

Replicating the Origin of Life Chemistry - Chemosynthesis by the Synthesis of Formaldehyde, Formic acid, Glycerol, Methanol, Glycogen, Oxygen and Cyclodextrin from Carbonic Acid.

Frank V. Wann

Abstract

Replicating chemosynthesis - the origin of life chemistry ($\text{CO}_2 + 2\text{H}_2\text{A} + h\nu \rightarrow (\text{CH}_2\text{O}) + 2\text{A} + \text{H}_2\text{O}$), was possibly realized by reacting carbonic acid from carbon dioxide in water ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3$), with atmosphere gasses methane, methanol, hydrogen sulfide, ammonia, cyanide and with low voltage electricity in carbonated water. Where carbonic acid is hypothesized to initiate this chemistry ($\text{H}_2\text{CO}_3 + \text{atmosphere gasses} + \text{e}^- + \text{Al}^{3+} \rightarrow \text{formic acid, formaldehyde, methanol, glycerol, cyclodextrin, glycogen, oxygen, amino acids and more}$).

Sodium hydrosulfide ($\text{NaSH}_{(\text{aq})}$) was used to replicate aqueous hydrogen sulfide ($\text{H}_2\text{S}_{(\text{aq})}$) to produce formaldehyde, formic acid and unknowns from bisulfide (HS^-); ($\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$), ($\text{NaSH}_{(\text{aq})} \rightleftharpoons \text{Na} + \text{HS}^-$).

Formaldehyde (CH_2O) was produced from carbonic acid from warm carbonated water and sodium hydrosulfide; producing 5800ug/L of formaldehyde and unknowns ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \{\text{NaSH} \rightleftharpoons \text{Na} + \text{HS}^-\} \rightleftharpoons \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$). ($\text{H}_2\text{CO}_3 + 2\text{H}_2\text{S} \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$).

Formic acid (HCOOH) was produced from carbonic acid from carbonated water, cyanide and sodium hydrosulfide; producing 13,000mg/L of formic acid. 77,000mg/L was produced from ocean water. ($\text{H}_2\text{CO}_3 + \text{KCN} + \text{NaSH} \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-\} \rightarrow \text{HCOOH} + \text{unknowns}$).

Methanol (CH_3OH) was produced from carbonic acid from cold carbonated water and methane or propane; producing 33ug/L of methanol and unknowns. ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{CH}_4 + \text{H}_2\text{O} \rightarrow 2\text{CH}_3\text{OH} + \text{O}_2$).

Glycerol ($\text{C}_3\text{H}_8\text{O}_3$) and oxygen were produced from carbonic acid from cold carbonated water and methanol; producing from 90-210ppm of glycerol and 1.1ug/L of oxygen. ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$).

Cyclodextrin, STRUKTOL, glycogen and oxygen were produced from carbonic acid, silicic acid and a 1.5-volt battery hooked up to aluminum wire electrodes in warm carbonated water. A 1.5-volt battery was used to mimic the voltage that is produced by plants and cyanobacteria, that theoretically produces these polymers from carbonic acid and the electrolysis of aluminum (Al^{3+}) and other metals from the electricity produced by plants and cyanobacteria during the photosynthetic process ($\text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{cyclodextrin, glycogen and oxygen}$).

From these initially produced compounds from carbonic acid; (formaldehyde, formic acid, methanol, glycerol, oxygen, glycogen, cyclodextrin, amino acids and unknowns); adequate amounts of acetone, acetic acid, ribulose, ribose, rhamnose, amino acids, nucleosides, glycerol, fatty acids, monosaccharides, sugar phosphates, oxygen, ribulose derivatives, noncarbohydrates, acetic acid derivatives, porphine, lactic acid, urea, nucleosides, methane and much more.

Phosphorylation of glucose into glucose 1 & 6-phosphate, fructose into fructose 6-phosphate and glycerol into glycerol 1, 2, 3-phosphate, was abiotically produced from distilled water, (glucose/fructose/glycerol), phosphoric acid, potassium cyanate and potassium hydroxide or calcium carbonate.

Introduction:

Carbonic acid from carbon dioxide in water ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$), was found to produce formaldehyde, formic acid, methanol, glycerol, oxygen, cyclodextrin, glycogen, amino acids and unknowns when carbonated water was mixed with atmospheric gasses and compounds; methane, methanol, cyanide, ammonia, urea, silicic acid, sodium chloride, hydrogen sulfide, a 1.5-volt battery (e^-) and aluminum (Al^{3+}), ($\text{H}_2\text{CO}_3 + \text{atmosphere gasses} + \text{e}^- + \text{Al}^{3+} \rightarrow \text{formic acid, formaldehyde, methanol, glycerol, amino acids, cyclodextrin, glycogen and oxygen}$). Possibly abiotically replicating chemosynthesis - origin of life chemistry and the electrical mechanism of photosynthesis.

Chemosynthesis ($\text{CO}_2 + 4\text{H}_2\text{S} + \text{O}_2 \rightarrow \text{CH}_2\text{O} + 2\text{A} + 3\text{H}_2\text{O}$) and the origin of life chemistry is hypothesized as originating from carbonic acid using hydrogen sulfide as an energy source. Hypothesized as ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 + 2\text{H}_2\text{S}_{(\text{aq})} \rightarrow \text{CH}_2\text{O} + 2\text{S} + 2\text{H}_2\text{O}$) and ($\text{H}_2\text{CO}_3 + \text{atmosphere gasses} + \text{e}^- + \text{Al}^{3+} \rightarrow \text{formaldehyde, formic acid, methanol, glycerol, cyclodextrin, glycogen, amino acids, oxygen and unknowns}$).

Photosynthesis ($\text{CO}_2 + 2\text{H}_2\text{A} + h\nu \rightarrow \text{CH}_2\text{O} + 2\text{A} + \text{H}_2\text{O}$), hypothesized here as originating from carbonic acid, electrolysis of aluminum, copper or other metals. Where the electricity produced in the plant and cyanobacteria during photosynthesis is hypothesized to produce cyclodextrin and glycogen from carbonic acid and electrolysis of either aluminum (Al^{3+}), copper (Cu^{2+}) or other metals ($\text{H}_2\text{CO}_3 + \text{e}^- + \text{Al}^{3+} \rightarrow \text{cyclodextrin, glycogen and oxygen}$).

Carbon dioxide in water ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3$) was replicated with carbonated water, ocean water or distilled water with sodium chloride added. Carbonated water contains approximately 3 - 7 grams of carbon dioxide per liter, distilled water contains approximately 1.7 - 2 grams of carbon dioxide per liter and ocean water contains at least 1.45 grams of carbon dioxide per liter. The ocean absorbs approximately 30% of all the carbon dioxide released into the atmosphere.

Sodium hydrosulfide was used to replicate aqueous hydrogen sulfide to produce formic acid and formaldehyde for these experiments ($\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$), ($\text{NaSH} \rightleftharpoons \text{Na} + \text{HS}^-$), (Fig. 3).

Formaldehyde (CH_2O) was produced from carbonic acid from warm carbonated water and sodium hydrosulfide, producing 5,800ug/L of formaldehyde ($\text{H}_2\text{CO}_3 + 4(\text{NaSH} \rightleftharpoons \text{Na} + \text{HS}^-) \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 4\text{S} + 4\text{Na}$). ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + [2\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons (2\text{H}^+ + 2\text{HS}^-)] \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$). Formaldehyde was found to produce, formic acid, methanol, glycerol and unknowns.

Formic acid (HCOOH) was produced from carbonic acid from carbonated water, cyanide and sodium hydrosulfide, producing 13,000mg/L of formic acid. 77,000mg/L of formic acid was produced from ocean water and cyanide (Table 2). ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{KCN} + (\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-) \rightarrow \text{HCOOH} + \text{unknowns}$). Formic acid was found to produce acetic acid, acetone, rhamnose, glycerol, monosaccharides and unknowns.

Hydrogen sulfide (H_2S) in the early earth's atmosphere contained significantly greater concentrations than today (0.11 - 0.33ppb) and is considered the major energy contributor for the evolution of life for 90% of earth's history (Olson, 2015). Hydrogen sulfide is produced from volcanic activity, decaying organic matter and from plants. Research has shown that plants emit from 0.9ppm to 9ppm hydrogen sulfide from their leaves, which could be a source of hydrogen sulfide to produce formaldehyde and formic acid in the plant (Vargas - Munoz, 2022), (Wilson,

1978), (Fig. 4, 22). Increasing the hydrogen sulfide levels to plants has been found to be beneficial for plant growth.

Methanol (CH_3OH) was produced from carbonic acid from cold carbonated water and methane or propane, producing 33ug/L of methanol ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 + \text{CH}_4 + \text{H}_2\text{O} \rightarrow 2\text{CH}_3\text{OH} + \text{O}_2$), (Table 3). Plants produce 10-45 percent of the total global atmospheric methane, and could this methane produced by the plant be the main source for producing methanol in plants (Nisbet, 2009), (Covey, 2018), (Perez-Coronel 2022). Methanol was found to produce acetic acid, oxygen, ribose, ribulose, sugar alcohols, noncarbohydrates, glucose, glycerol, acetic acid derivatives, monosaccharides and more.

Glycerol ($\text{C}_3\text{H}_8\text{O}_3$) and oxygen were produced from carbonic acid from cold carbonated water and methanol, producing 90 – 210ppm of glycerol and 1.1ug/L of oxygen ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$), (Table 4, 5, 6). Glycerol was found to produce ribose, ribulose, rhamnose, noncarbohydrates, ribulose derivatives, deoxyribose and carbohydrate intermediates when hydrogen peroxide was added to glycerol.

Cyclodextrin (6-O- α -D-Maltosyl- β -Cyclodextrin), (STRUKTOL 1B 531), glycogen and oxygen were produced from carbonic acid, silicic acid, sodium hydrosulfide and a 1.5-volt battery hooked up to aluminum wire electrodes submerged in either warm carbonated water, warm ocean water or warm distilled water with sodium chloride added. Polymers were also produced from a 1.5-volt battery and aluminum wire electrodes in warm carbonated water. A 1.5-volt battery was used to mimic the voltage that is produced by plants (0.28-volts - 0.626-volts) and cyanobacteria (1.4-volts - 1.5-volts) during photosynthesis. Theoretically producing these polymers from carbonic acid and the electrolysis of aluminum (Al^{3+}) from the electricity produced by plants and cyanobacteria during the photosynthetic process ($\text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{cyclodextrin, glycogen and oxygen}$), (Fig. 7), (Arnold, 1976), (Sarma 2016), (Lakatos, 2021), (Cano, 2018).

Some of the complexity of the origin of life chemistry, chemosynthesis and photosynthesis was possibly demonstrated by the following experiments: 1) ($\text{N}_2 + \text{H}_2 + \text{propane (CH}_4) + \text{carbonated water} + \text{KCN} + \text{NaSH} \rightarrow \text{formic acid, ribose, amino acids, ammonia and unknowns}$), (Fig. 6, 19), (UC Davis, Anresco, Stanford and ALS Labs). 2) (Distilled water + $\text{N}_2 + \text{H}_3\text{PO}_4 + \text{CaCO}_3 \rightarrow \text{amino acids} + \text{ammonia} + \text{nitrates} + \text{organic acids}$), (Fig 22), (UC Davis). 3) (Ionized $\text{KSi(OH)}_4 + \text{CH}_2\text{O} + \text{KCN} + \text{NH}_3 \rightarrow \text{amino acids and more}$), (Fig. 6), (Stanford). Adding ammonia to these experiments produced amino acids.

Abiotic Synthesis of Formaldehyde (Carbon Hydrate $\text{C-H}_2\text{O}$) from Carbonic Acid and Hydrogen Sulfide

Formaldehyde (CH_2O), 5800ug/L, was produced from carbonic acid from warm carbonated water and sodium hydrosulfide (NaSH), ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + [\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{HS}^- + 2\text{H}^+] \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$), (ALS Labs), (Table 1, #14). Formaldehyde was found to produce, formic acid, methanol, glycerol and unknowns.

Materials: Carbonated water, distilled water, sodium hydrosulfide hydrate, sodium chloride, silicic acid and a 12-volt battery hooked up to two coiled metal wire electrodes inside a mason

jar made of either copper, steel, magnesium or aluminum (Fig 1).

Methods: Carbonated water was used as an elevated carbonic acid source ($\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{HCO}_3^- + \text{H}^+ \rightleftharpoons \text{CO}_3^{2-} + \text{H}^+$). Sodium hydrosulfide was used to replicate hydrogen sulfide in aqueous form ($\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$), ($\text{NaSH} \rightleftharpoons \text{Na}^+ + \text{HS}^-$), (Fig. 3).

Results: The simplest method to produce formaldehyde resulted from warm carbonated water and sodium hydrosulfide hydrate (60mls warm carbonated water + 0.61mls NaSH $\rightarrow$ CH_2O , 5,800ug/L), (Table 1, #14), (ALS). ($\text{H}_2\text{CO}_3 + (\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-) \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$).

Formaldehyde was found to produce formic acid, methanol, glycerol and unknowns (Fig. 6), (Stanford), (Table 1, 2, 3).

