

# Abiotic Synthesis of Cyclodextrin, Glycogen, STRUKTOL 1B 531, Formaldehyde, Formic acid, Methanol, Glycerol, Oxygen and Unknowns from Carbonic Acid, Atmospheric Gases, Early Earth Compounds and a 1.5-Volt Battery

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## Abstract

Abiotic synthesis of cyclodextrin, glycogen, STRUKTOL 1B 531, formaldehyde, formic acid, methanol, glycerol, oxygen and unknowns were produced from carbonic acid, atmospheric gases and early earth compounds in a low voltage electrical environment. Hypothesized as  $(\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{atmosphere gases \& early earth compounds} + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{formaldehyde, formic acid, methanol, glycerol, oxygen, amino acids, cyclodextrin, glycogen, STRUKTOL 1B 531 and unknowns from carbonic acid})$ .

From these initially produced compounds from carbonic acid; (formaldehyde, formic acid, methanol, glycerol, oxygen, glycogen, cyclodextrin, STRUKTOL 1B 531 and unknowns). Glucose, acetic acid, acetone, ribulose, ribose, rhamnose, amino acids, nucleotides, glycerol, fatty acids, sugar phosphates, oxygen, monosaccharides, ribulose derivatives, lactic acid, noncarbohydrates, acetic acid derivatives, porphine, urea, ammonia, glycerol and more were produced.

Cyclodextrin, glycogen and STRUKTOL 1B 531 were produced from carbonic acid and ionized aluminum ( $\text{Al}^{3+}$ ) wire electrodes in a mason jar filled with either warm carbonated water or warm ocean water hooked up to a 1.5-volt battery. A 1.5-volt battery was used to mimic the voltage that is produced by plants and cyanobacteria during photosynthesis. Hypothesized as  $(\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{glycogen, cyclodextrin and STRUKTOL 1B 531})$ .

Formaldehyde ( $\text{CH}_2\text{O}$ ) was produced from carbonic acid from warm carbonated water and **sodium hydrosulfide**; producing 5800ug/L of formaldehyde and unknowns  $(\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \{\text{NaSH}_{(\text{aq})} \rightleftharpoons \text{Na} + \text{HS}^-\} \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S})$ .  $(\text{H}_2\text{CO}_3 + 2\text{H}_2\text{S} \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S})$ . And from a 12-volt battery, distilled water and methane or carbon monoxide.

Formic acid ( $\text{HCOOH}$ ) 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.  $(\text{H}_2\text{CO}_3 + \text{KCN} + \text{NaSH} \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-\} \rightarrow \text{HCOOH} + \text{unknowns})$ . And from a 12-volt battery, distilled water and methane or carbon monoxide.

Methanol ( $\text{CH}_3\text{OH}$ ) 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.  $(\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightarrow \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2)$ .

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), water, phosphoric acid, potassium cyanate and potassium hydroxide or calcium carbonate.

## Introduction:

Abiotic synthesis of cyclodextrin, glycogen, STRUKTOL 1B 531, formaldehyde, formic acid, methanol, glycerol, oxygen and unknowns were produced from carbonic acid ( $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3$ ), atmospheric gases and early earth compounds in a low voltage electrical environment. Where carbonic acid was found to react with atmospheric gases and compounds;  $\text{H}_2\text{CO}_3 +$  (hydrogen sulfide, silicic acid, methane, urea, methanol, cyanide, sodium chloride, ammonia, 1.5-volt & 12-volt battery ( $e^-$ ), copper, aluminum and more). Hypothesized as ( $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 +$  early earth compounds & atmospheric gases + 1.5-volts ( $e^-$ ) +  $\text{Al}^{3+} \rightarrow$  formaldehyde, formic acid, glycerol, methanol, oxygen, glycogen, cyclodextrin, amino acids, STRUKTOL 1B 531 and unknowns), (Clayton, 1965), (Dhar, 1935).

From these initially produced compounds from carbonic acid; (formaldehyde, formic acid, methanol, glycerol, oxygen, glycogen, cyclodextrin, STRUKTOL 1B 531, amino acids and unknowns). Acetone, acetic acid, ribulose, ribose, rhamnose, amino acids, nucleotides, glycerol, nucleosides, fatty acids, oxygen, ribulose derivatives, monosaccharides, sugar phosphates, methanol, noncarbohydrates, acetic acid derivatives, porphine, lactic acid, ammonia, urea, glycerol, methanol and more were produced.

