply delineated spectral graph appears. Peak @ 6.7 kHz.
Also dim 6.7 kHz peak shows up.
This seems to be a characteristic spectrum.
All factors have been captured here.

~10mV 1. DC offset (w/ and w/o at gain)
~~10mV~~ 2. peak voltage in AC signal (w/ & w/o at gain)
3. The DC waveform (w/ & w/o at gain)
4. The spectral signature w/ gain.

1357 Now let's go to the pencils in salt water
for spectral signature & time domain.
The spectrum of the salt water is the same!

1400 Salt water time domain DC
It shows the same thing w/ a potential of
0.5V amplified ≅ 20mV direct saltwater

1402 Test saltwater potential w/out amplification
There is no DC component w/o amplified
w/ salt water. There is
resonance w/ 67 kHz.

1404 Amplified Salt Water Time Domain
DC Avg is 70 mV.
So 70 mV / 25 ≅ 2.8 mV direct.
OIC, this is significant as it shows salt
water does not have a DC component but the
culture does.

1410 Back to the culture #1.
Reintroduce signal & turn signal off.
DC Component is about 3 mV.
I think once it decays it takes
a while to pick things up again.
You must do it at the beginning
of the documentation.

1415 Let's go to Culture #3 67kHz no offset
Yes we have 77 mV Reliable Measurement
Clearly documented evidence of potential
therefore there must be a apparatus
of charge.
Notice let's steal Voltage sometime
exceeds 80 mV.

1436 Potential now down to about 15 mV.
1442 12 mV
1449 11 mV Screen capture ended @ 1509.
1533 2.5 mV
1606 1 mV. Consider it done.

Now on to ELF - Culture #2

Save a page for RC comps

5th Screen Capture had stopped

RC Constant Comps

Let's solve time constant.

Regression formula $r = .9996$

$mV = .0193t$ (mm)

~~$mV = .292 + 1.5621 \cdot e$~~

$mV = .5382 + 21.56 e^{-.000339t}$

So we can disregard the 0.5 mV constant term

37% decay value = RC

37% of 21.56 = 7.98 mV

This occurs @ $t = \underline{310 \text{ sec}}$.

How does this compare w/ previous results.

We have one of 1000 sec
Another @ 2500 sec
Another @ 6000 sec

$\bar{X} = 3362 \text{ sec}$ This is very close

A reasonable estimate of our RC constant is 3350 sec w/ 4 trials.

5RC = 1% of original value = 4.65 hrs

1610 On to Culture #2 - ELF

1613 15 mV DC observed] unamplified.
60 mV peaks

The is w/ a 20Hz offset signal

1616 Lets go to amplified signal
Peak voltage is 4 Volts
DC offset amplified is about 60 mV

Notice that it is a pulse waveform.
Exactly what went into it.
This implies a memory of some kind
of the input signal

1625 Back to unamplified.
Abt 14 mV

1650 12 mV

Then does indeed have the specter of a battery.

What is the resistance?
How much current is flowing?

$\Omega = 1.05 M\Omega$
$I \approx .02 uA$ (Meas)!

All of this makes sense.

$I = \frac{E}{R}$ $\frac{12E-3V}{1.05E6\ \Omega} = .01 uA$ (Calc)!

We are measuring a current flow which is much higher than this

Yes this matches perfectly.
We have the circuit figured out.

16SB Turn off screen capture

This number looks reasonable.
You definitely have an equivalent circuit

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Suppose that the resistance between the walls of a biological cell is 7.37 x 10^9 ohms.?

(a) What is the current when the potential difference between the walls is 88.0 mV?

(b) If the current is composed of Na+ ions (q = +e), how many such ions flow in 0.567 s?

Best Answer

Steve4Physics answered 3 years ago

akm69 is right for part a) (though in standard form and to 3 significant figures the answer should be given as 1.19x10^-11A).

But for part b)

The first part is OK:
current = charge/time
=>i = q/t
=>i = ne/t
=>n = it/e
But then there is a mistake and it should be
=>n = (11.94 x 10^-12 x 0.567/(1.6x10^-19)
n = 4.23x10^7

Rate Comment

Other Answers (2)

Rated Highest

akm69 answered 3 years ago
(a) By i = V/R
=>i = (88 x 10^-3)/(7.37 x 10^9)
=>i = 11.94 x 10^-12 amp
(b) By current = charge/time
=>i = q/t
=>i = ne/t
=>n = it/e
=>n = (11.94 x 10^-12 x 1.6 x 10^-19)/0.567
=>n = 3.37 x 10^-30

Rate Comment

? answered 3 years ago
A) I = V/R
B) ampere = coulomb / second, e = 1.602176487×10−19 coulomb

Rate Comment

Sign In to add your answer

Related Questions

Suppose that the resistance between the walls of a biological cell is 4.9 × 109 Ω. (a) What is the current whe?

Suppose that the resistance between the walls of a biological cell is 6.4 × 109 Ω.?

Suppose that the resistance between the walls of a biological cell is 1.40 1010 Ω. (a) What is the current w?

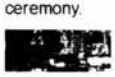
Are you aware the the 'biological factor' includes more than just DNA?

When does the soul first appear? Moment of conception? Moment the two cell walls touch? After flagella enters?

Today on Yahoo

Why Rob Kardashian skipped Kim's wedding

Though he flew overseas, Kim Kardashian's brother returned to Los Angeles just before the ceremony.



Debate over Vegas visit

How Oklahoma City star d

Nigerian officer: 'We kn

Discover Questions

Is that possible of discovering time-machine and if then how?

More physics stuff?

How to find the altitude that a rocket reaches?

A 2kg crate is shot up a 20 degree incline at 30m/s?

Come up with an estimate time

$RC = 3350\ sec$

$C = \frac{3350\ sec}{1.05E6\ \Omega} = 3.19\ mF$

$f_0 = \frac{1}{2\pi (LC)^{1/2}}$

$(LC)^{1/2} = \frac{1}{2\pi f_0} \Rightarrow LC = \frac{1}{4\pi^2 f_0^2}$

$L = \frac{1}{4\pi^2 C f_0^2}$

$C = 3.19\ mF$

$f_0 = 67E3\ Hz$

$L = \frac{1.77\ nH}{1.77\ nF}$

$1.77\ nH$

QVCs can solve this for a 1 sec interval w/ 10 steps but it takes a very long time. about 15-20 minutes.

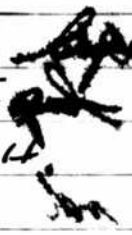
Change V on QVCs to 30mV (peak) instead of 20 mV

How long would it take this capacitor to charge as well?

This would be very interesting to simulate by the circuit.

What would you would like to do is charge it up a little and then discharge it.

My goodness. We have a test for [redacted] that look very effective and I not sure anyone knows about it.



Water
1 drop olive oil
Biuret reagent
heat
] bright pink!

I cannot repeat this. What has happened!?

Ok, I have to pink again with my smallest tube.
1 drop bile salt layer
2 ml H_2O
Benedict no drop
] heat a little until lipid may not be required.

I turned something bright pink & I have no idea how I did it.
What turned Benedict pink?
What turn Benedict pink?