Formaldehyde and Formic Acid	CH_2O ug/L MRL 300	HCOOH mg/L MRL 1.0	CH_3OH mg/L MRL 0.5	Glycerol %	Amino Acids
1) 12V, CH_4 , H_2 . Distilled water + 1.25mls KCN + 0.61mls NaSH	ND	2000			
2) 12V, CH_4 , 60mls Carbonated water + KCN + 0.61mls NaSH	ND	6400			
3) 60mls carbonated water + 1.25mls KCN + 0.61mls NaSH	ND	910			
4) 60mls Distilled water + 1.25mls KCN + 0.61mls NaSH	ND	860			
5) 120mls carbonated water + 0.125mls NaSH	490	ND			
6) 12V, $\text{CO} + \text{CH}_4 + 4\text{oz}$ carbonated water + 0.61mls NaSH + 1.25mls H_2O_2	130	260			
7) 12V + 4oz carbonated water + 0.61mls NaSH	130	ND			
8) 12V, $\text{CO} + 120\text{mls}$ carbonated water + 0.61mls NaSH + 1.25mls H_2O_2	160	ND			
9) 12V, CO , H_2 , $\text{CH}_4 + 4\text{oz}$ carbonated water + 0.61mls NaSH	120	ND			
10) 90mls carbonated water + 0.3mls KCN + 0.3mls NaSH	NT	13000			
11) 60mls iced carbonated water + 0.61mls NaSH 6-29-2020	170	NT			
12) 45mls Iced carbonated water + 1/16 tsp NaSH	ND	ND			
13) propane + 6oz carbonated water + 0.61mls NaSH gassed pH 7	NT	NT	2.5		
14) 60mls warm carbonated water + 0.61mls NaSH	5800				
16) 30mls $\text{H}_2\text{O} + 5\text{mls}$ 16% $\text{CH}_2\text{O} + 0.61\text{mls}$ $\text{NH}_3\text{OH} + 4$ drops HCOOH 9-22-21 Anresco				1.09	
17) 5mls 16% $\text{CH}_2\text{O} + 30\text{mls}$ $\text{H}_2\text{O} + 0.1\text{mls}$ $\text{NH}_3\text{OH} + 5$ drops HCOOH Anresco 11/30/21				1.18	
18) 45mls warm carbonated water + 12-Volts + $\text{H}_2 + \text{N}_2$	ND				ND
19) 45mls warm carbonated water + 12-volts + H_2	ND				ND
20) 45mls ocean water + 12-Volts	ND				ND
21) 12-volts + $\text{H}_2 + .06\text{mls}$ $\text{NaCl} + 60\text{mls}$ Dist Water	ND				ND
22) 12-volts + $\text{H}_2 + 60\text{mls}$ $\text{H}_2\text{CO}_3 + 0.6\text{mls}$ NaCl	ND				ND
23) 60mls Ocean water + 0.61mls NaSH					
24) 12-Volts + distilled water + CH_4	240	180			
25) 12-Volts + distilled water + CO	1300	170			

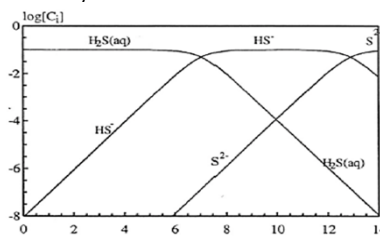
(Table 1)



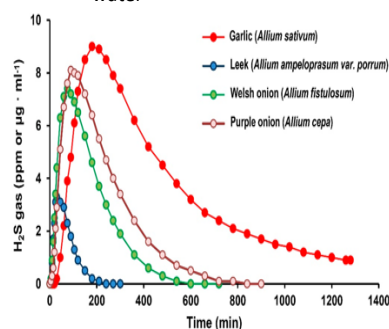
(Fig 1) 1.5 -12-volt battery hooked up to a metal wire for electrolysis



(Fig 2) Aluminum wire electrodes



(Fig 3) Wikipedia. Hydrogen sulfide in water



(Fig 4) Munoz-Vargas, 2022) H_2S gas emission using 300 gms of fresh plant material

Discussion: Warm carbonated water and sodium hydrosulfide hydrate produced formaldehyde while cold carbonated water and sodium hydrosulfide did not produce any detectable formaldehyde according to ALS (MRL 300ug/L). ALS would not be able to detect any formaldehyde produced at concentrations of formaldehyde lower than 300ug/L. Cold

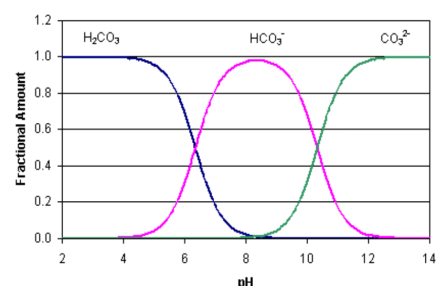
carbonated water and sodium hydrosulfide needs to be tested for unknowns to see what was or not produced.

Abiotic Synthesis of Formic Acid from Carbonic Acid, Cyanide and Hydrogen Sulfide

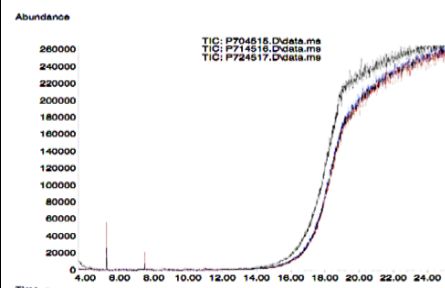
Formic acid (HCOOH), 17,000mg/L was produced from carbonic acid from carbonated water, cyanide and sodium hydrosulfide. 77,000mg/L was produced from ocean water, cyanide and sodium hydrosulfide (ALS, UC Davis), (Table 2, #9, 13, 16), (Table 2, #19, 16). $[H_2CO_3 + KCN + (H_2S_{(aq)} <---> 2HS^- + 2H^+) ---> HCOOH]$, (Table 2, #16-23). Formaldehyde also produced formic acid (Table 2, #10, 11). Formic acid was found to produce acetic acid, acetone, glycerol, rhamnose, monosaccharides and unknowns.

Formic Acid	HCOOH mg/L	CH ₃ OH Mg/L	CH ₂ O Ug/L	Amino Acids
1) 12V, CH ₄ , H ₂ . 45mls Distilled Water + 0.61mls KCN + 1.25mls NaSH	2000			
2) 12V, CH ₄ , H ₂ . 45mls Carbonated water + 0.61mls KCN + 1.25mls NaSH	6400			
3) 45mls Carbonated water + 0.61mls KCN + 1.25mls NaSH	910			
4) 45mls Distilled water + 0.6mls KCN + 1.25mls NaSH	860			
5) 12V, CO + CH ₄ + 120mls carbonated water + 0.6mls NaSH + 1.25mls H ₂ O ₂	260			
6) 12V, CO + CH ₄ + 120mls carbonated water + 0.6mls NaSH	ND			
7) 12V, CO + 120mls carbonated water + 0.6mls NaSH + 1.25mls H ₂ O ₂	ND			
8) 90mls carbonated water + 1.5mls KCN + 1.5mls NaSH	13000			
9) 90mls iced carbonated water + 1.25mls NaCN + 1.25mls NaSH	17000			
10) 60mls water + 0.6mls NaSi(OH) ₄ + 5mls 16% CH ₂ O W/O CH ₃ OH + 0.31mls NaSCN + 3 drops CH ₃ CN + 0.6mls NH ₃ OH + 0.31mls NaSH + 1mls HCL. pH 6	84000	91	ND	
11) 60mls Carbonated water + 7 drops NaSi(OH) ₄ + 5mls 16% CH ₂ O + 0.31mls NaSCN + 3 drops CH ₃ CN + 0.6mls NH ₃ OH + 0.31mls NaSH + 6 drops HCL. pH 6.4	51000	68	ND	
12) 12 Volts, CO + 180mls carbonated water + 0.6mls NaSi(OH) ₄ + 0.25mls H ₂ SO ₄ + 0.15mls HCl + 0.031 mls KCN + 0.1mls H ₂ O + 0.031 mls FeCO ₃ , FeSO ₄ , NiCO ₃ , AlOH, FeCN,	170	ND	1300	
13) 12-Volts + 60mls carbonated water + propane + N ₂ + 1.7mls HCN + 5mls NaSH	50000			
14) 30mls H ₂ O + 10mls 16% CH ₂ O + ¼ HCN + 0.55mls NH ₃ OH 11/23/21 ALS	ND			
15) 30mls H ₂ O + 5mls 37% CH ₂ O + 0.6mls KHCN + 0.65mls NH ₃ OH + 0.6mls tsp NaSH Dec 23, 2021 ALS	ND			
16) 45mls ocean water + 0.61mls KCN + 0.61mls NaSH	77000			
17)A) 12-Volts + 60mls H ₂ CO ₃ + H ₂ + 0.61mls KCN	ND			ND
19)C 12-Volts + H ₂ + 60mls Ocean water + 0.61mls KCN	892 ppm			ND
20) 12V + H ₂ + 60mls water + 0.6mls NaCl + 0.6mls KCN	ND			
21) 12V + H ₂ + 60mls water + 0.6mls NaCN	ND			
22) 12V + H ₂ + 60mls H ₂ CO ₃ + 0.6mls NaCN	ND			
23) 12V + H ₂ + 60mls H ₂ CO ₃ + 0.6mls NaCl + 0.6mls KCN	ND			
Dilute: 8oz H ₂ O + 5mls KSi(OH) ₄ or 5mls NaSi(OH) ₄				

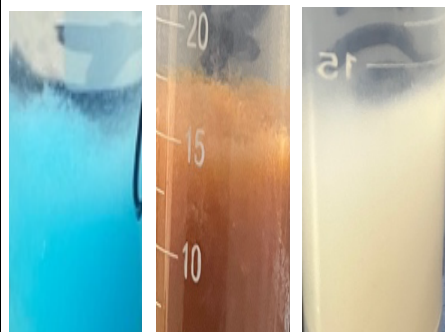
(Table 2)



(Fig 5) Wikipedia. CO₂, Carbonic acid in water



Ionized silicic acid + CH₂O + KCN + NH₃
(Fig 6) Stanford



(Fig 7). Polymer produced from carbonated water, sodium hydrosulfide, silicic acid and a 12-volt battery. Copper electrodes used on the left. Steel electrodes center. Far right 1.5-volts, aluminum electrodes, silicic acid and carbonated water.

Materials: Distilled water, carbonated water, ocean water, 37% formaldehyde solution (with methanol), 16% formaldehyde (without methanol), sodium hydrosulfide hydrate (NaSH), sodium cyanide, potassium cyanide, dilute silicic acid, sodium thiocyanate, propane and methane.

Methods: Formic acid was produced from either carbonated water or ocean water, cyanide and sodium hydrosulfate hydrate. Sodium hydrosulfide was used to replicate hydrogen sulfide in aqueous form ($\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$), ($\text{NaSH} \rightleftharpoons \text{Na} + \text{HS}^-$).

Results: The simplest method to produce formic acid was from carbonated water, cyanide and sodium hydrosulfide; 1) (90mls carbonated water + 1.2ml KCN + 1.2ml NaSH $\rightarrow$ 17,000mg/L of HCOOH), (Table 2, #9), (ALS), (Fig. 16, UC Davis). 2) From ocean water (45mls ocean water + 0.61mls KCN + 0.61mls NaSH $\rightarrow$ 77,000mg/L of HCOOH), (Table 2, #16, ALS). 3) Higher yields of formic acid were produced from sodium cyanide versus potassium cyanide and when propane and a 12-volt battery was used (12-volts + 60mls carbonated water + propane + 0.6mls KCN + 5mls NaSH $\rightarrow$ 50,000mg/L formic acid), (Table 2, #13). 4) The highest yields of formic acid were produced from formaldehyde (5mls 16% CH_2O + 60mls H_2O + 0.61mls dilute $\text{NaSi}(\text{OH})_4$ + 0.31mls KCN + 0.31mls NaSCN + 0.61mls NH_3OH + 0.3mls NaSH + 0.5mls HCL $\rightarrow$ 84,000mg/L of HCOOH), (Table 2, #9, 10), (Table 1, 2 #9, 3, 8, 10).

Formic acid produced; acetic acid, monosaccharides, acetone, glycerol, rhamnose, oxygen methanol and unknowns (Table 5, 6, 7, 9).

Discussion: Evidence from (Table 2, #10, 11) suggests that the synthesis of formic acid could proceed from formaldehyde. Ocean water, a 12-volt battery, cyanide and sodium hydrosulfide produced formic acid and a polymer (Table 2, #19). Adding sodium chloride and silicic acid significantly influenced the yields of formic acid produced. Sodium cyanide produced more formic acid than potassium cyanide (Table 2, #9, 10).

Abiotic Synthesis of Methanol from Methane or Propane and Carbonic acid.

Methanol (CH_3OH), 33ug/mL was produced from carbonic acid by bubbling propane or methane in cold carbonated water ($\text{H}_2\text{CO}_3 + \text{CH}_4 + \text{H}_2\text{O} \rightarrow 2\text{CH}_3\text{OH} + \text{O}_2$), (Table 3, #11), (ALS). Higher yields were obtained from 16% formaldehyde (Table 4, #19). Methanol was found to produce acetic acid, oxygen, ribose, ribulose, sugar alcohols, noncarbohydrates, glucose, acetic acid, glycerol, acetic acid derivatives and monosaccharides.

Materials: Carbonated water, distilled water, formic acid, formaldehyde (16%, without methanol), potassium bicarbonate, potassium thiocyanate, sulfuric acid, ammonia hydroxide, methyl cyanide, sodium hydrosulfide hydrate, potassium hydroxide, propane, methane and dilute silicic acid.

Methods: Bubbling methane or propane into carbonated water was the simplest method to produce methanol (Table 3, #11).