Cyclodextrin, glycogen and STRUKTOL 1B 531 were produced from carbonic acid and ionized aluminum ( $\text{Al}^{3+}$ ) wire electrodes in a mason jar filled with either warm carbonated water, or warm ocean water or warm distilled water with sodium chloride hooked up to a 1.5-volt battery. A 1.5-volt battery was used to mimic the voltage that is produced by plants and cyanobacteria during photosynthesis. Where electricity produced during photosynthesis is also hypothesized to produce glycogen, cyclodextrin and STRUKTOL 1B 531 from the electrolysis of aluminum ( $\text{Al}^{3+}$ ) or other metals with carbonic acid. Hypothesized as ( $\text{H}_2\text{CO}_3 + 1.5\text{-volts } (e^-) + \text{Al}^{3+} \rightarrow$  cyclodextrin, glycogen, STRUKTOL 1B 531 and unknowns), (Fig 1, 2, 7), (Arnold, 1976), (Sarma 2016), (Lakatos, 2021), (Cano, 2018), (Clayton, 1965), (Dhar, 1935).

Chemosynthesis ( $\text{CO}_2 + 4\text{H}_2\text{S} + \text{O}_2 \rightarrow \text{CH}_2\text{O} + 4\text{S} + 3\text{H}_2\text{O}$ ) and origin of life chemistry is hypothesized as originating from carbonic acid, atmosphere gases and early earth compounds in an electrically charged environment. Hypothesized as ( $\text{H}_2\text{CO}_3 +$  atmosphere gases & early earth compounds + ( $e^-$ ) +  $\text{Al}^{3+} \rightarrow$  formic acid, formaldehyde, methanol, glycerol, amino acids, cyclodextrin, glycogen, STRUKTOL 1B 531, oxygen and unknowns). **Hydrogen sulfide and carbonic acid produced** formaldehyde ( $\text{H}_2\text{CO}_3 + (2\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-) \rightarrow \text{CH}_2\text{O} + 2\text{S} + 2\text{H}_2\text{O}$ ). Carbonic acid, **hydrogen sulfide and cyanide produced formic acid** ( $\text{H}_2\text{CO}_3 + \text{KCN} + (\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-) \rightarrow \text{HCOOH} + \text{unknowns}$ ], (Clayton, 1965), (Dhar, 1935).

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

Formaldehyde ( $\text{CH}_2\text{O}$ ) was produced from carbonic acid from warm carbonated water and

**sodium hydrosulfide**, producing 5,800ug/L of formaldehyde ( $\text{H}_2\text{CO}_3 + 4(\text{NaSH} \rightleftharpoons \text{Na} + \text{HS}^-) \rightleftharpoons \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 4\text{S} + 4\text{Na}$ ).  $\{\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + [2\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons (2\text{H}^+ + 2\text{HS}^-)] \rightleftharpoons \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}\}$ . And from a 12-volt battery, water and methane or carbon monoxide (Table 1, #21, 22), (Table 2, #12). Formaldehyde was found to produce, formic acid, methanol, glycerol and unknowns.

Formic acid ( $\text{HCOOH}$ ) 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).  $[\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{KCN} + (\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-) \rightleftharpoons \text{HCOOH} + \text{unknowns}]$ . And from a 12-volt battery, water and methane or carbon monoxide (Table 1, #21, 22), (Table 2, #12). Formic acid was found to produce acetic acid, acetone, rhamnose, glycerol, monosaccharides and unknowns.

Methanol ( $\text{CH}_3\text{OH}$ ) was produced from carbonic acid from cold carbonated water and methane or propane, producing 33ug/L of methanol ( $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 + \text{CH}_4 + \text{H}_2\text{O} \rightleftharpoons 2\text{CH}_3\text{OH} + \text{O}_2$ ), (Table 3). Plants produce 10-45 percent of the total global atmospheric methane, and could this methane produced by plants 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 ( $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons 2\text{H}_2\text{CO}_3 + \text{CH}_3\text{OH} \rightleftharpoons \text{C}_3\text{H}_8\text{O}_3 + 2\text{O}_2$ ), (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.