I got pink by taking my bile lipid layer & adding very what NaOH !!!
Nothing else
So this is because of the phenolphthalein!
Benedicts has
Sodium citrate - It was because of alkaline additive w/ phenolpth. added!!!!

[illegible] lot go back to our
[illegible]id work.

and then we are trying to get a
polysaccharide layer which we do
not detect yet - this is solution,
this is iodine.

Good. We did record it.

2 ml lile
2 ml H_2O
6 drops phenol (leave out)
10 drops 0.1M NaOH.
1 Stem ~~B~~ CDB

Go by 5 time ~~so~~ now.

10 ml lile
10 ml H_2O.
No phenol
50 drops 0.1M NaOH = 5 drop 1M NaOH
5 Stems CDB

The pH of this solution is ~~[illegible]~~ 10.76

after 2 hrs
the pH dropped to 10.27

after 24 hrs, the pH is now 9.73
great.

May 30 2014

Have done #1

1. I would like to see an IR of the solids.

2. I am going to take to b/b sample & assure plenty of CO3 remain for welladd.

Non-Control

10 ml bile
15 ~~10~~ ml H_2O
3 ~~5~~ drops 1M NaOH

20 ml bile
30 ml H_2O
6 drops NaOH
1/2 ~~4~~ pipette

to increase the liquid supply.

pH = 9.8 after 24 hr

And the pH of the adjusted solution is now 9.95 as a new reference point.

The pH of this solution after 24 hrs is 8.93 so it is certainly turning more acidic.

48 hrs pH is now 8.49

Yes, this has generated solids!

good

May 31 2014

1. I think that we have a good case for endotoxins.
   also polysaccharides & even DNA.

2. We need to work on the API strips & the antibiotic testy

3. We need to see what is left after endotoxins.

4. We can start working w/ DNA again.
   test for:
   Starch (these are polysaccharides also)
   Sfa
   Proteins.
   Lipids – good –

5. Forensics course
   Chem course
   Biopharmaceutics course
   Nano course

[redacted]

7. Agar culture w/ [redacted]
8. Dissection of pig
9. Papers are all ready

Jun 01 2014

1. The protein question is a huge issue today. Controls: photos, Bradford, Biuret based upon CBB residue & / butane HCl
2. Study Bradford Regard again.

My formula (mildly homespun) for Bradford was (is)

15 ml Coomassie
20 ml Phosphoric acid
10 ml H_2O
5 ml Ethanol
(Notice this is 50 ml, not 3?)

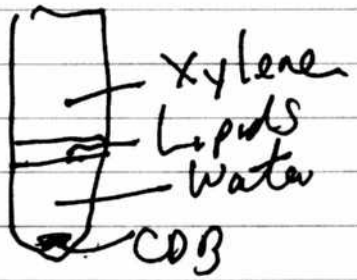
Our solution is red.

Every sample must be made highly acidic!
You must use 8.7M HCl one drop!

Now for controls again:

3. DNA

Bleb solution & xylene produces heavy smoke. Centrifugation is very effective quickly. Give 3 layers (actually 4)



Now using MEK:

1. Use bile product solution
2. Mix equals w/ MEK
3. Centrifuge.
4. Extracted Primary Layer
5. Mixed w/equal parts water.
6. 1 drop 0.1 M HCl, 4 drops Bradford

1. We got sort of a blue green solution.
2. Centrifuged. Still blue green with some kind of dye staining small particles blue. Test pH. This pH is ~ 0.34 so it is very low.
3. Next you added 3 drops NaOH

Page 222

1. Bile,
2. MEK equal
3. 33 drops 0.1 HCl
4. 66 drops [redacted] Bradford (see blue green @ bottom)
5. Shake
6. Centrifuge

I have 4 layers.

1. MEK on top is green
2. COB-Lipid layer thin
3. * Blue green but more blue - bulk of solution
4. COB on bottom
5. Extract blue green. add 2 more drops Bradford, turn more blue

We have matching spectrum - heavy milk & COB

Jun 04 2014

1. Can we detect Proteins?
   How?
   Bradford
   Problems w/ Controls

2. Forensic Course is high priority.
   Jun 09 It is due

3. Sensitivity testing

4. API Strips

5. Papers written

6. Oxbile @ home?

[redacted]

8. DNA Study Course

9. Agar cultures of Vite & CDB

10. Director of PS

~~11.~~

added 2 drops 6.7M HCl

Control Tests

MEK 2ml
H_2O 2ml
1 drop 1M NaOH
4 drops Bradford
Moderate separation
Nice blue layer on top
approx 1/3 of volume
Light blue layer below
2/3 of volume.

But no Proteins!
So how would you know?

Centrifuge

Very clean separation
Light blue remains below
darker blue above

Xylene 2ml
H_2O 2ml
1 drop 1M NaOH
4 drops Bradford
Strong separation
Clear above Xylene
Light blue below
1/2 & 1/2

But no Proteins
So how would you know?

Centrifuge

Very clean separation
even more pronounced
Clear above
very light blue below.

Now lets see if
bile solution

Extract bile solution, leave CO3 alone

2 drops HCl

~~No Change~~ Blue is held
NOT GOOD.

2 drops HCl

NO Blue
GOOD

Page 225

Kerun Controls on
Previous Page w/ acid added - Remarkable?

OLD

Bile (1) Extract, No COB 2ml
2ml Xylene
Shake & Suds
Older bile solution does not separate
Mine separation
4 Extract Stem suds in to 2ml H2O
4 drops Bradford
2 drops HCl B.TM
Centrifuge

* We get a green binding

New

Bile (2), No COB 2ml
2ml Xylene
Shake & Suds
New bile solution does separate.
Mine separation
4 Extract Stem Suds into 2ml H2O
4 drops Bradford
2 drops HCl B.TM
Centrifuge

* We get a green binding.

I say not a positive protein result.

OLD & NEW

Same as previous page except for CBB instead of lule extract in 2 ml H_2O.
1 ml CBB
2 drops HCl
4 drops Bradford

No definite color change

I regard these as negative probably for both

Conclusion. No proteins identified.

Jun 05 2014

* 1. Rework to controls.

2. Yw how some incredible labs to work on
   1. DNA
   2. OSMOSIS:
   3. Biological fuel cells
   4. Continue w/ digestion enzymes

Looks favorable

3. Can we find proteins or not?
   If not, why not?
   If so, how & by what proof?

~~4. Agarose gels standard & control data~~

5. Modulation - my formation content.

6. How does oxidation potential
   Compare to zeta potential?
   What is definition of zeta potential?

* 7. Forensic Course & Test by the 8th!
   Physical Chemistry
   Biomaterials

[redacted]

* 9. Progressions & Characteristics
9. Agar culture my Vibe

10. Dissection of Pig
11. Sensitivity & API

Jun 06 2014

The list is almost identical.
add: [redacted]

Good work today
2. Lets work on the paper first.
3. Watched physical Chemistry. Course - week I

CDB Protein Isso again.

1. Start with bile - CDB Solution Shaken up.
2. 2ml bile - CDB
3. 2ml Xylene
4. 3 drops ~~Bradford~~ HCl !! 8.7M
5. 4 drops Bradford reagent
6. Shake all up
7. Centrifuge
8. You get 3 layers of liquid w/ a solid @ the bottom

A Problem.