Results: Bubbling propane into carbonated water produced 33ug/mL of methanol (Table 4, #1, 14, 17), (Table 3, (#11, #12)), (ALS). Providing evidence that methanol can be easily produced in the plant from carbonated water from either atmospheric methane, propane or methane produced by the plant (Nisbet, 2009, Covey, 2018). Methane was produced from (12volts + H₂ + 180mls cold carbonated water + 2.5mls KSi(OH)₄ + 0.17mls H₂SO₄ + 0.61mls SCN + 0.61mls NaSH ---> 5ug/L of CH₄), however these results were not reliable (ALS), (Keppler, 2006).

16% formaldehyde solution produced the highest yields of methanol (60mls H₂O + 0.61mls KSi(OH)₄ + 5mls 16% CH₂O + 0.3mls CH₃CN + 0.61mls KSCN + 0.61mls NaSH ---> 2,200ug/ml of methanol), (Table 3, #10, 19, 20). When formic acid was used instead of formaldehyde the yields of methanol were reduced from 91% - 99.8% (ALS).

Methanol produced noncarbohydrates, acetic acid derivatives, acetic acid, glucose, glycerol, oxygen and monosaccharides (CCRC, Anresco, ETS Analytical and R&L Analytical).

Methanol	HCOOH mg/L	CH ₃ OH ug/ml	Methanol	CH ₃ OH ug/ml	HCOOH mg/L
1) 210mls rain water + 1.25mls NaSi(OH) ₄ + 5mls 16% CH ₂ O (no CH ₃ OH) + 0.6mls HCl + 0.3mls H ₂ SO ₄ + 0.3mls NaSH + 0.6mls KHCO ₃ .	31	28	13) 60mls water + 1.25mls dilute NaSi(OH) ₄ + 2.5mls HCOOH + 1.25mls NaSH	1.7	
2) 120mls water + 5mls CH ₂ O (w/o CH ₃ OH) + 1ml dilute KSi(OH) ₄ + 1.25mls CH ₃ CN + 1.1mls H ₂ SO ₄		34	14) 60mls water + 1.25mls dilute NaSi(OH) ₄ + 2.5mls HCOOH + 0.3mls Thiocyanide + 0.3mls NaSH	1.6	
3) 60mls H ₂ O + 5mls CH ₂ O (w/o CH ₃ OH) 2.5mls dilute KSi(OH) ₄ + 1.3mls CH ₃ CN + 0.6mls NaSH		210	15) 60mls water + 1.25mls dilute NaSi(OH) ₄ + 2.5mls HCOOH + 0.6mls CH ₃ CN + 0.6mls NaSH	1.4	
4) 180mls water + 2mls dilute KSi(OH) ₄ + 5 mls CH ₂ O (w/o CH ₃ OH) + 1.3mls CH ₃ OH + 0.6mls NaSH + 1ml HCL + 0.6mls NaSH		110	16) 60mls water + 1.25mls dilute KSi(OH) ₄ + 1.25mls HCOOH + 0.6mls NaSH	3.7	
5) 120mls water + 5mls CH ₂ O (w/o CH ₃ OH) + 1.1mls CH ₃ CN + 0.6mls NaSH + 0.5mls H ₂ SO ₄ + NaSH to pH 7		44	17) 60mls water + 1.25mls dilute KSi(OH) ₄ + 1.25mls HCOOH + 0.3mls ThioCN + 0.3mls NaSH	1.9	
6) 150mls water + 0.3mls dilute KSi(OH) ₄ + 5mls CH ₂ O (w/o CH ₃ OH) + 0.6mls NaSH + 1ml NH ₃ + 1ml H ₂ SO ₄ + NaSH pH 6 No CH₃CN		91	18) 60mls water + 0.6mls NaSi(OH) ₄ + 5mls 16% CH ₂ O + 0.3mls KSCN + 0.3mls CH ₃ CN + 0.6mls NaSH	876	
7) 150mls water + 2.2mls dilute KSi(OH) ₄ + 5mls CH ₂ O (w/o CH ₃ OH) + 1.3mls CH ₃ CN + 0.6mls NH ₃ + 0.1mls H ₂ SO ₄ No NaSH		57	19) 60mls water + 0.6mls dilute KSi(OH) ₄ + 5mls 16% CH ₂ O + 0.3mls KSCN + 0.3mls CH ₃ CN + 0.6mls NaSH	2200	
8) 90mls H ₂ CO ₃ + CH ₄ + 0.6mls NaSH 2-19-20		2.5	20) 60mls H ₂ O + 1.25mls dilute NaSi(OH) ₄ + 5mls 16% CH ₂ O + 0.1mls H ₂ SO ₄ + 1.25mls NaSH	1200	
9) 60mls water + 1.2mls NaSi(OH) ₄ + 5mls 16% CH ₂ O + 1.25mls SCN + 1.25mls NaSH pH 8+		750	21) 60mls H ₂ O + 1.25ml dilute NaSi(OH) ₄ + 1.25mls HCOOH + 0.1mls H ₂ SO ₄ + 0.3mls KSCN + 1.25mls NaSH	18	
10) 60mls water + 1mls dilute NaSi(OH) ₄ + 5mls 16% CH ₂ O + 0.6mls KHCN + 0.6mls SCN + 0.3mls NaSH		750	22) 60mls air bubbled water + 0.6mls NaSi(OH) ₄ + 5mls 16% CH ₂ O + 0.3mls CH ₃ CN + 0.1mlsH ₂ SO ₄ + 0.3mls NaSH + 0.3mls NH ₃ + 0.1mls KHCO ₃ + 0.1mls H ₂ SO ₄	120	28
11) 60mls carbonated water + propane Oct 12		33	Dilute: 240mls H₂O + 5mls KSi(OH)₄ or 5mls NaSi(OH)₄		
12) 60mls cold carbonated water + propane + 1mls NaSH		8.8			

(Table 3)

Discussion: Plants produce 10-45 percent of the total global atmospheric methane; could this methane produced by the plant be a source of methane to produce methanol from carbonic acid, thus accounting for methanol emission from plants (Nisbet, 2009, Covey, 2018).

Research has shown that the application of methanol to the leaves will increase yields (Fall, 1996), (Harley, 2007), (MacDonald, 1993), (Nemecek, 1995). Ocean water should also be tested for the synthesis of methanol (Ocean water + methane ---> CH₃OH). Using warm carbonated water instead of cold.

Abiotic Synthesis of Glycerol and Oxygen from Carbonic Acid and Methanol and the Abiotic Synthesis of Glycerol 1, 2, 3-Phosphate.

Glycerol (C₃H₈O₃) and oxygen were produced from carbonic acid from cold carbonated

water and methanol, producing from 70ppm to 220ppm glycerol and 1.1 mg/L oxygen ($2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$), (Table 4, #1, 10), (Table 5, #1), (Iowa Central Fuel Testing, R&L Analytical and CCRC). Greater yields of glycerol were produced when sulfuric acid and acetone was added (Table 4, #14), (CCRC). Glycerol was also produced from formaldehyde and xylitol (Table 4, #22, 23).

Glycerol produced ribose, ribulose, rhamnose, noncarbohydrates and carbohydrate intermediates when hydrogen peroxide was added to glycerol and formic acid (CCRC, R&L Analytical, SDK, Anresco), (Table 6, #28, 33).

Glycerol 1, 2 & 3 phosphate, was produced from glycerol, phosphoric acid, cyanate and potassium hydroxide/calcium carbonate (Fig. 8).

Materials: Distilled water, carbonated water, glycerol, phosphoric acid, potassium cyanate, calcium carbonate, silicic acid, methanol, acetone, sulfuric acid, formic acid and potassium hydroxide.

Methods: Mixing in order and combinations of cold carbonated water, distilled water, sulfuric acid, formic acid, methanol, cyanate and acetone.

Results: Glycerol was produced from; 1) Cold carbonated water and methanol (30mls cold carbonated water + 15mls methanol $\rightarrow$ 90ppm of glycerol and 1.1mg/L of oxygen), (CCRC, Iowa Central Fuel testing and R&L Analytical), (Table 4, #24), (Table 5, #1). 2) From formic acid, carbonated water and acetone (30mls carbonated water + 0.61mls formic acid + 10mls acetone $\rightarrow$ 709.2ug/ml of glycerol), (CCRC), (Table 4, #19), (Fig 13, CCRC). 3) From methanol, carbonated water and sulfuric acid (30mls carbonated water + 0.17mls H_2SO_4 + 10mls CH_3OH $\rightarrow$ 374.2ug/mg of glycerol, pinitol, glucose, xylitol, arabinose, xylose and 1.1mg/L oxygen), (Fig 9), (CCRC), (Table 5, #1, R&L Analytical). 4) From 16% formaldehyde (5mls 16% CH_2O + 30mls H_2O + 0.61mls NH_3OH + 0.3mls HCOOH $\rightarrow$ 10,900ppm of glycerol) and (30mls distilled water + 5mls 16% formaldehyde + 0.61mls NH_3OH + 5mls H_2O_2 + 0.55mls HCOOH $\rightarrow$ 3.7% solution of glycerol), (Table 4, #22, 23, 26), (Anresco). 5) From xylitol (15mls xylitol + 15mls distilled water + 10mls H_2O_2 + 0.5mls HCOOH $\rightarrow$ 4.2ug/10uL of glycerol + 24.3ug/uL of ribulose + fructose + ribitol derivatives), (CCRC).

Ribose was produced from the oxidation of glycerol with hydrogen peroxide in distilled water; 1) (10mls glycerol + 15mls distilled water + 5mls H_2O_2 + 10mls CH_3OH $\rightarrow$ 1900ppm solution of ribose), (Table 6, #27, Anresco). 2) (15mls glycerol + 10mls H_2O + 0.3mls dilute $\text{NaSi}(\text{OH})_4$ + 2.5mls acetone + 5mls H_2O_2 + 7mls CH_3OH $\rightarrow$ 20.8% solution of ribose), (Anresco), (Table 6, #35). 3) (10mls glycerol + 15mls H_2O + 5mls H_2O_2 + 0.61mls HCOOH $\rightarrow$ 35.2ug/uL of ribose), (Table 6, #33, Anresco).

Ribulose was produced from the oxidation of glycerol with hydrogen peroxide in carbonated water; (15mls glycerol + 15mls cold carbonated water + 0.3mls HCOOH + 10mls H_2O_2 + 5mls CH_3OH $\rightarrow$ 24.6ug/uL of ribulose + non-carbohydrates), (Table 6, #14, 28, 30, 32), (CCRC, Anresco). ($\text{C}_3\text{H}_8\text{O}_3 + \text{H}_2\text{CO}_3 + \text{HCOOH} + 2\text{H}_2\text{O}_2 \rightarrow \text{C}_5\text{H}_{10}\text{O}_5 + 3\text{H}_2\text{O} + 2\text{O}_2$).

Rhamnose was produced from the oxidation of glycerol with hydrogen peroxide in distilled water; 1) (5mls glycerol + 60mls H_2O + 1.23mls acetone + 2.5mls H_2O_2 + 0.61mls HCOOH $\rightarrow$ 12.9% solution of rhamnose), (Table 6, 1-5, 31), (Anresco, SDK). 2) (5mls glycerol + 30mls H_2O +

2.5mls H₂O₂ + 0.61mls HCOOH ---> 40.63% solution of rhamnose), (Table 6, #1-5, 17, 31), (Anresco, SDK).

Rhamnose produced ribulose, ribulose derivatives and non-carbohydrates from; 1) (15mls rhamnose + 20mls H₂O + 0.61mls HCOOH + 0.088mls H₃PO₄ + 0.15mls KOCN + 0.15mls HCN ---> ribulose + ribulose derivatives + non-carbohydrates (CCRC). 2) (10mls Rhamnose + 15mls H₂O + 0.3mls HCOOH + 0.31mls H₃PO₄ + 1.25mls KOCN + 0.61mls KOH ---> 11.7mg/mL of ribulose + mannose-semicarbazone + 1,5-anhydrol-1-rhamnitol + glucopyranosyl azide + ribono-1,4-lactone + 4-acetamideo-4,6-dideoxyl-galactopranose + 1,4-anhydro-D-xylitol), (CCRC).

Glycerol 1, 2 and 3-phosphate was produced from (30mls H₂O + 60mls C₃H₈O₃ + 10mls H₃PO₄ + 5mls KOCN + 2.5mls KOH ---> C₃H₉O₆P), (Fig 8), (CCRC).