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).

### Abiotic Synthesis of Formaldehyde from Carbonic Acid and Hydrogen Sulfide

Formaldehyde ( $\text{CH}_2\text{O}$ ), 5800ug/L, was produced from carbonic acid from warm carbonated water and **sodium hydrosulfide** ( $\text{NaSH}$ ), ( $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + [\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{HS}^- + 2\text{H}^+] \rightleftharpoons \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$ ). And from 12-volts, distilled water and carbon monoxide or methane (ALS Labs), (Table 1, #5, 7, 8, 11, 14, 21, 22), (Table 2, #12). Formaldehyde was found to produce, formic acid, methanol, glycerol and unknowns.

**Materials:** Carbonated water, distilled water, sodium hydrosulfide hydrate, hydrogen sulfide water, sodium chloride, silicic acid and a 12-volt battery hooked up to two coiled metal wire electrodes inside a mason jar made of 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<sub>2</sub>O, 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 <sub>2</sub> O ug/L MRL 300	HCOOH mg/L MRL 1.0	CH <sub>3</sub> OH mg/L MRL 0.5	Glycerol %	Amino Acids
1) 12V, CH <sub>4</sub> , H <sub>2</sub> . Distilled water + 1.25mls KCN + 0.61mls NaSH	ND	2000			
2) 12V, CH <sub>4</sub> , 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, CO + CH <sub>4</sub> + 4oz carbonated water + 0.61mls NaSH + 1.25mls H <sub>2</sub> O <sub>2</sub>	130	260			
7) 12V + 4oz carbonated water + 0.61mls NaSH	130	ND			
8) 12V, CO + 120mls carbonated water + 0.61mls NaSH + 1.25mls H <sub>2</sub> O <sub>2</sub>	160	ND			
9) 12V, CO, H <sub>2</sub> , CH <sub>4</sub> + 4oz 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				
15) 30mls H <sub>2</sub> O + 5mls 16% CH <sub>2</sub> O + 0.61mls NH <sub>3</sub> OH + 4 drops HCOOH 9-22-21 Anresco				1.09	
16) 5mls 16% CH <sub>2</sub> O + 30mls H <sub>2</sub> O + 0.1mls NH <sub>3</sub> OH + 5 drops HCOOH Anresco 11/30/21				1.18	
17) 45mls warm carbonated water + 12-volts + H <sub>2</sub>	ND				ND
18) 45mls ocean water + 12-Volts	ND				ND
19) 12-volts + H <sub>2</sub> + .06mls NaCl + 60mls Dist Water	ND				ND
20) 60mls Ocean water + 0.61mls NaSH					
21) 12-Volts + distilled water + CH <sub>4</sub>	240	180			
22) 12-Volts + distilled water + CO	1300	170			

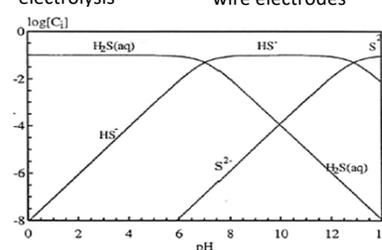
(Table 1)



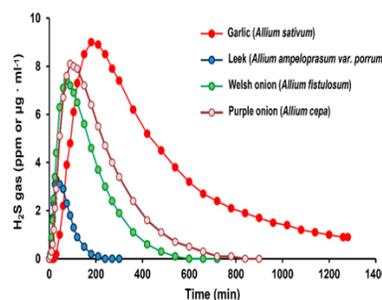
(Fig 1) 1.5 -12-volt battery hooked up to copper wire for electrolysis



(Fig 2) Aluminum wire electrodes



(Fig 3) Wikipedia. Hydrogen sulfide in water



(Fig 4) Munoz-Vargas, 2022) H<sub>2</sub>S 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). It was interesting that using a 12-volt battery, distilled water and carbon monoxide produced 1300ug/L CH<sub>2</sub>O, and 12-volts, distilled water and methane produced 240ug/L CH<sub>2</sub>O (Table 1 #21, 22).