Even your lipase reaction is not taking place now.
You must back up.

We have a failure.
Go back

06-06-14 1800
Control:

2ml bile
2ml H_2O
1 drop 1M NaOH
1 Stem COB
Incubate.

20 ml bile
20 ml H_2O
10 drops 1M NaOH
10 Stems COB

pH = 11.3
This may be a little to high.

Xylene.

Suds?

NOW Incubate
Turn down to 95°

Ok I have results back.
20 ml bile
30 ml H_2O
6 drops NaOH
½ pipette COB

pH measures 9.8 after 2 hr
add Xylene & we have suds.
& Shake

add
3 drops HCl
& 4 drops
Bradford
& Centrifuged
& extract
COB reading

Page 230

Something has happened here
and you need to recover the problem.

Cultures:
~150 ml H_2O
Soya - 4.5 ml Sucrose
Salt D. 6 ml
2 droppers Liq Iron
CO_2
Heat
20 Hz ELF

[redacted] Page 232

Now that we understand labs, we can go back to our list:

finished it 1. a little more on the paper each day. You are getting closer!

2. Verify proteins, determine what is happening in the tube, look @ blood w/ Bradford & look @ a mix of the two.

3. Incredible labs:
   1. DNA
   2. OSMOSIS
   3. Biological fuel cells
   4. Digestion

4. A new paper:
   CDB: ~~bacteria, polymer~~ Endotoxins & Proteins
5. Modulation of information content
6. Oxidation vs. Zeta potential
7. Courses:
   1. Forensics
   2. Physical Chemistry
   3. Bioinformatics
   4. [redacted]
9. Agar culture w/ Vit C
10. Dissection of pig
11. Sensitivity & API.

After you removed the CDB residue, post lipid processing, & examined it under scope you clearly have a protein in the heterocyte.

When you left the residue overnight in a small amount of water, you have some type of other filament structure developing.

Place this under the scope in a well slide.

We also notice the CDB residue is sticky!

Plain filament growth from deployed from CDB residue in water.

Once you stain have good set slide. It took a few minutes of the xylene & shaking it. You are working w/ non non Control.

You have great seeds layer.

Molarity?

Now add
3 drops HCl
4 drops bradford
Centrifuge
Extract

Use the innoculating needle!

We are working toward Proteins

We are working w/ the COB residue & it looks like a rapid growth is taking place.

1. Bile extract (2ml)
2. add xylene - make suds. (2ml) if no suds repeat.
3. Now add 3 drops HCl (to make acidic for Bradford)
4. 4 drops Bradford
5. Centrifuge
6. Dump off all liquid (this has lipids in it)
7. Extract) COB residue & observe. (blue cells?)
8. With remaining COB residue:
9. Add water
10. In 24 hrs you see straight filament growth.
11. We added:
    1. sugar
    2. salt
    3. iron
    4. inculate

It seems like radical protein growth is taking place.

The Bile Extract is:
~20 ml bile
~20 ml H_2O
6 drops 1M NaOH
½ Pipette
Incubation 24-48 hrs
pH should change

Bradford Reagent:

15 ml Coomassie
20 ml Phosphoric Acid
10 ml H_2O
5 ml ethanol

Every sample must be highly acidic

Medium Test Tube

We have a positive test for protein.

You need to see if you can get the material growing.

We are now increasing the scale of COB Protein Extraction.
It appears that shaking the tube extract - Xylene solution does make a difference on the amt of crude.

I think we should be using 0.1 M HCl To Xylene Bile Salts Solution

add
3 drops 1M HCl 0.1 M
6 drops Bradford
Centrifuge
Extract

Extraction dilutes in water
add Small Sga
- smaller salt
- drop of lysis
Incubate

CDB defendets do not always straight forward
for protein.
the outer shell must be stripped off
& I have done that.

You have made good progress you are
on your way to protein elaboration.

Prepare paper

• CDB: Endotoxins & Porins.

June 98 Page 237

We get to go camping again!
No need to repeat the entire lab

1. Paper - make a dilution
2. Alan - introduce endotoxins & proteins
3. Protein development from COB
   is a crucial advance

4. Verify protein
   Enzyme analysis

5. All courses OK? transfer?

We have had extremely good results
today reproducing the protein
standards.

Proposed Protein Generation:

1. First step is to create an incubated bile - CDB solution.
   This method is now:
   - 20ml bile
   - 30 ml H_2O
   - 6 drops 1M NaOH
   - ½ pipette CDB

   measure the pH of this solution = 10.8
   after 1 hr we have a reasnt of 9.8
   Incubate 24-72 hrs estimated. 95°F estimated Check

2. Next Step is to make suds.
   1. Extract to a mid sized test tube (may be able to increase)
   2. Mix w/ equal parts xylene & shake till lots of suds appear Shake until most of tube is suds
   3. Next add 3 drops HCl] this may not be necessary?
   4. Add 6 drops Bradford]
   5. Centrifuge
   6. Drain off all solution (Sep funnel - H_2O is product a compound)

3. Now we create the protein form: (This steps eventually)
   1. Mix the remaining solid w/ water
   2. Add modest sugar 2 larger scoops
   3. add minimum salt 1 smaller scoop
   4. add low levels liquid iron 4 drops
   5. Incubate @ 95° F estimated
   6. 12-24 hrs you believe you have a white protein

   May not need this step to produce the protein / separate the residue

4. Test for protein (1M is sufficient)
   1. Dissolve white material in HCl solution
   2. In this acid solution (pH 1-2) add Bradford
   3. Change in Bradford to Blue means protein!

JUNE 2014

1. Coursera
   - Forensics ← DNA
   - Bioinformatics
   - Physical Chemistry

2. We have something happening with proteins?

Our extract also seems to be producing the same materials.

Did not require the mega salt iron precipitation addition.

We have an interesting situation w.r.t. the extract @ the end of step 2. The solution has a yellowy H_2O component and a xylene component. The H_2O is green from the Bradford process

(IS this necessary? I bet Not)

and the xylene is yellow colored. It was separated off in sep funnel.

The green H_2O component is what has produced a significant precipitate.

We need to purify it, look @ it and the rxn, & test it for proteins. And then we need to see if it can be replicated.
It took 2-3 days for the process to occur @ room temperature

Let's start repeating it first.

1. You need to get more protein made
2. You need to get the fourier test done
3. You need to work on the paper
4. You need to plan on AP1 & reactivity tests
5. You need to redo culture w/ 67 kHz
They are sorting a cloud the time why?
all @ 20kHz vs 67kHz in mix?

Cultures#

1 ~~test~~ 49 Pulse ~~offset~~
2 ~~control~~ 20
3 ~~20~~ ~~67 test~~ 67 Pulse ~~No offset~~

Cultures have been started and are ready.

Sugar
Sat
Ligation
COB

Now try to produce protein.

We now have 100 ml of bile-COB-
circulated solution that is 1 week old.