Sugar Alcohol-Polyols	Xylitol	Glycerol ppm	Galactitol	Non-Carbohydrates unknowns
1) 90mls iced carbonated water+ 0.09mls H ₂ SO ₄ + 15mls CH ₃ OH		210		
2) 90mls carbonated water+ 15mls erythritol	0	0	0	
3) 90mls carbonated water+ 15mls glycerol	0	182,000	0	
4) 90mls carbonated water + 10mls ethanol (Fig 16, #14)	+++	0	0	
5) (Fig16, #9) 30mls carbonated water + 0.6mls HCOOH + 10mls isopropyl	0	0	0	+++++
6) 2.5mls HCOOH + 30mls carbonated water +10mls CH ₃ OH + 10 drops NH ₃ OH		5100		
7) 30mls formamide + 5mls H ₂ O ₂ + 5mls HCOOH + ¼ tsp NH ₃ OH			1.36%	
8) (Fig 16, #13) 15mls xylitol + 15mls H ₂ O + 10mls H ₂ O ₂ + 0.5mls HCOOH	+++	4,200 ,000		++
9) 35mls cold carbonated water + 0.85mls NH ₃ OH + 5mls CH ₃ OH 11/30/21	ND	ND		
10) 15mls cold carbonated water + 15mls cold CH ₃ OH		190		
11) 15mls H ₂ O + 15mls CH ₃ OH + 0.3mls KCN		80		
12) 15mls carbonated water + 5mls dilute Si(OH) ₄ + 15mls CH ₃ OH		70		
13) 30mls carbonated water iced + 0.3mls HCOOH + 15mls CH ₃ OH iced		170		
14) 30mls carbonated water + 0.6mls HCOOH + 10mls acetone CCRC		709,200		
14b) 30mls carbonated water + 0.6mls HCOOH + 10mls acetone ICF		0.00		

(Table 4)

Sugar Alcohols	Xylitol ppm	Glycerol ppm
14c) 30mls water + 0.6mls HCOOH + 10mls Acetone (Iowa Central Fuel testing)		320
15) 90mls carbonated water + 15mls sorbitol	0	0
16) 90mls carbonated water+ 15mls mannitol	0	0
17) 90mls carbonated water+ 15mls a-Terpeneol	0	0
18) 540mls carbonated water + 0.35mls H ₂ SO ₄ + 60mls Methanol-concentrated		100
19) 90mls carbonated water + 15mls xylitol	0	0
20) 25mls formamide + 5mls H ₂ O ₂ + 10mls CH ₃ OH	600	100
21) 2.5mls HCOOH + 30mls carbonated water + 0.85mls NH ₃ OH + 10mls CH ₃ OH		1100
22) 30mls H ₂ O + 16% CH ₂ O + 0.65mls NH ₃ OH + 0.31mls HCOOH		10900
23) 5mls 16% CH ₂ O + 30mls H ₂ O + 1.5mls NH ₃ OH + 0.61mls HCOOH 11/23		11800
24) 15mls carbonated water + 15mls CH ₃ OH		90
25) 15mls carbonated water iced + 0.35mls H ₂ SO ₄ + 15mls CH ₃ OH iced		210
26) 10mls CH ₂ O + 1.6mls NH ₃ OH + 5mls H ₂ O ₂ + 0.91mls HCOOH		3.76%

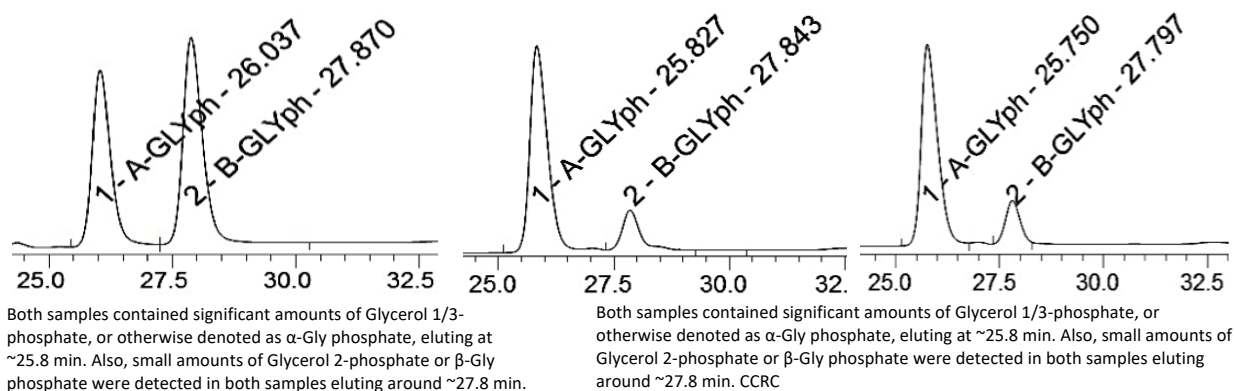
Oxygen from Carbonic Acid	Glycerol ppm	O ₂ mg/L
1) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 15mls CH ₃ OH	210	1.1
2) 90mls carbonated water (iced) + 0.09mls H ₂ SO ₄ + 15mls butanol		0.4
3) 90mls carbonated water + 0.17mls HCOOH + 10mls isopropyl		1.6
4) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 5mls mannitol		0.8
5) carbonated water + 0.09mls H ₂ SO ₄ Control		0.3
6) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 0.41mls NaSH		0.3
7) Carbonated water Control		0.3
8) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 15mls Ethanol (Fig 16, #14)		0.6

(Table 5)
R&L Analytical

Oxygen from Carbonic Acid	O ₂ mg/L
9) 90mls carbonated water (iced) + 0.09mls H ₂ SO ₄ + 15mls maltitol	0.7
10) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 15mls butanol	0.4
11) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 5mls xylitol	0.3
12) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 5mls erythritol	0.5
13) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 5mls inositol	2.0
14) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 10mls polyethylene glycol	2.0
15) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 5mls dulcitol	2.8
16) 90mls carbonated water iced + 0.09mls H ₂ SO ₄ + 15mls glycerol	1.1
17) 90mls carbonated water + 0.61mls SCN (chemical test)	3ppm

Discussion: Anresco and SDK laboratories mass spectrometry machines were calibrated to test only for rhamnose from a standard sample of rhamnose purchased from Sigma Aldrich (Table 6, #1-5, 31).

Since glycerol was easily produced from formaldehyde, xylitol, methanol and carbonated water, and that glycerol was found to produce, ribulose, rhamnose, carbohydrate intermediates, non-carbohydrates and lipids. Makes one question if glycerol could be the first sugar alcohol of photosynthesis that also produces monosaccharides and carbohydrate intermediates by detoxifying hydrogen peroxide in plants (Hopkins, 2009, Plant Physiology).



(Fig.8) Sample Contents: 30mls water + 30mls glycerol + 5mls phosphoric acid + 5mls potassium cyanate + 2.5mls calcium carbonate + 5mls potassium hydroxide to adjust pH close to neutral (CCRC).

Abiotic Synthesis of Monosaccharides; Glucose, Rhamnose, Ribose, Ribulose, Xylose, Fructose, Fructose 6-Phosphate and Glucose 1 & 6-Phosphate.

Monosaccharides; glucose, ribose, ribulose, rhamnose, fructose, mannose, maltose and others were produced when various sugar alcohols were oxidized with 3% hydrogen peroxide solution (Table 6), (Fig. 10).

Glucose 1 & 6-phosphate and fructose 6-phosphate was produced from distilled water, phosphoric acid, glucose/fructose/glycerol, potassium cyanate, dilute silicic acid and potassium hydroxide/calcium carbonate for pH adjustment (Fig. 13).

Materials: Sugar alcohols, carbonated water, distilled water, glycerol, 3% hydrogen peroxide, glucose, formic acid, acetic acid, potassium cyanate, phosphoric acid, dilute silicic acid and calcium carbonate (Table 6).

Methods: Mixing distilled water and carbonated water with various species of sugar alcohol, then adding 3% hydrogen peroxide solution and formic acid or acetic acid or methanol to produced monosaccharides.

Phosphorylation of glucose and fructose was achieved with; distilled water, potassium cyanate, phosphoric acid, formic acid, acetic acid and pH adjusted with potassium hydroxide.

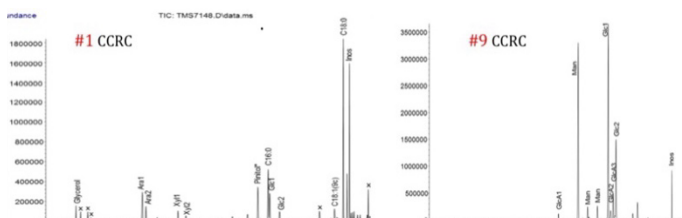
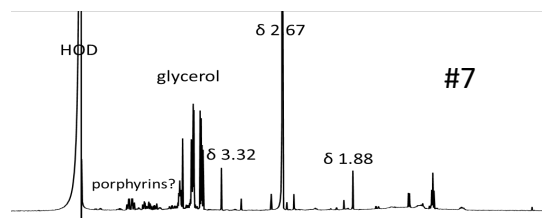
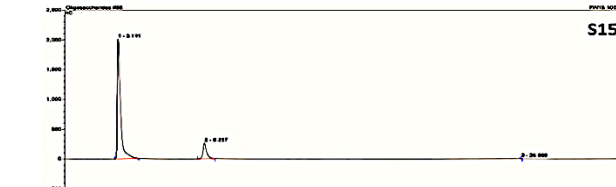
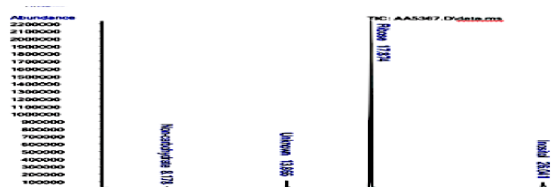
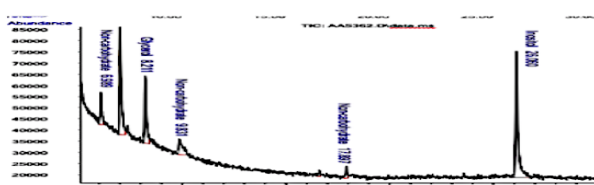
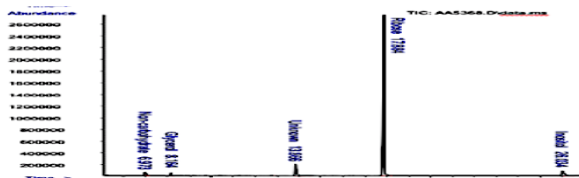
Results: It was found that the general chemistry for the synthesis of monosaccharides from sugar alcohols as (60mls H₂O + 5mls sugar alcohol + 2.5mls H₂O₂ + 0.61mls HCOOH --->

monosaccharides), (Table 6, # 1-5, 1, 31), (SDK, Anresco Labs). Substituting acetic acid and methanol for formic acid reduced the yields of monosaccharides produced.

Glucose was produced from the oxidation of either sorbitol or mannitol with hydrogen peroxide; 1) (15mls mannitol/sorbitol + 20mls distilled water + 2.5mls H₂O₂ + 0.3 - 0.61mls formic acid or acetic acid ---> 20% solution of glucose), (Table 6, #8-11 & 21-23). 2) Lower yields of glucose were produced from dulcitol and arabitol. Glucose was also produced from mannitol; (C₆H₁₄O₆ + H₂O + H₂O₂ + 6HCOOH ---> 2C₆H₁₂O₆ + 3H₂O + 3O₂).

Sugar Alcohol ---> Monosaccharides %	Rhamnose	Glucose	Lactose	Maltose	Fructose	Xylose	Ribose	Ribulose Ug/uL	Galactitol
1) 5mls glycerol + 60mls iced H ₂ CO ₃ + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	11.7%	0	0	0	0	0			
2) 5mls glycerol + 2 oz water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	12.2	0	0	0	0	0			
3) 5mls glycerol + 2 oz H ₂ CO ₃ iced + 2.5mls H ₂ O ₂ + 1.3mls HCOOH + 2mls tsp KHCO ₃	8.4	0	0	0	0	0			
4) 5mls glycerol + 60mls water + 0.6mls HS + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	11.7	0	0	0	0	0			
5) 5mls glycerol + 60mls water + 1.25mls acetone + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	12.9	0	0	0	0	0			
6) 15mls xylitol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	0	14.4%	0			
6b) 15mls xylitol + 60mls H ₂ O + 2.5mls H ₂ O ₂ + 1.25mls HCOOH					20.8%				
7) 15mls Erythritol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	0	0	23			
8) 15mls Mannitol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	19.3	0	0	0	0			
9) 15mls sorbitol + 60mls water + 2.5mls H ₂ O ₂ + 0.5mls HCOOH	0	25.5	0	0	0	0			
10) 15mls sorbitol + 60mls water + 2.5mls H ₂ O ₂ + 0.5mls H ₃ PO ₄ + 0.6mls CaCO ₃	0	22	0	0	0	0			
11) 15mls sorbitol + 60mls water + 2.5mls H ₂ O ₂ + 0.31mls CH ₃ COOH	0	19.6	0	0	0	0			
12) 15mls Inositol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	24.1	0	0			
13) 15mls Polyethylene Glycol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	0	0	0			
14) 15mls Adonitol/Ribitol + 30mls water + 2.5mls H ₂ O ₂ + 0.8mls HCOOH	0	0	0	0	0	0	0.3%	0.3%	
15) 5 gms Adonitol + 40mls H ₂ O + 2.5mls H ₂ O ₂ + 2.5mls CH ₃ OH	0	0	0	0	0	0	0	0	
16) 5 gms Adonitol + 15 mls water + 10mls H ₂ O ₂ + 15mls CH ₃ OH						0	0	0	
17) 15mls Maltitol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0.4	0	0	20.4	0	0			
18) 15mls Inositol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	19.8	0.2	0	0		
19) 5gms Lactitol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	0	0.1	0	0	0	
20) 15mls D-Arabitol + 60mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	0	0	0	13.8%	0			
21) 15mls Dulcitol + 90mls water + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	0	3.6	0	0	0.1	0			
22) 15mls Dulcitol + 30mls H ₂ O + 2.5mls H ₂ O ₂ + 5mls CH ₃ OH		5.12							
23) 15mls glucose + 60mls water + 2.5mls H ₂ O ₂ + 1ml HCOOH	0	12.5	0	0	0	0	0	0	
24) 15mls Terpeneol + 60mls water + 2.5mls H ₂ O ₂ + 1.1mls HCOOH	0	0	0	0	0	0	0	0	
25) 15mls Ribose + 60mls water + 2.5mls H ₂ O ₂ + 1.1mls HCOOH	0	0	0	0	0	0	20%	0	
26) 30mls Formamide + 5mls H ₂ O ₂ + 5mls HCOOH + 1.25mls NH ₃ OH							0		1.36%
27) 10mls Glycerol + 15mls water + 5mls H ₂ O ₂ + 1.3mls CH ₃ OH							0.19		
28) Fig 16, #10) 10mls glycerol+ 20mls carbonated water + 10mls H ₂ O ₂ + 1.3mls HCOOH (CCRC)	0							17.1	
29) 25mls Water + 1.25mls NH ₃ OH + 5mls CH ₃ OH	0	0	0	0	0	0	0	0	0
30) Fig 16, #26) 2.5mls HCOOH + 30mls Carbonated water + 10mls CH ₃ OH + 2mls NH ₃ OH (CCRC)								26.7	
31) 5mls glycerol + 30mls H ₂ O + 2.5mls H ₂ O ₂ + 1.3mls HCOOH	40.63								
32) 10mls glycerol + 15mls H ₂ O + 5mls H ₂ O ₂ + 5mls CH ₃ OH								13.11	
33) 10mls glycerol + 15mls H ₂ O + 5mls H ₂ O ₂ + 1.2mls HCOOH							35.2		
34) 35mls cold carbonated water + 2mls NH ₃ OH + 5mls CH ₃ OH 11-30	ND	ND	ND	ND	ND	ND	ND	ND	ND
35) 15mls glycerol + 10mls H ₂ O + 0.5mls dilute NaSi(OH) ₄ + 2.5mls acetone + 5mls H ₂ O ₂ + 7mls CH ₃ OH 5-29-22							20.8		

(Table 6) (Anresco, SDK Analytical)



Ribose was produced from distilled water, glycerol, methanol or formic acid and 3% hydrogen peroxide; 1) (10mls glycerol + 15mls water + 5mls H₂O₂ + 0.61mls HCOOH ---> 35.2% solution of ribose), (Table 6, #27, 33, 35). 2) From adonitol and ribitol, ribose was produced (10mls adonitol/ribitol + 15mls water + 10mls H₂O₂ + 0.61mls HCOOH ---> 0.28% solution of ribose + 0.29% solution of ribulose + glycerol + non-carbohydrates + unknowns), (CCRC), (Anresco), (Table 6, #14, 25, 27, 28, 30, 32), (Fig 9, 10).