### 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, 19). [ $\text{H}_2\text{CO}_3 + \text{KCN} + (\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons$



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 HYDROGEN SULFIDE or sodium hydrosulfide; 1) (90mls carbonated water + 1.2ml KCN + 1.2ml NaSH ---> 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 ---> 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 ---> 50,000mg/L formic acid), (Table 2, #13). 4) The highest yields of formic acid were produced from formaldehyde (5mls 16%  $\text{CH}_2\text{O}$  + 60mls  $\text{H}_2\text{O}$  + 0.61mls dilute  $\text{NaSi}(\text{OH})_4$  + 0.31mls KCN + 0.31mls NaSCN + 0.61mls  $\text{NH}_3\text{OH}$  + 0.3mls NaSH + 0.5mls HCL ---> 84,000mg/L of HCOOH), (Table 2, #9, 10), (Table 1, 2 #9, 3, 8, 10).

Formic acid produced; acetic acid, monosaccharides, acetone, glycerol, rhamnase, oxygen, methanol and unknowns (Table 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 hydrogen sulfide in water or sodium hydrosulfide produced formic acid. It was interesting that using a 12-volt battery, distilled water and carbon monoxide produced 170mg/L HCOOH and 12-volts, distilled water and methane produced 180mg/L HCOOH (Table 1 #21, 22). (Table 2, #19). Adding sodium chloride and silicic acid significantly influenced the yields of formic acid produced.

### **Abiotic Synthesis of Methanol from Methane or Propane and Carbonic acid**

Methanol ( $\text{CH}_3\text{OH}$ ), 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 3, #3-10,18-20). 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, 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 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 +  $\text{H}_2$  + 180mls cold carbonated water + 2.5mls  $\text{KSi}(\text{OH})_4$  + 0.17mls  $\text{H}_2\text{SO}_4$  + 0.61mls SCN + 0.61mls NaSH ---> 5ug/L of  $\text{CH}_4$ ), however these results were not reliable (ALS), (Keppler, 2006).