Next add ~~50~~ ml xylene try 50 ml

All this is in a 200 ml beaker.
Place thin in a canary jar & shake
Shake vigorously. Total volume is 150 ml

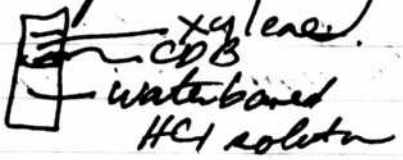
Now we are not getting a lot of suds
but lets go ahead.
Earlier you had 3 drops 0.7 ml HCl = 9 drops HCl
50 ml solution 150 ml
so lets add 9 drops HCl.
9 by the way we do have some suds.
Lets see what the pH of this is before adding the HCl.
It is about 9. Now you are getting some
suds. Shake it really well & get the suds
before looking @ the acid solution.
It looks much better after shaking alternately
for 10 minutes or so. The color changes.

Now we add the 9 drops HCl &
shake & it gets even more homogeneous.
It really does look like an almost
homogeneous solution.
Test the pH. pH is now ~ 1.4

It look very milky on the glass already
when shaking. I am sure there
protein.

Question:
What happen if we centrifuge the mixture before we do not add the Bradford?

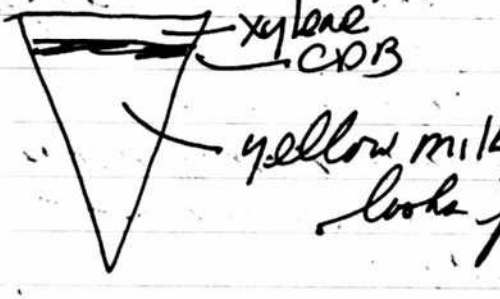
It separates very readily into 3 layer.



The reason it will separate in the sep funnel after centrifugation

We can see that it is protein based it is milky
This is the perfect amount for the sep funnel.

Very good separation is taking place.
Dark layer up top.



Separation dropping looks great.
Nice milky powder.

The xylene is allowing the proteins to mix w/ the water upon shaking.

Great Separation.

Tests: Approx 2 ml Pro
w/ H_2O (20 ml) — Incubate — NOT PRODUCTIVE
Sgar — NOT PRODUCTIVE
Sgar + Sdt — NOT PRODUCTIVE
SDSgar + Sdt + Fe — PRODUCTIVE

Notice the xylene has a yellow color so it has something in it. Better save it.

We have another case w/ abt 20 ml Protein & 30 ml H_2O, let it set.

We have another case of about 10 ml Protein Centrifuge.

We have abt 50 ml of Protein on standby.

What happens upon centrifugation of what you are regarding as PRO
Give us another layer of separation approx 25%. It floats on top & is yellow. So it is either more xylene or a very narrow layered layer.

So this is why this separation also occurs when we let it sit.

you will need to determine
the top layer is lipids
or xylene:

It certainly turns white when
a few drops are added to
an ethanol-water solution:
This says lipids.

Xylene - alcohol water
DOES NOT TURN WHITE
It does a very little but not at
all the same.

I believe therefore that we have
significant lipids.

This indicates that we have
a protein-lipid combination
This is perfect.

Very clean separation upon
centrifugation!

This all looks wonderful

Jun 13 2014 Page 246

1. Look @ the Protein Cases!

2. The Forensic test. is in Place!
   Bioinformatics must come down.

3. Characteristics paper.
   1. Lipids & Proteins
   2. Electromagnetics
   3. Transition & Trace metals

4. Cells
   enzymes
   osmosis
   DNA
   first cell

5. Dissection of pig

6. Oxidation vs Zeta potential

[redacted]

8. Agar culture w/ Vitc

9. Sensitivity & API !!!

The last set
is highly deleted.

Time to study the protein results:

1. On our delete set test
see 2 pages back.
Only one set is productive

2 ml PRO + Sigma + Salt + Liq Iron.
Looks to be highly productive.
There is no centrifugation here
only the liq. iron seems to be important.
Sigma & Sat did nothing on the other
need to look under the scope.

We do not have the fine unfeatured filaments
what we do have is the
muddy red iron-COB protein complex
in relatively large nodules.

So the iron is clearly important.
this was not centrifuged
& Bradfords reagent was not added.

Concentrated Tests.

In our final test tubes (large tubes) w/ a great deal of material collected and not inculpated and nothing added it looks like something very major has taken place.

It needs to go under the scope.

Yes. We have the radiating filament here

so this will be large volume material

These are also organisms produced at the base of the stem or radiating filament products.

We should have masses of material here.

It is heterocytes & Star Filaments

~~one glass wall at test tubes end~~

The centrifuge tube looks the cleanest cleanest

Centrifuging produces very good results with a mixing filaments & CBB & heterocyte

We do have the congealed form of centrifuged

Ok
I have a bile xylene
purified protein extract
isolated with a
concentration level of 0.05 mg/ml

It takes some real work to get.
The steps are

1. Collect & congeal as much protein as you can
2. keep in minimum water in 50ml beaker
   & add 4 drops 0.7ml HCl
3. Heat to sub boiling for 10 – 15 minutes
   you will see a slight difference.

4. When you are done heating you must
   centrifuge & draw off clear
   extract or you will plug up the
   UV machine.

Double Calibration

5. Use same concentration HCl as
   your reference solution. Calibrate
   @ 254 & take a reading.
Clean tube.
   Calibrate at 280 & take a
   reading & form the ratio.

Sticky material left in beaker

With all this work you are @ 0.05 mg/ml
It is measurable but still weak.

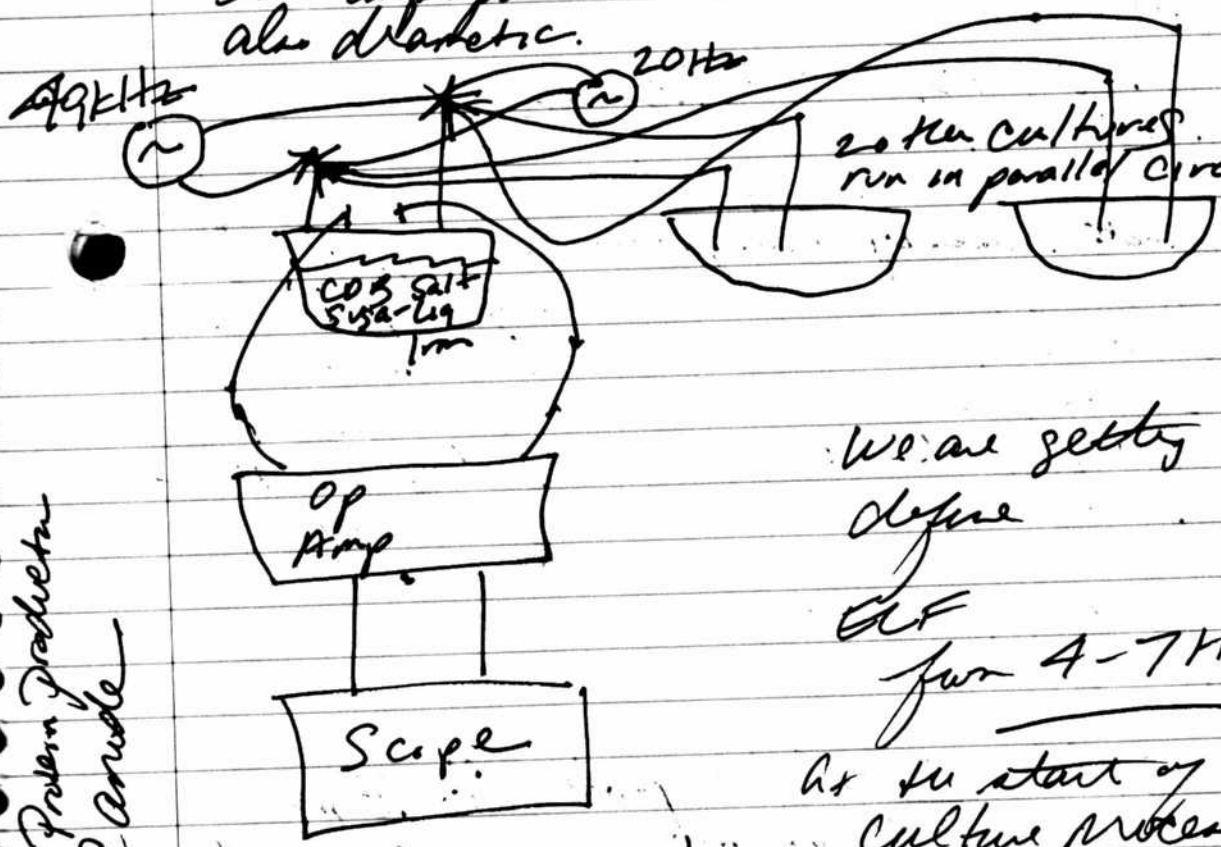
It should work but it is hard.