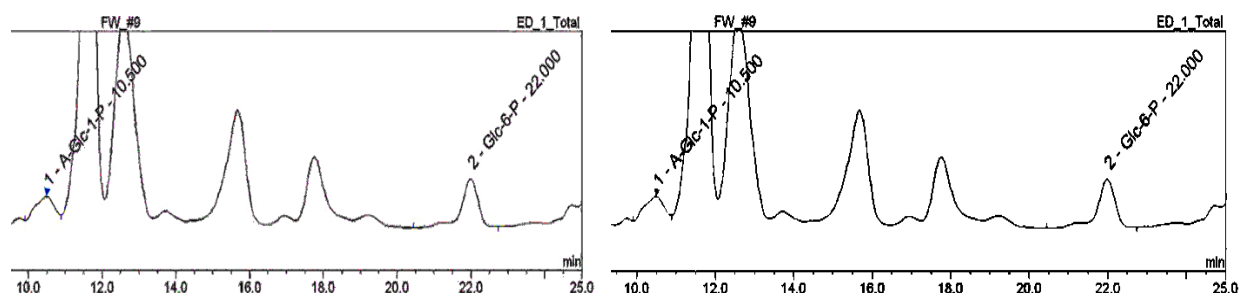
Ribulose was produced from carbonated water, hydrogen peroxide, formic acid, methanol and ammonia; 1) (2.5mls HCOOH + 30mls carbonated water + 10mls CH₃OH + 2mls NH₃OH ---> 26.7mg/uL ribulose), (Table 6, #14, 28, 30, 32), (CCRC and Anresco). 2) (10mls glycerol + 20mls carbonated water + 10mls H₂O₂ + 0.95mls HCOOH ---> 17,100ppm solution of ribulose), (CCRC). (C₃H₈O₃ + H₂CO₃ + HCOOH + H₂O₂ ---> C₅H₁₀O₅ + 3H₂O + 2O₂). 3) (10mls Glycerol + 15mls distilled water + 5mls hydrogen peroxide + 5mls CH₃OH ---> 13.11Ug/uL ribulose).

Fructose was produced from the oxidation of xylitol, galactitol, arabitol, inositol, lactitol, and dulcitol with hydrogen peroxide (Table 6, #6, 6b, 18-21). From xylitol (15mls xylitol + 60mls distilled water + 2.5mls H₂O₂ + 0.61mls HCOOH ---> 20.8% solution of fructose + ribulose, ribitol derivatives + glycerol), (CCRC), (Table 6, #6, 6b, 18-21).

Glucose 1 & 6-Phosphate was produced from (30mls distilled water + 0.61mls KSi(OH)₄ + 30mls glucose + 5mls KOCN + 10mls H₃PO₄ + 2.5mls KOH), (Fig 25), (CCRC). Fructose 6-phosphate was produced from (30mls water + 30mls fructose + 5mls potassium cyanate + 10mls phosphoric acid + 2.5mls KOH/CaCO₃), (Fig 13, 14).

Discussion: The synthesis of monosaccharides from the oxidation of sugar alcohols with 3% hydrogen peroxide could possibly give evidence for the necessity of sugar alcohols to at least produce some monosaccharides and to detoxify hydrogen peroxide in the plant (Heldt, 2005).

The phosphorylation of sugars and sugar alcohols could possibly give chemical evidence for the formation of phosphorylated compounds in plants.



(Fig. 13) In both samples' significant amounts of Glc 6-phosphate were detected eluting around ~22 min. Additionally, small amounts of β-Glc 1-phosphate were detected in sample FW_#8 eluting at ~12.9 min as well as small amounts of α-Glc 1-phosphate in sample FW_#9 eluting at ~10.5 min. (CCRC)

(30mls glucose + 30mls water + 5mls phosphoric acid + 5mls potassium cyanate (KOCN) + 1/8tsp Calcium carbonate + 2.5 mls potassium hydroxide (used to raise the pH close to neutral), (C₆H₁₂O₆ + H₂O + H₃PO₄ + KOCN + CaCO₃ + KOH ---> C₆H₁₃O₉P).

Sample	Glycosyl residue	Mole%
#1	Arabinose (Ara)	55.0
	Xylose (Xyl)	15.0
	Glucose (Glc)	30.0
		100
#7	Xylose (Xyl)	34.0
	Glucose (Glc)	66.0
		100
#9	Glucuronic Acid (GlcA)	20.5
	Mannose (Man)	29.5
	Glucose (Glc)	50.0
		100

In all the tested samples carbohydrate content was estimated as less than 1%. 60mg of dry material was used to prepare the samples for testing.

Sample #1: glycerol, arabinose, xylose, pinitol, glucose, dimethylurea and fatty acids.

Sample #2, #3, #4, #5, #6: Formate

Samples #2, #4, #5, #6, #7: Acetic acid methyl groups

Sample #3: urea, glycerol

Sample #4: Mannose, Glucose, glycerol and Glucuronic acid

Sample #5: Glycerol

Sample #7: Glucose, xylose, glycerol, porphyrins and fatty acids.

Sample #9: Mannose, glucose, N-methylurea and glucuronic acid

Sample #1: 15mls H₂CO₃ + 0.15mls H₂SO₄ + 15 mls CH₃OH.

Sample #2: 15mls H₂CO₃ + 5mls CH₃OH + 0.15mls cyanogen + 0.15mls KSi(OH)₄

Sample #3: 15mls H₂CO₃ + 0.61mls KSi(OH)₄ + 15mls CH₃OH + 0.15mls KCN + 0.15mls CN₂H₂

Sample #4: 15mls H₂CO₃ + 0.61mls KSi(OH)₄ + 15 mls CH₃OH

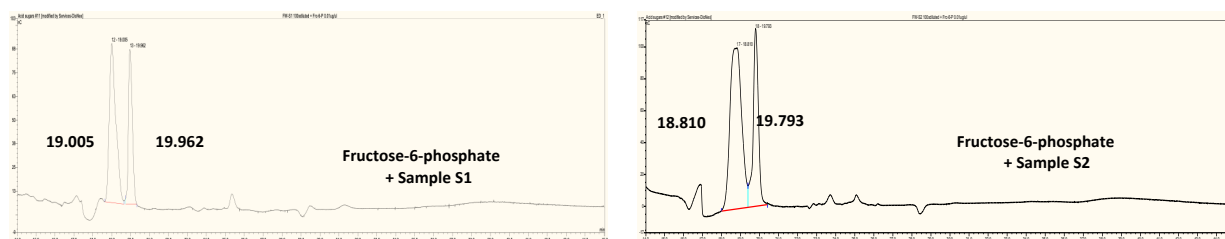
Sample #5: 15mls H₂CO₃ + 0.61mls KSi(OH)₄ + 0.15mls ZrCO₃ + 15 mls CH₃OH + 0.15mls KCN

Sample #6: 15mls H₂CO₃ + 0.15mls KSi(OH)₄ + 15 mls CH₃OH

Sample #7: 15mls H₂CO₃ + H₂ gas + 0.15mls KSi(OH)₄ + 0.17mls H₂SO₄ + 15mls CH₃OH

Sample #9: 15mls H₂CO₃ + 0.15mls KSi(OH)₄ + 2 drops H₂SO₄ + 0.61mls oxalic acid + 0.61mls HCOOH + 15mls CH₃OH.

(Fig 15) CCRC

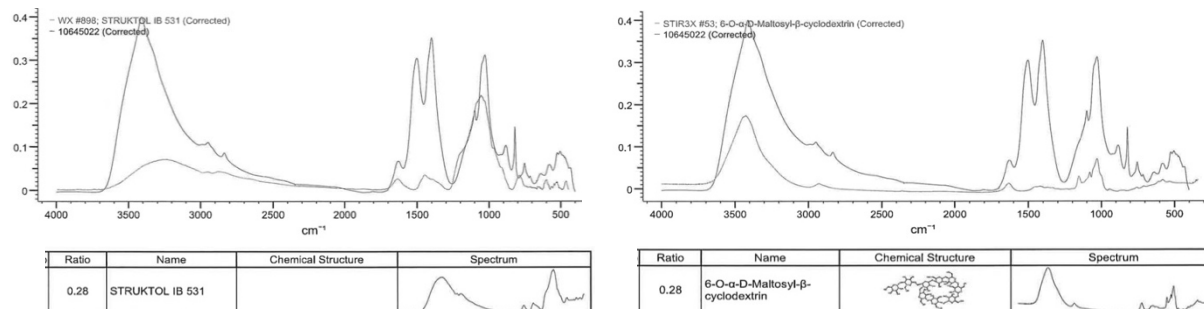


(Fig 14) Sample #1 & 2 were mixed with fructose-6-phosphate standard and separated by CarboPac PA20 column (CCRC).

Abiotic Synthesis of a Cyclodextrin, STRUKTOL 1B 531, Glycogen and Oxygen from Carbonic Acid and a 1.5-Volt Battery Hooked up to Either Copper or Aluminum Wire Electrodes.

Cyclodextrin (6-O- α -D-Maltosyl- β -Cyclodextrin), (STRUKTOL 1B 531), glycogen and oxygen were synthesized from 60mls warm carbonated water, 0.1mls potassium silicic acid and a 1.5-volt battery hooked up to either aluminum or copper wire electrodes in warm carbonated water (RJ Lee Group), (Creative Proteomics), (Fig. 1, 7, 14-18), (Arnold, 1976), (Porcellinis, 2017).

Plants produce (0.28-volts - 0.626-volts) of electricity and cyanobacteria produce (1.4-volts - 1.5-volts) of electricity from the photosynthetic process. Could this electricity produced by plants and cyanobacteria during photosynthesis produce these polymers on a micro level from the ionization of aluminum (Al^{3+}) or other metals with carbonic acid in the plant or cyanobacteria? ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{cyclodextrin} + \text{glycogen} + \text{H}_2\text{O} + \text{O}_2$). Cyclodextrin ($42\text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{Al}(\text{C}_{42}\text{H}_{70}\text{O}_{35}) * 7\text{H}_2\text{O} + 42\text{O}_2$). Glycogen ($6\text{H}_2\text{CO}_3 + \text{Cu}^{2+} + 1.5\text{-volts (e}^-) \rightarrow \text{Cu}(\text{C}_6\text{H}_{10}\text{O}_5)_n + \text{H}_2\text{O} + 6\text{O}_2$), was detected using chemical analysis procedures (Creative Proteomics), (Fig. 1, 2, 7, 16-20), (Schmitt, 2016).



(Fig.16) (RJ Lee Group), (12-Volts + 60mls Carbonated Water + 0.31mls NaSH + 0.1mls $\text{KSi}(\text{OH})_4$ and Copper wire electrodes

Glycogenesis Metabolism Analysis

Sample name	glycogen content (mg/mL)
polymer	0.266

Transfer a 0.2ml sample into tube, add 0.75ml of KOH solution, vortex thoroughly, and maintain at 95°C for 20 minutes, shaking the tube every 5 minutes to ensure mixing. The, dilute the mixture to a total volume of 5ml with distilled water, vortexed and centrifuged at 8,000 g for 10 minutes at 25°C, collect the supernatant sample to each tube separately. Add with 240 ul anthraquinone solution into each tube, incubated for 10 minutes at 95°C, cooled down to room temperature. Transfer 0.2ml solution vortexed and the absorbance value was determined at 620nm.