16% formaldehyde solution produced the highest yields of methanol (60mls H<sub>2</sub>O + 0.61mls KSi(OH)<sub>4</sub> + 5mls 16% CH<sub>2</sub>O + 0.3mls CH<sub>3</sub>CN + 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 <sub>3</sub> OH ug/ml	Methanol	CH <sub>3</sub> OH ug/ml	HCOOH mg/L
1) 210mls rain water + 1.25mls NaSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O (no CH <sub>3</sub> OH) + 0.6mls HCl + 0.3mls H <sub>2</sub> SO <sub>4</sub> + 0.3mls NaSH + 0.6mls KHCO <sub>3</sub> .	31	28	13) 60mls water + 1.25mls dilute NaSi(OH) <sub>4</sub> + 2.5mls HCOOH + 1.25mls NaSH	1.7	
2) 120mls water + 5mls CH <sub>2</sub> O (w/o CH <sub>3</sub> OH) + 1ml dilute KSi(OH) <sub>4</sub> + 1.25mls CH <sub>3</sub> CN + 1.1mls H <sub>2</sub> SO <sub>4</sub>		34	14) 60mls water + 1.25mls dilute NaSi(OH) <sub>4</sub> + 2.5mls HCOOH + 0.3mls Thiocyanide + 0.3mls NaSH	1.6	
3) 60mls H <sub>2</sub> O + 5mls CH <sub>2</sub> O (w/o CH <sub>3</sub> OH) 2.5mls dilute KSi(OH) <sub>4</sub> + 1.3mls CH <sub>3</sub> CN + 0.6mls NaSH		210	15) 60mls water + 1.25mls dilute NaSi(OH) <sub>4</sub> + 2.5mls HCOOH + 0.6mls CH <sub>3</sub> CN + 0.6mls NaSH	1.4	
4) 180mls water + 2mls dilute KSi(OH) <sub>4</sub> + 5mls CH <sub>2</sub> O (w/o CH <sub>3</sub> OH) + 1.3mls CH <sub>3</sub> OH + 0.6mls NaSH + 1ml HCL + 0.6mls NaSH		110	16) 60mls water + 1.25mls dilute KSi(OH) <sub>4</sub> + 1.25mls HCOOH + 0.6mls NaSH	3.7	
5) 120mls water + 5mls CH <sub>2</sub> O (w/o CH <sub>3</sub> OH) + 1.1mls CH <sub>3</sub> CN + 0.6mls NaSH + 0.5mls H <sub>2</sub> SO <sub>4</sub> + NaSH to pH 7		44	17) 60mls water + 1.25mls dilute KSi(OH) <sub>4</sub> + 1.25mls HCOOH + 0.3mls ThioCN + 0.3mls NaSH	1.9	
6) 150mls water + 0.3mls dilute KSi(OH) <sub>4</sub> + 5mls CH <sub>2</sub> O (w/o CH <sub>3</sub> OH) + 0.6mls NaSH + 1ml NH <sub>3</sub> + 1ml H <sub>2</sub> SO <sub>4</sub> + NaSH pH 6 <b>No CH<sub>3</sub>CN</b>		91	18) 60mls water + 0.6mls NaSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O + 0.3mls KSCN + 0.3mls CH <sub>3</sub> CN + 0.6mls NaSH	876	
7) 150mls water + 2.2mls dilute KSi(OH) <sub>4</sub> + 5mls CH <sub>2</sub> O (w/o CH <sub>3</sub> OH) + 1.3mls CH <sub>3</sub> CN + 0.6mls NH <sub>3</sub> + 0.1mls H <sub>2</sub> SO <sub>4</sub> <b>No NaSH</b>		57	19) 60mls water + 0.6mls dilute KSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O + 0.3mls KSCN + 0.3mls CH <sub>3</sub> CN + 0.6mls NaSH	2200	
8) 90mls H <sub>2</sub> CO <sub>3</sub> + CH <sub>4</sub> + 0.6mls NaSH 2-19-20		2.5	20) 60mls H <sub>2</sub> O + 1.25mls dilute NaSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O + 0.1mls H <sub>2</sub> SO <sub>4</sub> + 1.25mls NaSH	1200	
9) 60mls water + 1.2mls NaSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O + 1.25mls SCN + 1.25mls NaSH pH 8+		750	21) 60mls H <sub>2</sub> O + 1.25ml dilute NaSi(OH) <sub>4</sub> + 1.25mls HCOOH + 0.1mls H <sub>2</sub> SO <sub>4</sub> + 0.3mls KSCN + 1.25mls NaSH	18	
10) 60mls water + 1mls dilute NaSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O + 0.6mls KHCN + 0.6mls SCN + 0.3mls NaSH		750	22) 60mls air bubbled water + 0.6mls NaSi(OH) <sub>4</sub> + 5mls 16% CH <sub>2</sub> O + 0.3mls CH <sub>3</sub> CN + 0.1mlsH <sub>2</sub> SO <sub>4</sub> + 0.3mls NaSH + 0.3mls NH <sub>3</sub> + 0.1mls KHCO <sub>3</sub> + 0.1mls H <sub>2</sub> SO <sub>4</sub>	120	28
11) 60mls carbonated water + propane Oct 12		33	<b>Dilute: 240mls H<sub>2</sub>O + 5mls KSi(OH)<sub>4</sub> or 5mls NaSi(OH)<sub>4</sub></b>		
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 ---> CH<sub>3</sub>OH). 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 (C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>) 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 (2H<sub>2</sub>CO<sub>3</sub> + CH<sub>3</sub>OH ---> C<sub>3</sub>H<sub>8</sub>O<sub>3</sub> + 2O<sub>2</sub>), (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&I Analytical, SDK, Anresco), (Table 6, #28, 33), (Table 7).

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 ---> 90ppm of glycerol and 1.1mg/L of oxygen), (CCRC, Iowa Central Fuel testing and R&I Analytical), (Table 4, #24), (Table 5, #1). 2) From formic acid, carbonated water and acetone (30mls carbonated water + 0.61mls formic acid + 10mls acetone ---> 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<sub>2</sub>SO<sub>4</sub> + 10mls CH<sub>3</sub>OH ---> 374.2ug/mg of glycerol, pinitol, glucose, xylitol, arabinose, xylose and 1.1mg/L oxygen), (Fig 9), (CCRC), (Table 5, #1, R&I Analytical). 4) From 16% formaldehyde (5mls 16% CH<sub>2</sub>O + 30mls H<sub>2</sub>O + 0.61mls NH<sub>3</sub>OH + 0.3mls HCOOH ---> 10,900ppm of glycerol) and (30mls distilled water + 5mls 16% formaldehyde + 0.61mls NH<sub>3</sub>OH + 5mls H<sub>2</sub>O<sub>2</sub> + 0.55mls HCOOH ---> 3.7% solution of glycerol), (Table 4, #22, 23, 26), (Anresco). 5) From xylitol (15mls xylitol + 15mls distilled water + 10mls H<sub>2</sub>O<sub>2</sub> + 0.5mls HCOOH ---> 4.2ug/10uL of glycerol + 24.3ug/uL of ribulose + fructose + ribitol derivates), (CCRC).