Jun 15

1. Today we may have made great progress with the electromagnetics

We have employed the circuit considerably w/ one fixed point & variable input by carrier + ELF modulation

We have also run the signal through the amplifier and the result is also diabetic.



We are setting defense ELF for 4-7Hz

At the start of the culture process we may also be getting rapid production of protein materials

The anode (O_2 vs blue) does appear to be the point of protein production.

Yes, Protein Production Console

06/22/14

Page 25 |

400ml:

13.6 ml Bile
400 ml H_2O
50 drops 1M NaOH
20 ml CDB

Measurement of CDB

X_1 1499
Y_1 755
X_2 1524
Y_2 755

$\Delta X = 25$ pixels.

@ 5000x 1 pixel = .054 u

$\frac{1}{.054} \quad \frac{25}{X} \quad X = 1.35$ u

Lets scale up bile production solution

	multiply by 4 and 2 jars
20ml bile	160 ml
30 ml H_2O	240ml H_2O
6 drops 1M NaOH	48 drops 1M NaOH
1 ml CDB	8 ml CDB

Volume of jars is:
200 ml

Ox bile: $\frac{4.5 \text{ ml bile powder}}{45 \text{ ml } H_2O} \approx 18 \text{ ml bile powder}$

pH of bile solution: (old solution) 6.6
pH of bile w/ NaOH added: 10.8

Very good. 2 full jars of bile.

Jun 17 2014 Page 252

You have done something ingenious today. You have introduced oxygen into the culture process. You know that it prefers oxygen & iron.

You can almost certainly now start scaling up the operation to a single large glass dish.

Today

Both Jars 48hrs late

1. Check pH of bile solution Was 10.8 → 7.6
2. Develop controlled solution of protein growth.
3. Courses Forensics
4. The characteristics paper, just make headway.

[redacted]

1. Characteristics paper
   2. Lipids & Proteins
      3. Electromagnetics
         4. Transition & Trace metals

2. Labs
   1. Enzymes
   2. Osmosis
   3. DNA
   4. Fuel Cell

3. Dissection of pig
4. Oxidation / via Zeta potential
[redacted]
6. Agar culture w/ UV
7. Sensitivity & API

Question:

How to make a 3 way valve?

Drive Air into a Container
with 4 holes in it.

That would work fine.
Best if you fly over to a
single dish. You
do not need it.

So this is a great solution. Just I
don't think you need it. Any more.

Bile pH.

You have a radical change
In 48 hrs.
Both years have gone from a pH of 10.8 to 7.6
under incubation of 94°F.

That is highly significant. A Factor of 1000
more acidic now.

Lets start planning the bile work.
Each jar is 200 ml. We have 2 jars (400ml total)
Let's take 1 jar & split it into 2 of 100 ml each.
Lets add 25ml xylene to each 25ml
You shake shake shake & rest in between
over a ½ hr period.

Here we are going to split into 2 categories:

200ml
Direct Sep Funnel

We get 2 layers.
Seeds on top, Bile based below.

This method is not creating this layer of solids.

This method gives a Sudsy lipid layer within xylene & a bile layer with lipids removed, at least partially.

~~Centrifuge the xylene~~
~~lipid layer~~
These have some serious lipids in them. Some.

200ml
add HCl, Bradford, Centrifuge
HCl 20. drop's 0.7 ml (10/100ml)
40 drops Bradford (20/100ml)
~~Centrifuge~~
~~Then to Sep funnel~~

This process destroys the suds so it is entirely different looks like a COB layer is created up top within the xylene. Totally different. When you centrifuge this, the solids (COB) go to the bottom.

This will be so easier to sep funnel & then centrifuge the xylene.
A little bit of acetone @ the end was used to clean the sep funnel solids - they stick.
Now centrifuge this residue
No need to !! This stuff sticks to the collecting beaker quickly
It is a sludge.

Culture work is dramatically different now.

You have
1. approx 1000 ml of solution
2. 5 (4.5 ml) of sugar
3. 5 (.9 ml) salt
4. 5 (2 droppers worth)
5. a little COB is all you need now.
6. An air hose input!
7. heat

You could use your heating coil & it will be a lot more efficient!

Notice it was the soluble after drawing
off all the solution
after the Bradford & centrifuge
that actually made the pellet.
You originally did not save any of the solution

Now we are saving the layers.

We have a very important sludge layer
left over from the Bradford process.

Put some on a slide.

Jun 10 2014

The results of your tests are productive & surprising.

Many things did not work:

Sludge + H_2O
Sludge + Salt
Sludge + Sgair

but
Any combination of 3

Sludge + Liq Iron
does produce a protein - rust colored

The surprise with the life separation solutions, No Bradford & Post Bradford.

The most interesting case is the post Bradford life separation. You took some of that as a lark, added some water (I cannot recall) & added ammonia and you have the pure whole protein formula.

That is very good.

the No Bradford case may also be of interest.
It appears to be producing the most Colored protein.

I just can't recall if I added iron to the a light.

So you need to run the series of tests if like what you're not already a the big surprise.

CORRECTION!

Under the scope, this is NOT the filament form, even though it appears to be white. It is actually the most colored protein formation.

You do not have the filament form. But it is a whitish protein!!!, Clearly we are getting protein production but what do you do with it as the question.

Remember that you agreed bleach stood for 3 days before you saw this.

The whitish Post Bradford material DOES TEST POSITIVE for Protein! - Bradford.

Page 260

Post Bradford Bile Protein Production

It may not be what we expected but it is working perfectly.

1. It is white
2. It looks like & dissolves like protein.
3. It is not filamentous
4. It appears to be soluble in MilliQ H_2O
5. It tests absolutely positive for Bradford.