(Fig.17) Creative Proteomics, (12-Volts + 60mls Carbonated Water + 0.31mls NaSH + 0.1mls $\text{KSi}(\text{OH})_4$. Copper wire electrodes

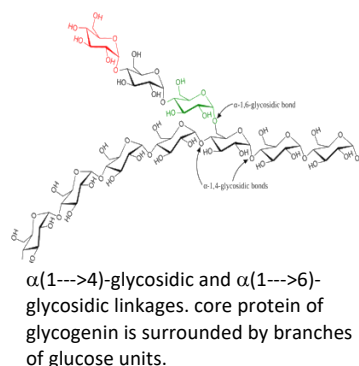
Materials: 1.5-volt battery, 2-volt DC transformer, 12-volt battery, 6-volt AC transformer, sodium hydrosulfate, silicic acid, methanol, warm carbonated water, warm ocean water, warm distilled water with sodium chloride, sodium chloride, copper wire, steel wire, stainless-steel

wire, magnesium wire and aluminum wire. Carbon dioxide in water was replicated with warm carbonated water, warm ocean water or warm distilled water with sodium chloride added to produce these polymers from carbonic acid and low voltage electricity.

Methods: Copper, steel, aluminum, magnesium or other metal wire electrodes hooked up to a 1.5-volt or 12-volt battery placed inside a 240ml mason jar filled with either warm carbonated water, warm ocean water or warm distilled water with sodium chloride added (Fig 1).

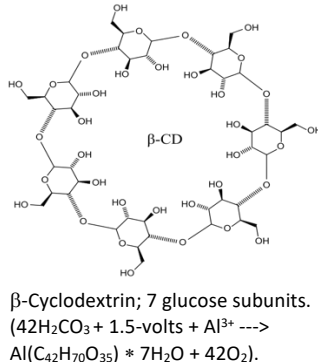
Carbonated water contains approximately 3 - 7 grams of carbon dioxide per liter, distilled water contains approximately 1.7 - 2 grams of carbon dioxide per liter and ocean water contains over 1.45 grams of carbon dioxide per liter of water.

Glycogen Structure



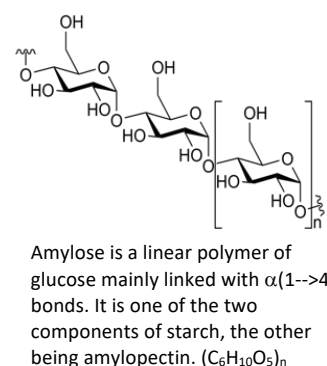
(Fig.18)

β -Cyclodextrin Structure



(Fig.19)

Starch Structure



(Fig.20)

Results: Cyclodextrin, (STRUKTOL 1B 531), glycogen and oxygen were abiotically produced from 45mls warm carbonated water, 0.3mls sodium hydrosulfide, 0.1mls silicic acid and a 1.5-volt or 12-volt battery hooked up to aluminum wire electrodes in either warm carbonated water, warm ocean water or warm distilled water with sodium chloride added (Fig. 1, 7, 16-20), (Creative Proteonics), (RJ Lee Group). Polymers were also produced from; 1) Warm carbonated water, methanol, a 12-volt battery and copper electrodes. 2) Warm carbonated water, cyanide, sodium hydrosulfate, a 12-volt battery and aluminum wire electrodes. 3) Ocean water, a 1.5-volt battery and aluminum wire electrodes. 4) Warm carbonated water, silicic acid, a 1.5-volt battery and aluminum wire electrodes. 5) 45mls warm distilled water, 0.3mls silicic acid, 0.6mls sodium chloride, a 1.5-volt battery and copper wire electrodes. 6) 1.5-volt battery, carbonated water, potassium silicic acid, sodium hydrosulfide and aluminum wire electrodes. 7) Warm ocean water, aluminum wire electrodes and a 1.5-volt battery. 8) Warm distilled water, 0.6mls NaCl, 1.5-volt battery and aluminum wire electrodes. Copper electrodes produced a blue/green polymer and aluminum electrodes produced a white polymer (Fig. 7, 14-18). Yields were significantly higher using a 12-volt battery and by adding sodium chloride.

Discussion: Could the abiotic synthesis of (6-O- α -D-Maltosyl- β -Cyclodextrin), STRUKTOL, glycogen and oxygen from the electrolysis of aluminum wire electrodes hooked up to a 1.5-volt battery in either warm carbonated water, warm ocean water, or warm distilled water with sodium chloride added open up a new prospective on the physiology of plant growth?

Questioning if the electrolysis of aluminum (Al^{3+}) or other metals inside the plant or cyanobacteria from the electricity produced by the plant or cyanobacteria during photosynthesis is capable of producing these polymers from carbonic acid (Fig. 7), (Arnold, 1976). ($\text{H}_2\text{CO}_3 + \text{Al}^{3+} + 1.5\text{-volts (e}^-) \rightarrow \text{cyclodextrin} + \text{glycogen} + \text{H}_2\text{O} + \text{O}_2$).

Using an AC transformer or stainless wire did not produce any noticeable polymers (Shlosberg, 2022), (Arnold, 1976). Polymer yields were much higher using sodium chloride in carbonated water or distilled water. Using a 12-volt battery greatly increased yields.

Abiotic Synthesis of Acetone from Ammonia and Formic Acid, Ammonia and Acetic Acid or Ammonia and Methanol

Acetone (CH_3COCH_3) was produced from; 1) Methanol and ammonia. 2) Formic acid and ammonia. 3) Acetic acid and ammonia. Showing how easily acetone could be produced by plants, possibly accounting for acetone's emission from plants. ($3\text{HCOOH} + \text{NH}_3\text{OH} \rightarrow \text{C}_3\text{H}_6\text{O} + 2\text{H}_2\text{O} + 2\text{O}_2$), ($4\text{CH}_3\text{OH} + 2\text{NH}_3\text{OH} + \text{H}_2\text{O} \rightarrow 2\text{C}_2\text{H}_6\text{O} + 5\text{H}_2\text{O}$), ($\text{C}_2\text{H}_4\text{O}_2 + 3\text{NH}_3\text{OH} \rightarrow \text{C}_2\text{H}_6\text{O} + 4\text{H}_2\text{O}$).

Materials: Carbonated water, distilled water, sodium and potassium silicate, formic acid, ammonia, methanol and acetic acid.

Methods: Mixing distilled water and ammonia with either formic acid, acetic acid or methanol to produce acetone.

Acetone	isopropyl ug/L	CH ₄ ug/L	Methanol ug/ml	Acetone ug/L MRL 1000	Ribulose Ug/uL	Glycerol ug/mg
1) No gasses. 30mls carbonated water + 15 drops NaSi(OH) ₄ + 2.5 mls acetic acid + 10 mls NH ₃ + 0.6mls NaSi(OH) ₄ + 1'5 mls NH ₃ . pH 7	ND	ND		44000 D		
2) 7oz carbonated water + 9 drops NaSi(OH) ₄ + 2mls HCOOH + 17.5mls NH ₃ . pH 7			ND	220 ppb		
3) 30mls water + 0.6mls NaSi(OH) ₄ + 2mls HCOOH + 60mls NH ₃ . pH 7				13000000 D		
4) 45mls Carbonated water + 0.6mls NaSi(OH) ₄ + 2.5mls HCOOH + 30mls NH ₃	ND	ND	0.63	49000 D		
5) 30mls water + 5mls acetic acid + 2.5mls NH ₃ OH 6-21				320		
6) 30mls water + 15mls dilute NaSi(OH) ₄ + 2mls HCOOH + 5mls NH ₃ OH ALS 11-20				1200		
7) 30mls H ₂ O + 20 drops HCOOH + 5mls NH ₃				1400		
8) 30 mls CH ₃ OH + 10 mls H ₂ O ₂ + 0.6mls NH ₃				2200		
9) 40mls CH ₃ OH + 0.1mls NH ₃ OH				5400		
10) Fig 16, #18) 25mls formamide + 5mls acetone + 10mls H ₂ O ₂					31.8	
11) 30mls cold carbonated water + 0.61mls HCOOH + 10mls acetone						709.2
Dilute: 8oz H ₂ O + 5mls KSi(OH) ₄ or 5mls NaSi(OH) ₄						

(Table 7)

Results: Acetone was produced from; 1) Formic acid, distilled water and ammonia (30mls H₂O + 1.8mls HCOOH + 5mls NH₃OH $\rightarrow$ 1,400ug/L of acetone). 2) Methanol, distilled water and ammonia (30mls H₂O + 5mls CH₃OH + 0.61mls NH₃OH $\rightarrow$ 5,400ug/L of acetone). 3) Acetic acid, distilled water and ammonia (30mls water + 5mls CH₃COOH + 2.5mls NH₃OH $\rightarrow$ 320ug/L of acetone + unknowns), (Table 7).

When acetone was added to carbonated water and formic acid, 709.2ug/mg of glycerol was produced (Table 7, #11), (Table 4, #14, 14c), (CCRC). When acetone was added to glycerol and hydrogen peroxide, ribulose was produced (30mls glycerol + 30mls distilled water + 10mls acetone + 10mls hydrogen peroxide + 0.61mls formic acid ---> 14.2ug/mg of ribulose + monosaccharides (CCRC). Showing a possible biochemical role for acetone for the formation of glycerol, ribulose, non-carbohydrate intermediates and unknowns.

Discussion: Do plants produce acetone for a physiological purpose? (Fincheira 2018). The chemical evidence more than suggests that they do, thus possibly explaining acetones diurnal emission from plants.

Abiotic Synthesis of Ethanol and Isopropyl Alcohol.

Ethanol ($\text{CH}_3\text{CH}_2\text{OH}$) was produced from distilled water, dilute sodium silicic acid, phosphoric acid, calcium carbonate and sodium hydrosulfide (Table 9, #11-12), ($2\text{CaCO}_3 + \text{H}_2\text{O} + 2\text{H}_3\text{PO}_4 + 2\text{NaSH} \rightarrow \text{C}_2\text{H}_6\text{O} + \text{H}_2\text{O} + 6\text{O}_2 + 2\text{P} + 2\text{Na} + 2\text{S} + 2\text{Ca}$). Isopropyl alcohol ($\text{C}_3\text{H}_8\text{O}$) was produced from a 12-volt battery, carbon monoxide, carbonated water, hydrochloric acid, dilute $\text{NaSi}(\text{OH})_4$ and sodium hydrosulfide (Table 9, #13).

Isopropyl alcohol was shown to produce non-carbohydrates when added to carbonated water and formic acid (Table 9, #13). Ethanol produced xylitol and non-carbohydrates when added to carbonated water and formic acid (CCRC).

Materials: Carbonated water, distilled water, dilute sodium silicic acid, phosphoric acid, sodium hydrosulfide, hydrogen peroxide, formic acid, methanol and calcium carbonate.

Methods: Mixing order, pH and temperature of the carbonated water and distilled water all influenced the final results.

Date: 10-1-18, 11-14-18, 1-4-19 and 4-2-21	ALS	CH_2O ug/L	HCOOH mg/L	CH_4 ug/L	CH_3OH ug/L	Acetone ug/L	Acetic acid mg/L
1) CO , 240mls carbonated water + 2.5mls $\text{NaSi}(\text{OH})_4$ + 0.3mls NaHS + 0.25mls HCL + 0.3mls H_2SO_4		ND	ND	ND	ND	ND	ND
2) CO , 12 volt. 7 oz H_2CO_3 + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.5mls H_2SO_4 + 0.2mls HCL + 0.15mls KCN . Base NaSH 0.15mls + 0.1mls NH_3 + 0.15mls FeCN + 0.1mls $\text{NaSi}(\text{OH})_4$ + 0.6mls KHCO_3 .		ND	370	1.6	ND		1
3) CO gas, No 12 volt, no NaSH . 0.15mls NH_3 + 0.15mls $\text{NaSi}(\text{OH})_4$ pH 6.6		ND	10	ND	ND		ND
4) 210mls rain water + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.5mls H_2SO_4 + 0.3mls HCL + NaSH 0.15mls + 0.1mls $\text{NaSi}(\text{OH})_4$ + 0.1mls NH_3		ND	9.1	ND	ND		1.2
5) 12-Volt, CO . 7oz Carbonated water + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.3mls H_2SO_4 + 0.1mls HCL + 0.15mls tsp KCN + 0.15mls FeCO_3 , NiCO_3 , CuCO_3 , AlOH , KHCO_3 + 0.3mls H_2SO_4 + 0.3mls $\text{KSi}(\text{OH})_4$ + 0.2mls NH_3		ND	100	ND	ND		2
Dilute: 240mls H_2O + 5mls $\text{KSi}(\text{OH})_4$ or 5mls $\text{NaSi}(\text{OH})_4$							

(Table 8)

Results: Ethanol was produced from (60mls distilled water + 0.61mls dilute $\text{NaSi}(\text{OH})_4$ + 0.3mls H_3PO_4 + 0.61mls CaCO_3 + 0.3mls $\text{NaSH} \rightarrow 1600\text{ug/L}$ of ethanol), (Table 9, #11-12, ALS). Without sodium hydrosulfide no ethanol was produced (Table 9). Ethanol produced non-carbohydrates and xylitol when mixed with carbonated water and formic acid (Anresco, CCRC).

Isopropyl alcohol was produced from (12-volts + CO + 130mls carbonated water + 0.61mls HCL + 0.61mls dilute $\text{NaSi}(\text{OH})_4$ + 0.61mls NaSH $\rightarrow$ 26ug/L of isopropyl), (ALS). Isopropyl alcohol was found to produce non-carbohydrates (30mls iced carbonated water + 0.61mls HCOOH + 10mls isopropyl $\rightarrow$ non-carbohydrates), (CCRC).