The Pre Bradford Test

Gives a more green color w/ the Bradford Test and the compound is not white It is rust colored.

So you need to while post Bradford Protein production
It does not need to be filamentous in fact it should not be. Dot is harder to break down.

Better photograph this protein.

Good news:

We seem to be getting very good protein production.

Pour Bradford Lisis solution is working by study.

However 10 ml mixed to 35 ml H_2O
w/ Sigma salt, 1 drop Lisis
is also producing a very generous supply.

Thus is Great.

JUN 19 Page 264

1. You want to start separate problems

2. Forensic Course

3. My Paper.

4. API & penalty FRI-SAT.

Now that you do have problems you want to
so about getting them into solution

Page 265

Dissolving Proteins

1st attempts:

Too much acid is destroying the solution.

3.1M
8 drops – Bradford Sample
2 drops – Bradford solution turns blue
lights up

Below HCl.
Gives a very weak Brad result.

H [illegible] light & boil successfully dissolved the proteins.

1. Protein in solution
2. Strong alkaline added [illegible] 1M NaOH
1 drop or 1 M KOH
3. Turn the solution acid, (weakly) 1M HCl
4. Now test for Bradford.

The pH of the Protein solid, dissolved in water is ~ 4.6
This fits exactly.

Now when you add 1 drop NaOH (1M)
pH goes to ~ 11.5
and solution turns brown to clear
Centrifuge & keep clear ~~solute~~ solution.
Now with 1M HCl ~~bring it to neutral first.~~
1 drop brings pH to ~~3.4~~ 3.1

Dilute w/ H_2O & add 1 drop 1M HCl
to keep it acidic

Bradford Test. We get a nice blue color.
= Peak is @ 630 vs 595
indicates some green
Wa La.

You know how it! 2.5 mS/mL UV 254/280 ratio.

1. Add alkaline to ~ 11.5
2. Centrifuge & use the clear solution

Jun 21 2014

1. Characteristics progress

2. API advent

3. DNA studies?
   Gel work?
   What types of proteins are acidic?

4. Labs
   1 Enzymes
   2 Osmosis
   3. DNA
   4. Fuel Cell

5. Dissection of Pig
6. Oxidation vs Zelle Potential
[redacted]
8. Agar Culture w/ Yeast
9.

$(F-32) \cdot 5/9 = C$

85-100°F
30°C - ~~33°C~~ 38°C

Page 268

Jun 25 2014

1. A major production system for COB is in place.
   ~1000 ml H_2O
   14 ml Fructose
   3 ml salt
   25 ml Ferrous Lone Liq Iron
   Heat ~ 40°C
   67 KHz
   20 Hz
   24~~48~~ hrs.
   Clear, ~~Violet~~ Cloudy, Clear

2. A Major System for ~~Production~~ of Lipids & Proteins

   1. Bile Solution:
      1. 13.6 ml bile powder
      2. 400 ml H_2O
      3. 50 drops NaOH (1M)
      4. 20 ml COB

   Let this sit for ~40 hrs

   2. Xylene Step: Forgot to measure pH.

No Bradford: ~~200ml~~ ~~25 50ml Xylene~~	~~200ml~~ ~~25 50ml Xylene~~	Bradford:
150 ml bile	150 ml bile	150 ml bile
~~20 ml~~ Xylene	~~20 ml~~ Xylene	~~20 ml~~ Xylene
40 ml Xyl	40 ml Xyl	40 ml Xyl
Shake ~~Rest~~ Shake	Shake, ~~Rest~~	Rest Shake
Sit 2 hrs, 3 layers.	20 drops 8.7M HCl	20 drops 8.7M
Xylene 12% Top	40 drops Brad	40 drops Brad
Solids 3% Middle	Sit 2 hrs, 2 layers	
Bile 85% Bottom	Xylene - Dark - COB 20%	
	Bile 80%	

Use Sep funnel

Page 269

• Continuing w/ Separation of Layers

No. Bradford (200ml)

3 layer separation w/sep funnel

85% 1. Bile (Bottom)
3% 2. Presumed Lipids (Middle)
12% 3. Xylene (Top)

I do not believe the xylene layer has any value.
ok Let's discard for now.

The lipids have been isolated. They are not soluble in the slightest bit & they do pass an alcohol test.

Bradford 2 X 200ml = 400ml

2 layer Separation w/sep funnel
1. Bile 80%
20% 2. Dark-Xylene 20%

~~4~~ - The dark layer sticks to sep funnel & is ~~4~~ - Sludgy.

There actually are
3 layers
1. Bile 80%
2. COB Sludge 3%
3. Xylene 17%

The bile solution is of strong interest for protein growth.
COB Sludge has been non productive

Notice the bile solution is already milky!

Now lets go to work generating large amounts of protein from the Blood bile layer.

It appears that it will grow in water alone.

But it also appears that

2 ml Protein Solution
20 ml H_2O
Sugar + Salt to Very Little Iron

} Was very productive

(Notice that diluting it in water made it much more alkaline. So it would have caused the same type of precipitation.

Scale it up & Try it.

20 ml Protein Solution
180 ml H_2O
2.2 ml Sugar
0.6 Salt
4 @ drops Iron
Incubate

Yes now have 14 jars into production.

[redacted]

Jul 06 2014 Page 271

1. Work in Paper

[redacted]

- We continue to scale up production

600 ml H_2O
20 ml bile
15 drops 1M NaOH (Actually about 100 brings pH to about 9.5)
50 ml COB
Covered w/ wax paper
This is all w/in a 1000 ml beaker

Now incubate @ ~ 85°F

July 09 2014

Ok, This has been incubated for 3 days @ ~ 90°F.
The pH has dropped to 6.6 so this has worked well at ~~xxx~~

Now let's add 25% Xylene = 150 ml
& stir w/ mixer

Now you can mix this w/ the portable blender but you must be very careful.
Cover beaker w/ saran wrap &
use only intermittently.

Go ahead 3 pages

Jul 07 2014 Page 272

On the Clark Fork River approx 15m S. of Paradise MT

Researcher Needs

Find out the name of the Univ @ Nerva, Huelva Spain
Environmental Earth Spa Science

Fe3 is only soluble under acidic conditions

Univ. of St Andrews, United Kingdom

Eh - Diagrams

[redacted]

1. Fungi genera
2. Mn reference
3. Hemoglobin reference
4. Cyanobacteria reference

July 08 2014 Page 273

In the Advanced Biology Lab I disagree with the approach to determining the "rate of diffusion" She uses a "spot" which does not exist.

What does work is a ratio of diffusion. We use:

$$\frac{\text{\% of Potato Interior Colored} * \text{Cube Volume}}{\text{Upon Slicing}} \Big/ \frac{\text{Total Time of Diffusion}}{\text{Total Cube Volume}}$$

$$\frac{\frac{\%_0 \cdot V}{T}}{V} = \frac{\%_0 \cdot V}{T} \cdot \frac{1}{V} = \frac{\%_0}{T}$$

So the better answers are:

Cube	%	%/T (T=180 sec)
.5	100	.56%/sec
1.0	50	.28%/sec
1.5	20	.11%/sec
2.0	5	.03%/sec

The non Bradford bsa appear non productive. You can attach layers if you would like @ the stage.
But we are more interested in proteins

20 drops 0.1M HCl = 80 drops 0.1M HCl
150 ml bile solution 600 ml

1 drop = .01 ml
So ~~60~~ 80 drops ≈ 5.6 ml 0.1 HCl
Use 6 ml 0.1 ~~HCl~~ HCl
per 600 ml bile

40 drops Bradford reagent = 160 drops Brad
150 ml bile 600 ml bile

160 drops (.01 ml/drop) = 11.2 ml Bradford

Notice the acid alone caused a fairly distinct layer to separate. Dark on top, precipitate on the bottom.

Bradford:
15 ml Coomassie
20 ml Phosphoric acid
10 ml H_2O
5 ml Ethanol
= 50 ml Bradford

Bradford reagent
Get hot
when you

The addition of the Bradford Carbon
3 layers / to form

One is blue green. 60%
One is dark sludge about ~~[illegible]~~ 7%
Top one is relatively clear ~ ~~[illegible]~~ 13%

The matches previous work.

We must separate these w/ the sep funnel.

Main Projects:
1. CDB Composition, Structure, Metabolism
2. ~~[illegible]~~ DNA analysis
3. Env. Filament Proj
4. MRP

Immediate Papers
1. Glow Progressions
2. Characteristics
3. ~~[illegible]~~ Growth Conditions - Influence of Metals
Carbon, Iron, Oxygen
Iron, Gold
4. ~~[illegible]~~ Lipids + Proteins
5. Electromagnetics

[redacted]

JUL 10 2014

1. Ile paper purdue forward.

2. Forensics - love fun!

[redacted]

4. Protein Growth!

We are getting a massive amt of whitish-light green precipitate forming from our separated bile solution.

We continued to use the sep funnel to refine it further.

Method was to take the remaining bile solution, add a little to water in a medium large beaker add 4 drops liq iron & ~0.3 sugar & you get a huge amt of precipitate.

It also separates into a floating section & a sinking section.

Now find out if iron alone is sufficient.

Fe + Glucose actually seems to be more productive than Fe alone.

Or, at least it seems to be sinking more readily.

Not really true in the end. Fe alone is also sinking might just take a little longer.

These test tubes are 20ml.

$\frac{4 \text{ drops}}{20 \text{ ml}} = \frac{X \text{ drops}}{550 \text{ ml}}$ $X = 110$ drops

@ 0.06ml = 6.6ml Fe to the entire beaker.

But! We diluted with water radically

Up!

So we used

Scale up	
900ml	10ml water = 250ml water
~~10ml water~~	
90ml @ 1ml Iule solution	75ml 25ml Iule
11ml 2 drops Iron	9ml 50 drops Iron = 3ml iron

This is a fantastic achievement.

a major protein complex easy to access.

It turns highly blue with Bradford!
No NaOH needed.

1. Take the precipitate
2. Dilute it dramatically .5 ml to 4 mL
3. Add some 1 M HCl ~~was~~ suffices
4. Test w/ Bradford.

It is very blue right away!

It is passing Bradford w/ flying colors.
You can now set high concentrations

The reason that the protein precipitation worked was so successful I am sure is because you used the blender.

You did not have to grow anything.

You have precipitated it right out of solution.

So Back to Bile:

600 ml H_2O
20 ml bile
~100 drops NaOH 1M to pH 9.5
60 ml CDB

Remember you heated the bile slightly

NaOH prep:

$\frac{40\text{gms}}{1000\text{ ml}} = \frac{X}{110\text{ ml}}$ $X = 4.4\text{gms}$

pH post bile, pre CDB is 7.1
pH post bile, post CDB is 5.8

Easiest to just add NaOH 1M until pH = 9.5 (I have 10.0)

Your Bradford test is very performed on:

4ml H_2O
1ml Protein
6 drops Bradford
2 drops 0.1M HCl

4ml H_2O
1ml Protein
2 drop 1M NaOH turns it brown.
then
1 drop HCl turns it more clear.

then 3 drops Bradford turns it darker blue than the above test also more blue.

So there is something to be said for turning it more alkaline.

It is far superior.

UV Test:

8ml H_2O
2ml Protein
4 drop 1M NaOH (turns it slightly brown)

It is too Concentrated for UV detection

dilute by a factor of 2

add 1 ml H_2O (Filtered)

254 = 183
280 = 166

We have 2.52 mg/ml

by 2 for 1st dilution factor = 5.64 mg/ml

by 4 = 20.16 mg/ml

Blood has 4 gms / decoliter

= .4 gms / liter
= .0004

$\frac{4 \text{ gms}}{1E10 \text{ l}} = \frac{X \text{ gms}}{\pi \; 1E\text{-}3 \text{ l}}$ $X =$

Albumin is ~ 45 mg/ml

Protein Concentration test repeated

10 ml H_2O
1 ml protein
5 drops 1M NaOH

Shifts it to a brown tint This become more clear after 24 hrs

Control is H_2O w/ NaOH 10
Still to concentrated. Add 9 more ml

= ~~10 ml H_2O~~ 20 ml H_2O
1 ml protein

254 = 159

280 140

Conc = 440 mg/ml.

Ratio is $\frac{1}{20}$ or $\frac{20}{1}$ = 82 mg/ml

Super work.

(Has 1 M NaOH)

To get a good Bradford result, take the 20 to 1 solution, dilute both 1/2, add one drop 0.1 M HCl & then approx 5 drops Bradford.
Don't overload it w/ the 0.1 M HCl

Sensitivity Tests

Agar Broth

210 ml H_2O
2.10 gms Vit Cottage agar
1 Slice potato ground.
5 ml Leg Iron
2.2 mg Sarsa Gluco
.6 mg Salt

Centrifuge test on the proteins.

No visible separation. This means the protein is uniform.

Sensitivity Tests are in place.

Now for NIN tests.

1. Straight Protein: Negative results
2. Prot w/ 1 drop 0.1M HCl.
3. Prot w/ 2 drops 1M NaOH

Case #3. Yes we have a positive result. It is the reddish color.

Discovery:

The pH of the raw protein is highly acidic.
~~Kobe~~ !!!. This seems very strange
1.35

NIN test standardize

1. Very little protein
2. More MSG
3. 1 drop NaOH
4. 4 drops NIN

I am getting variable results.

MSG by itself, no NaOH turns purple
OK, beautiful result w/ MSG purple as control

NaOH changes MSG response dramatically.

Our protein solution, after treatment w/ NaOH is only mildly alkaline, about 8.8.

MSG is almost neutral, so to equate them we may only add slight NaOH to the MSG.
This does seem to be the case.
Then response to NIN looks similar.

Jul 12 2014

1. The protein may be drying & dividing into 8 two stages.

2. Tests w/ Stillwater?

3. Work on the paper, a little at a time

4. Coursera!

5. pH of Lule It is now 9.5 so moving slowly. ~10.5

6 1L of protein components 24hrs 9.9 48hrs 9.5

Jul 15 2014

1. pH of the bile solution is now 6.5! Right on target.