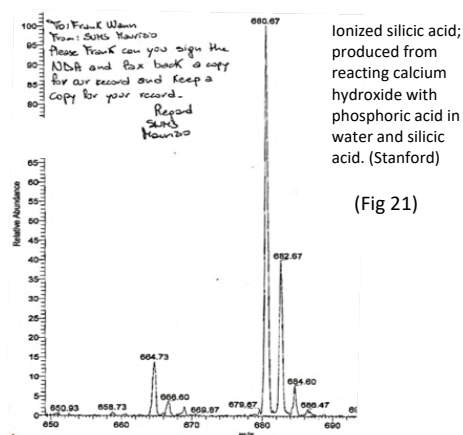
Discussion: Methanol and isopropyl produced more oxygen than ethanol, while butanol produced little too no oxygen (Table 5). However, more work will be required to prove this and the exact biochemical purpose of alcohol in plants, if any.

Abiotic Synthesis of Acetic Acid from Formic Acid, Methanol and Hydrogen Peroxide.

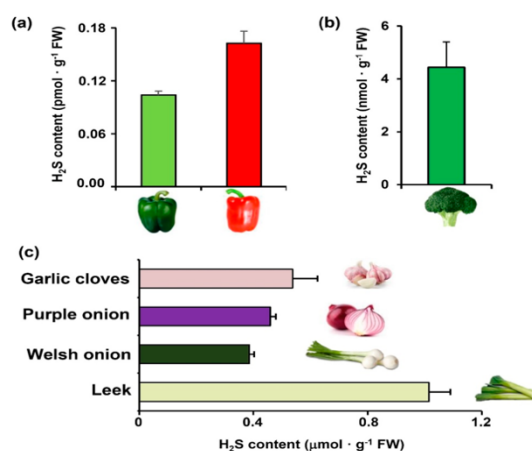
Acetic acid (CH_3COOH) was abiotically produced from; air bubbled distilled water, formic acid/methanol, potassium hydroxide and hydrogen peroxide (Table 9, 1-10), (ETS Analytical). From formic acid ($2\text{HCOOH} + \text{H}_2\text{O} + 3\text{KOH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_3\text{COOH} + 4\text{H}_2\text{O} + 2\text{O}_2$). From methanol ($2\text{CH}_3\text{OH} + \text{H}_2\text{O} + 2\text{KOH} + \text{H}_2\text{O}_2 \rightarrow \text{CH}_3\text{COOH} + 5\text{H}_2\text{O}$), (Table 9, #2, 4, 9).

Acetic Acid, Ethanol & Isopropyl	Acetic acid g/L	Ethanol Ug/L	Iso propyl
1) 60mls air bubbles water + 0.61mls HCOOH + 0.31mls KOH + 15mls H_2O_2	0.2		
2) 60mls air bubbled water + 0.6mls CH_3OH + 15mls H_2O_2	0.17		
3) 60mls air bubbled water + 0.6mls HCOOH + 15mls H_2O_2	0.18		
4) 60mls air bubbled water + 0.6mls CH_3OH + 0.6mls HCOOH + 0.3mls KOH + 15mls H_2O_2	0.19		
5) 60mls air bubbles water + 0.6mls CH_3OH + 0.6mls HCOOH + 15mls H_2O_2	0.16		
6) 60mls air bubbled water + 2.5mls dilute $\text{KSi}(\text{OH})_4$ + 0.3mls NaThioSulfate + 0.6mls HCOOH + 15mls H_2O_2	0.17		
7) 60mls air bubbled water + 0.6mls HCOOH + 0.6mls CH_3OH + 2.5mls dilute $\text{KSi}(\text{OH})_4$ + 15mls H_2O_2	0.18		
8) 60mls air bubbled water + CH_4 + 0.65mls HCOOH + 0.3mls KOH + 15mls H_2O_2	0.21		
9) 60mls air bubbled water + 1.25mls CH_3OH + 0.31mls KOH + 30mls H_2O_2	0.30		
10) 60mls air bubbled water + 1.25mls HCOOH + 0.3mls KOH + 30mls H_2O_2	0.23	Below MRL	
11) 60mls water + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.25mls H_3PO_4 + 0.55mls CaCO_3		340	
12) 30mls water + 0.7mls $\text{NaSi}(\text{OH})_4$ + 0.25mls H_3PO_4 + (0.61mls CaCO_3 & 0.3mls NaSH)		1600	
13) CO, 12volt. 75mls carbonated water + 0.6mls HCL + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.61mls NaSH			26
14) 40mls H_2O + 0.2mls $\text{NaSi}(\text{OH})_4$ + 0.3mls H_3PO_4 + 0.3mls CaCO_3		ND	
15) 40mls cold H_2CO_3 + 0.1mls dilute $\text{NaSi}(\text{OH})_4$ + 0.3mls H_3PO_4 + 0.61mls CaCO_3		ND	
16) 40mls Cold H_2CO_3 + 0.3mls H_3PO_4 + 0.5mls CaCO_3 11/23/21		ND	
17) 40mls H_2O + 3 drops H_3PO_4 + (0.61mls CaCO_3 & 0.3mls NaSH)		ND	
18) 40mls Carbonated water + 0.2mls H_3PO_4 + (0.61mls CaCO_3 & 0.3mls NaSH)		ND	
Dilute: 240mls H_2O + 5mls $\text{KSi}(\text{OH})_4$ or 5mls $\text{NaSi}(\text{OH})_4$			

(Table 9)



(Fig 21)



(Fig.22). Endogenous H_2S content (Munoz-Vargas, 2022).

Materials: Carbonated water, air bubbled distilled water, methanol, formic acid, 3% hydrogen peroxide and potassium hydroxide.

Methods: 24-hour mass spectrometry results were obtained from ETS Laboratories to eliminate fermentation as the mechanism for producing acetic acid. One sample was tested a week later with the same results; providing more evidence that fermentation was not involved in the formation of acetic acid in any of the samples tested.

Results: Acetic acid was produced from methanol, formic acid, potassium hydroxide and hydrogen peroxide (60mls H_2O + (1.23mls CH_3OH and or $HCOOH$) + 0.61mls KOH + 15mls H_2O_2 ---> 0.3g/L of CH_3COOH), (Table 9), (ETS analytical). Raising the pH with potassium hydroxide increased the yields.

Acetic acid and ammonia produced acetone (30mls distilled water + 5mls acetic acid + 2.5mls NH_3OH ---> 320ug/L acetone), (Table 7, #5). Acetic acid was found to produce glucose and monosaccharides when substituted for formic acid.

Discussion: Raising the pH of the solution aided in the formation of acetic acid. In the experiments that did not use potassium hydroxide, the yields of acetic acid were substantially reduced. Substituting methanol for formic acid resulted in the same yields of acetic acid produced.

Monosaccharides were formed when sugar alcohols were added to hydrogen peroxide, methanol and acetic acid.

Hydrogen peroxide was added last in all the experiments to produce acetic acid. Could the formation of acetic acid be another means to detoxify hydrogen peroxide.

The Abiotic Synthesis of Amino Acids.

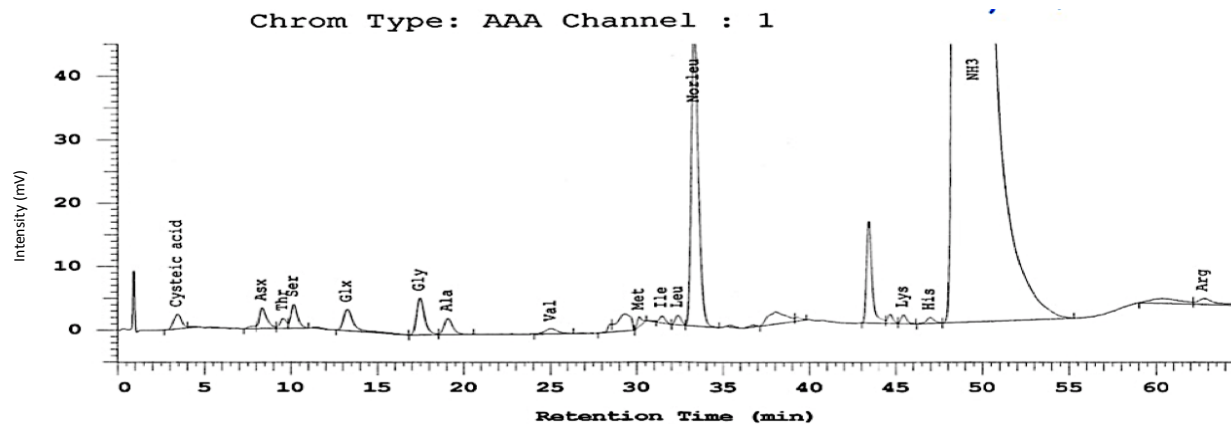
Amino acids were produced from nitriles, ammonia and nitrogen; 1) nitrogen gas, phosphoric acid and calcium carbonate (Table 2), (Fig. 23, 24), (UC Davis). 2) From ionized silicic acid, formaldehyde, potassium cyanide and ammonia (Fig. 6), (Stanford). 3) Carbonated water, nitrogen, propane, potassium cyanide, and sodium hydrosulfide.

Materials: Distilled water, carbonated water, nitrogen, silicic acid, 12-volt battery, ammonia, cyanide, cyanate, calcium carbonate, phosphoric acid, hydrogen and sulfuric acid.

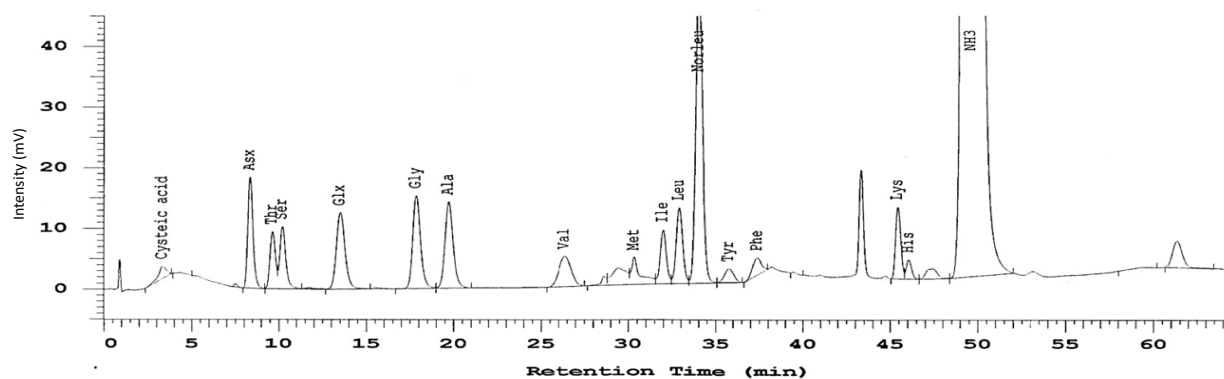
Methods: Producing amino acids from carbonated water, ammonia, nitriles and nitrogen gas. Mixing carbonated water, distilled water, nitrogen, dilute silicic acid, ammonia and cyanide containing compounds; producing amino acids and other unknowns.

Results: Amino acids were synthesized from; 1) Nitrogen gas bubbled into distilled water, phosphoric acid and calcium carbonate ($N_2 + H_2$ + distilled water + H_3PO_4 + $CaCO_3$ ---> amino acids, ammonia and nitrates (Fig 21), (UC Davis). 2) From cyanide (Carbonated water + KCN + $NaSH$ ---> formic acid + amino acids), (Table 2, #1-16), (Fig. 23, 24), (UC Davis, Anresco). 3)

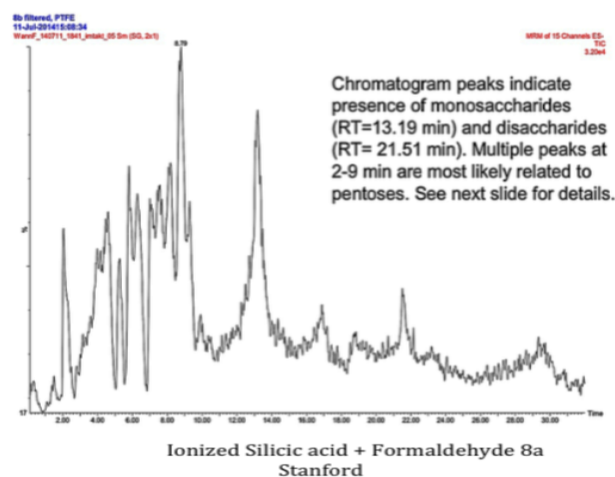
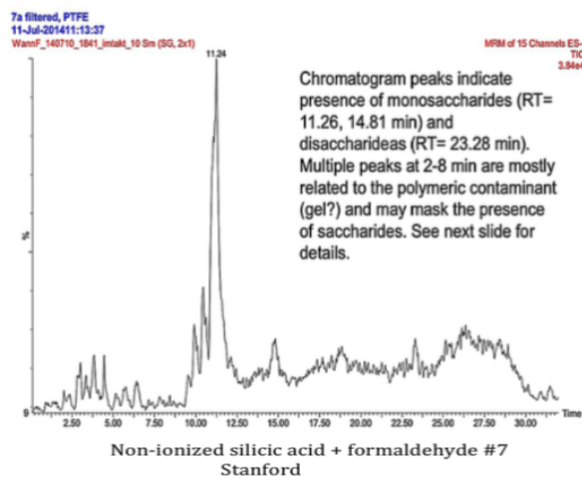
(Distilled water + CH₂O + NH₃ + KCN + ionized silicic acid ---> Fig. 6), (Stanford).



(Fig 23) UC Davis, Molecular Structure Facility
(3,000mls Carbonated Water + N₂ + H₂ + propane + 9.9mls HCN + 31mls NaSH), (sample concentrated to 12 ounces)



(Fig. 24) UC Davis, Molecular Structure Facility
90mls Water + N₂ gas + 0.01mls H₃PO₄ + 0.61mls CaCO₃



(Fig.25)

Discussion: Amino acids were produced from nitrogen gas, ammonia and nitriles added to some of the experiments. Contamination of the samples sent to UC Davis for amino acid analysis is probable, especially considering using a rotary vacuum evaporator to concentrate one sample for mass spectrometry analysis (Fig. 23, 24). Could the unknowns from synthesizing formic acid utilizing a 12-volt battery, carbonated water, cyanide and sodium hydrosulfide be amino acids? ($\text{H}_2\text{CO}_3 + \text{KCN} + (\text{H}_2\text{S}_{(\text{aq})}) \rightleftharpoons 2\text{H}^+ + 2\text{HS}^- \rightarrow \text{HCOOH} + \text{unknowns}$).

Final Discussion: Evidence provided may prove that chemosynthesis - origin of life chemistry and the electrical chemical component of photosynthesis begin from carbonic acid from carbon dioxide in water ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3$). Carbonic acid reacts with atmospheric gasses, compounds and with metals in a low voltage (1.5-volts) electrical environment in carbonated water ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{atmospheric gasses and compounds} + 1.5\text{-volt battery (e}^-) + \text{Al}^{3+} \rightarrow \text{formic acid, formaldehyde, methanol, glycerol, oxygen, amino acids, cyclodextrin, glycogen and unknowns}$), ($\text{H}_2\text{CO}_3 + 1.5\text{-volt battery (e}^-) + \text{Al}^{3+} \rightarrow \text{glycogen, cyclodextrin, struktol and oxygen}$). From these initially produced compounds from carbonic acid, atmospheric gasses, aluminum and a 1.5-volt battery; amino acids, fatty acids, monosaccharides, ribose, ribulose, nucleosides, acetic acid, nucleotides, glycolic acid, lactic acid, stearic acid, palmitic acid, methane, glycogen, porphyrins and more were produced. Possibly replicating chemosynthesis - the origin of life chemistry and the photosynthetic processes (Stanford's mass spectrometry department), (Complex Carbohydrate Research Center), (Anresco), (ALS), (ETS), (Avomeen Analytical), (RJ Lee Group), (R&L Analytical), (SDK Analytical).

Chemosynthesis – the origin of life chemistry ($\text{CO}_2 + 4\text{H}_2\text{S} + \text{O}_2 \rightarrow \text{CH}_2\text{O} + 4\text{S} + 3\text{H}_2\text{O}$), is hypothesized here as originating from carbonic acid and using hydrogen sulfide as an energy source ($\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3 + 2\text{H}_2\text{S}_{(\text{aq})} \rightarrow \text{CH}_2\text{O} + 2\text{S} + 2\text{H}_2\text{O}$), ($\text{H}_2\text{CO}_3 + \text{atmosphere gasses} + \text{e}^- + \text{Al}^{3+} \rightarrow \text{formic acid formaldehyde, methanol, glycerol, cyclodextrin, glycogen, amino acids, oxygen and unknowns}$).

The present model of photosynthesis, the formaldehyde theory utilizes light as an energy source to convert carbon dioxide into formaldehyde and glucose ($\text{CO}_2 + 2\text{H}_2\text{A} + h\nu \rightarrow (\text{CH}_2\text{O})_n + 2\text{A} + \text{H}_2\text{O}$). Anoxygenic photosynthesis ($6\text{CO}_2 + 12\text{H}_2\text{S} + h\nu \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 12\text{S}$). Theorized here as ($\text{H}_2\text{CO}_3 + (1.5\text{-volts}) \text{e}^- + \text{Al}^{3+} \rightarrow \text{cyclodextrin, glycogen, STRUKTOL 1B 531 and oxygen}$). ($\text{H}_2\text{CO}_3 + \text{atmospheric gasses} + \text{e}^- + \text{Al}^{3+} \rightarrow \text{methanol, amino acids, glycerol, oxygen, formic acid, formaldehyde, glycogen and cyclodextrin}$) Add urea, ammonia or cyanide and amino acids will be produced.

Carbon dioxide in water was replicated with carbonated water, ocean water or distilled water with sodium chloride added. Carbonated water contains approximately 3 - 7 grams of carbon dioxide per liter, distilled water contains approximately 1.7 - 2 grams of carbon dioxide per liter and the ocean contains at least 1.45 grams of carbon dioxide per liter. The ocean absorbs approximately 30% of all the carbon dioxide released into the atmosphere.

Sodium hydrosulfide was used to replicate hydrogen sulfide in aqueous form to produce formaldehyde, formic acid and other unknowns from bisulfide (HS^-), (Fig. 3), ($\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$), ($\text{NaSH}_{(\text{aq})} \rightleftharpoons \text{Na} + \text{HS}^-$).

Formaldehyde was produced from carbonic acid from warm carbonated water and sodium hydrosulfide ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^- \} \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$).

Formaldehyde was found to produce; methanol, formic acid, glycerol and unknowns (Table 1-4).

Formic acid was produced from carbonic acid from carbonated water or ocean water, cyanide and sodium hydrosulfide ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{KCN} + [\text{NaSH} \rightleftharpoons \text{Na} + \text{HS}^-] \rightarrow \text{HCOOH} + \text{unknowns}$), (Ocean water + KCN + ($\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$) $\rightleftharpoons \text{HCOOH} + \text{unknowns}$). Formic acid was also produced from formaldehyde. Formic acid was found to produce acetic acid, acetone, glycerol, rhamnose, monosaccharides and unknowns (Table 1-3).

Plants emit from 0.9ppm up to 9ppm of hydrogen sulfide from their leaves. Could this hydrogen sulfide produced by plants be the predominate means for fixing carbonic acid into formaldehyde, formic acid and unknowns in the plant? (Fig. 4, 15), (Munoz-Vargas, 2022), (Wilson, 1978), (Olson, 2015). Research has shown that by increasing the hydrogen sulfide concentrations to plants is beneficial for growth, however, very little is known about hydrogen sulfide and if it has a role in plant physiology.

Methanol was produced from carbonic acid from carbonated water and methane or propane ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{CH}_4 + \text{H}_2\text{O} \rightarrow 2\text{CH}_3\text{OH} + \text{O}_2$), and from formaldehyde. Methanol was found to produce formic acid, glycerol, sugar alcohols, monosaccharides, acetone, glucose, ribose, ribulose and acetic acid (Table 4, 7, 9). Plants produce roughly 10-45 percent of the total global methane produced in the atmosphere (Nisbet, 2009), (Covey, 2018). Could this methane produced by the plant be a source for producing methanol from carbonic acid in the plant.

Glycerol was produced from carbonic acid from cold carbonated water and methanol ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$), and from formaldehyde (Table 1). Glycerol was found to produce rhamnose, ribulose, ribose, oxygen, carbohydrate intermediates, glycerol phosphates and non-carbohydrates (CCRC, ALS, Anresco, R&L Analytical and SDK labs). The evidence provided shows that glycerol and sugar alcohols could have a role to produce monosaccharides such as rhamnose, fructose, xylose, glucose, fructose, maltose, ribose, ribulose and more when glycerol and sugar alcohols were oxidized with hydrogen peroxide (Table 6). Could the oxidation of sugar alcohols with hydrogen peroxide into monosaccharides and unknowns be a viable means to detoxify hydrogen peroxide in plants?

Oxygen was produced from carbonic acid from carbonated water and methanol, which also produced glycerol ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$). Oxygen was also produced from mannitol, inositol, dulcitol, glycerol and from producing glycogen and cyclodextrin from carbonic acid and a 1.5-volt battery (Table 5), (R&L Analytical), (RJ Lee Group).

Cyclodextrin, 6-O- α -D-Maltosyl- β -Cyclodextrin, STRUKTOL 1B 531, glycogen and oxygen were artificially produced from carbonic acid, silicic acid and a 1.5-volt battery hooked up to aluminum or metal wire electrodes in a mason jar filled with either warm carbonated water, warm ocean water or warm distilled water with sodium chloride added (Fig. 1, 7, 16-20), (Creative Proteomics), (RJ Lee Group). Plants produce (0.28-volts - 0.626-volts) of electricity and cyanobacteria produce (1.4-volts – 1.5-volts) of electricity derived from the photosynthetic process. Could this electricity produced by plants and cyanobacteria during the photosynthetic process produce these polymers from the ionization of aluminum (Al^{3+}) with carbonic acid inside the plant or cyanobacteria on a micro level ($\text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{cyclodextrin} + \text{glycogen} + \text{H}_2\text{O} + \text{O}_2$).

From these initially produced compounds from carbonic acid; formaldehyde, formic acid, methanol, oxygen, glycerol, cyclodextrin, glycogen, amino acids and unknowns; stearic acid, palmitic acid, acetic acid, glycogen and porphyrins were produced (Stanford's mass spectrometry department), (Complex Carbohydrate Research Center), (Anresco), (ALS), (ETS), (Avomeen Analytical), (RJ Lee Group), (R&L Analytical).

Glucose was produced from the oxidation of either mannitol, sorbitol or dulcitol with 3% hydrogen peroxide (Table 6, #8-11, 22, 23). Fructose was produced from the oxidation of xylitol, lactitol, inositol, dulcitol and D-arabitol with hydrogen peroxide (Table 6, 8-11, 21-23). Maltose was produced from the oxidation of inositol and maltitol with hydrogen peroxide (Table 6, #12, 17, 18).

Glucose-1-phosphate both alpha and beta, fructose-6-phosphate and glycerol 1, 2 and 3-phosphate were produced from ([30mls glucose/fructose/glycerol] + 30mls distilled water + 10mls phosphoric acid + 5mls potassium cyanate + 2.5mls potassium hydroxide or calcium carbonate), (Fig 8, 13, 14). Phosphates of glycerol, glucose and fructose were all produced by this same chemistry, which may be the same for all sugar phosphates. Possibly enlightening the biochemistry of sugar phosphates in plants.

Attempting to replicate the potential complexity of the origin of life chemistry, chemosynthesis and photosynthesis was possibly demonstrated from the following experiments: 1) (3,000mls carbonated water + 12-volts + N₂ + propane + 10mls KCN + 31mls NaSH ---> formic acid, ribose, ammonia and amino acids). This sample was concentrated to 120mls with a rotary vacuum evaporator (Fig. 23, 24), (UC Davis, Stanford, ALS and Anresco). 2) (Distilled water + N₂ + H₃PO₄ + CaCO₃ ---> amino acids + ammonia + nitrates + organic acids). 3) (Distilled water + ionized silicic acid + CH₂O + KCN + NH₃ ---> amino acids, fatty acids, lactic acid, glycolic acid, porphine and more were produced), (Fig. 6, 21, 25), (Stanford).

Many of the experimental results could be inaccurate due to numerous known and unknown factors: 1) The lag time between performing the experiments and test results. 2) MRL of the chemical being tested. 3) If the mass spectrometry machines were calibrated for one specific chemical. 4) Testing procedures. 5) Contamination. 6) Using a rotary vacuum evaporator. 6) The temperature of the carbonated water, distilled water, ocean water or chemicals used. 7) Unknowns. 8) pH of the solutions. 9) Order that the chemicals were added to the mix. 10) The higher the voltage the greater the yields of cyclodextrin and glycogen polymers that were produced. Nothing should be taken at face value and that there is a daunting amount of work that needs to be done.

Summary: Chemosynthesis, the replication of the origin of life chemistry and abiotically replicating the photosynthetic process are all hypothesized as based upon carbonic acid from carbon dioxide in water from either carbonated water, ocean water or distilled water with sodium chloride reacting with atmospheric gasses, compounds and a 1.5 volt battery (CO₂ + H₂O <---> H₂CO₃ + atmosphere gasses + e⁻ + Al³⁺ ---> formic acid formaldehyde, methanol, glycerol, cyclodextrin, glycogen, oxygen, amino acids and unknowns).

Formaldehyde was produced from warm carbonated water and sodium hydrosulfide. (H₂O + CO₂ <---> H₂CO₃ + {H₂S_(aq) <---> 2H⁺ + 2HS⁻} ---> CH₂O + 2H₂O + 2S). Formaldehyde was found to produce formic acid, methanol, glycerol and unknowns

Formic acid was produced from carbonated water, cyanide and sodium hydrosulfide (H₂O +

$\text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{KCN} + \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-\} \rightarrow \text{HCOOH} + \text{unknowns}$). Formic acid was found to produce acetic acid, acetone rhamnose, glycerol, monosaccharides, and unknowns.

Methanol was produced from carbonated water and methane ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{CH}_4 + \text{H}_2\text{O} \rightarrow 2\text{CH}_3\text{OH} + \text{O}_2$). Methanol was found to produce acetic acid, oxygen, monosaccharides, ribulose, sugar alcohols, glucose, glycerol and acetic acid derivatives.

Glycerol and oxygen were produced from cold carbonated water and methanol ($\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$). Glycerol was found to produce ribose, ribulose, rhamnose, ribulose derivatives and deoxyribose.

Cyclodextrin, glycogen and oxygen were produced from warm carbonated water, silicic acid and the electrolysis of aluminum or copper wire with a 1.5-volt battery in carbonated water. Mimicking the voltage produced by plants and cyanobacteria ($\text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-\text{)} + \text{Al}^{3+} \rightarrow \text{cyclodextrin} + \text{glycogen} + \text{H}_2\text{O} + \text{O}_2$).

From formaldehyde, formic acid, methanol, glycerol, ammonia, phosphoric acid and hydrogen peroxide, adequate amounts of monosaccharides, nucleosides, nucleotides, fatty acids, porphyrins, amino acids, non-carbohydrates, acetic acid derivatives, ribulose derivatives, sugar phosphates and acetic acid was produced to just name a few compounds.

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