Elapsed Time: y			X
0	10.5	July 10	0
1	10.0	July 11	1
2	8.5	July 13	3
3	6.5	Jul 15	5

5 days. 4 pts. $10^4 = 10{,}000$

There is a layer of floaty on the top. Most likely lipids.

$pH \approx -.8(\text{No. of Days}) + 10.7$

CDB, Lipid, Protein Production

(1) CDB Recipe

Solution:
1200 ml H_2O
20 ml Liq Iron - 25 ml
14 - 20 ml Glucose
1.1 ml Salt
CDB

Agar:

210 ml H_2O
2.1 gms Agar
1 slice potato liquified
5 ml liq. iron
2.2 ml Glucose
0.6 mg Salt

(2) Pre-Separation Bile Recipe

600 ml H_2O
20 ml bile powder
60 ml CDB
NaOH to pH ~10.0
Warm the bile solution mildly
Incubate 5 days @ 85°F

Bradford Reagent is:
15 ml Coomassie
20 ml Phosphoric Acid
10 ml H_2O
5 ml Ethanol
Σ = 50 ml

(3) (optional) Lipid Solution

1. Take Incubated Bile Solution
2. Add 25% Xylene
3. Use a blender to liquify
4. 3 layer separation takes place
   - 85% Bile (bottom)
   - 3° Lipids (middle)
   - 12% Xylene (top)

Lipid Separation

(4) Pre-Precipitate Protein Solution

1. Take the blended solution (xylene)
2. Add 24 drops 8.7 M HCl / 150 ml blended bile

or

6.0 ml 8.7 M HCl / 600 ml blended bile

(This forms a layered solution)

(11 ml mod Brad / 600 ml pre-precip)

3. Now add Bradford w/ IV + Coomassie

20 ml Phosphoric Acid
10 ml H_2O
5 ml Ethanol
Σ = 35 ml

35 ml Phosphoric
17 ml H_2O
8 ml ethanol
60 ml

(5) Post Precipitate Protein Recipe

1. Take Pre-Precipitate Preparation:
   - 25 ml preprecip
   - 250 ml H_2O
   - 3 ml Liq Iron
2. Sit, watch, Separate
3. Turn alkaline to set up for protein test.

Iron test for basic

You must add the iron protein complex to produce the ~~precipitate~~.

We have a highly successful Protein Bradford test now without Coomassie.

Ok it works great.

Now we just need to work on what is actually the Lipid protein,

yes you must add the iron!

~~The lig iron may have not been taken away?~~ to precipitate it?

Make it alkaline, then Bradford test.

Yes you must add the iron 1/19 It is what causes the complex to form. protein

Then we alkalize it then acidify it the Bradford Rg stops.

So there really should be no reason to dilute at 10 to 1. Just add the iron.

It appears that Coom. Blue may be involved in producing the precipitate form of the protein but Lipid iron both may be involved in producing the complex.

The Coomassie Blue-Bradford method actually seems to be more reliable than the phosphoric acid approach.

The top layer (thin) of the phosphoric acid approach (actually seems to be the protein layer.

But not exactly sure. The diluted vs concentrated phosphoric acid approach seem quite appreciable.

You are getting a decent result w/ Bradford if you do it right with dilute Osmon phosphoric solution:

1. Dilute 1 to 1
2. only add a couple drops NaOH
3. then Bradford

Phosphoric approach seems to be more contaminated.

Yes a superb result w/ precip gum. Very pure result.

1. Add slight NaOH
2. Acidify w/ 0.1 M HCl
3. Bradford

The precip is superior.

Ok. Lets go again:

07/16/14

Bile solution:

600 ml H_2O
20 ml Bile
60 ml COB
pH to ~~10.0~~ 9.5

Incubate 5 days

Low pH @ ~ 9.3

Extract 100 ml for Lipid tests.

Towards Protein

Post Bile Incubation

1. Add 25% xylene
2. Blend w/ Cling wrap cover
3. 6 ml 6.7M HCl / 600 ml blended bile
4. 11 ml Bradford / 600 ml blended bile
5. Separate, separate, Separate

3 layer will form

Bradford recipe:

15 ml Coomassie
20 ml Phosphoric
10 ml H_2O
5 ml Ethanol
Σ = 50 ml

Protein Precipitation

1. 10 to 1 ratio water to protein extract from sep funnel
   or 250 ml H_2O
   25 ml protein extract sep funnel
   3 ml Liq Iron (Fresh)
2. Wait, water, separate

To test for protein:

1. Mildly alkalize purified protein just to the point of dissolving
2. Acidify
3. Bradford & UV test

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CDB Culture

Liquid:
1200 ml H_2O
20-25 ml Liq Iron
20 ml Glucose
1.1 ml Salt
Warm water
67 kHz & 20 Hz signal

Agar:

210 ml H_2O
2.1 gms agar (1%)
Liquified potato
5 ml Liq Iron
2.2 ml Glucose
0.6 mg Salt

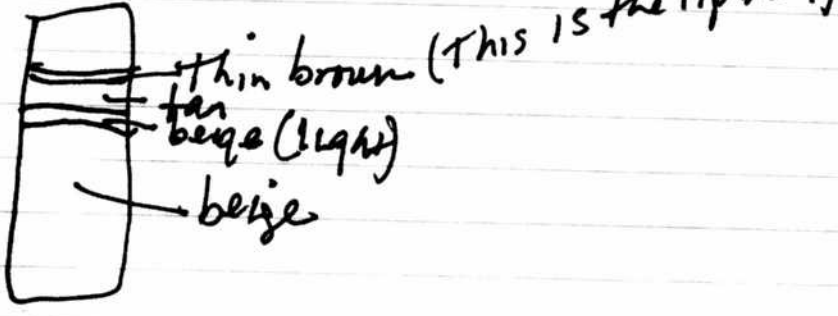
Preserved Lipid extraction:

1. take incubated bile solution
2. add 25% Xylene
3. Shake but do not blend. Several time over 10-15 min
4. This sits for 2 hrs and produces 3 layers use sep funnel

85% bile (bottom)
3% Preserved Lipids (middle)
12% Xylene (Top)

This middle layer passes a lipid test.

Post blended pre Bradford actually has 4 layers after settling for several hours.



You have the lipids settled now!

Post blending & letting it sit for quite a long time you have a very thin layer @ the top.

These are lipids because you can see the globules in water that will not dissolve.

It then passes an alcohol (ethanol) emulsion test.

You have it

1. Siphon off this top layer that settles.
2. Shake it up
3. Mix w/ water & you will see that it does not mix well
4. Use the alcohol emulsion test & you will get an emulsion & some material which will not even mix w/ the alcohol. These are lipids.

You actually have a lot of lipids already separated that pass the alcohol test.

5. You are in business

Page 300

Dilute Version of Phosphoric Acid Protein

1. It definitely passes the Bradford test very nicely. If you first dust overdo it.

2. ½ Tube dilute phosphoric acid protein
½ Tube H_2O
2 drops 1M NaOH max
2 drops 0.1M HCl max
Bradford
Centrifuge. Very clear.

So you can use either version.

You actually have the protein either way.

Is pure enough, it is highly acidic pH 1.5!

Dilute it w/ water purifies it from the xylene contaminant.
UV detector.
5 ml diluted to 8 ml

254 108.5
300 94