Ribose was produced from the oxidation of glycerol with hydrogen peroxide in distilled water; 1) (10mls glycerol + 15mls distilled water + 5mls H<sub>2</sub>O<sub>2</sub> + 10mls CH<sub>3</sub>OH ---> 1900ppm solution of ribose), (Table 6, #27, Anresco). 2) (15mls glycerol + 10mls H<sub>2</sub>O + 0.3mls dilute NaSi(OH)<sub>4</sub> + 2.5mls acetone + 5mls H<sub>2</sub>O<sub>2</sub> + 7mls CH<sub>3</sub>OH ---> 20.8% solution of ribose), (Anresco), (Table 6, #35). 3) (10mls glycerol + 15mls H<sub>2</sub>O + 5mls H<sub>2</sub>O<sub>2</sub> + 0.61mls HCOOH ---> 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<sub>2</sub>O<sub>2</sub> + 5mls CH<sub>3</sub>OH ---> 24.6ug/uL of ribulose + non-carbohydrates), (Table 6, #14, 28, 30, 32), (CCRC, Anresco). (C<sub>3</sub>H<sub>8</sub>O<sub>3</sub> + H<sub>2</sub>CO<sub>3</sub> + HCOOH + 2H<sub>2</sub>O<sub>2</sub> ---> C<sub>5</sub>H<sub>10</sub>O<sub>5</sub> + 3H<sub>2</sub>O + 2O<sub>2</sub>).

Rhamnose was produced from the oxidation of glycerol with hydrogen peroxide in distilled water; 1) (5mls glycerol + 60mls H<sub>2</sub>O + 1.23mls acetone + 2.5mls H<sub>2</sub>O<sub>2</sub> + 0.61mls HCOOH ---> 12.9% solution of rhamnose), (Table 6, 1-5, 31), (Anresco, SDK). 2) (5mls glycerol + 30mls H<sub>2</sub>O + 2.5mls H<sub>2</sub>O<sub>2</sub> + 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 H<sub>2</sub>O + 0.61mls HCOOH + 0.088mls H<sub>3</sub>PO<sub>4</sub> + 0.15mls KOCN + 0.15mls HCN ---> ribulose + ribulose derivatives + non-carbohydrates (CCRC). 2) (10mls Rhamnose + 15mls H<sub>2</sub>O + 0.3mls HCOOH + 0.31mls H<sub>3</sub>PO<sub>4</sub> + 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 H<sub>2</sub>O + 60mls C<sub>3</sub>H<sub>8</sub>O<sub>3</sub> + 10mls H<sub>3</sub>PO<sub>4</sub> + 5mls KOCN + 2.5mls KOH ---> C<sub>3</sub>H<sub>9</sub>O<sub>6</sub>P), (Fig 8), (CCRC).

Sugar Alcohol-Polyols	Xylitol	Glycerol ppm	Galactitol	Non-Carbohydrates unknowns
1) 90mls iced carbonated water+ 0.09mls H <sub>2</sub> SO <sub>4</sub> + 15mls CH <sub>3</sub> 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 <sub>3</sub> OH + 10 drops NH <sub>3</sub> OH		5100		
7) 30mls formamide + 5mls H <sub>2</sub> O <sub>2</sub> + 5mls HCOOH + ¼ tsp NH <sub>3</sub> OH			1.36%	
8) (Fig 16, #13) 15mls xylitol + 15mls H <sub>2</sub> O + 10mls H <sub>2</sub> O <sub>2</sub> + 0.5mls HCOOH	+++	4,200,000		++
9) 35mls cold carbonated water + 0.85mls NH <sub>3</sub> OH + 5mls CH <sub>3</sub> OH 11/30/21	ND	ND		
10) 15mls cold carbonated water + 15mls cold CH <sub>3</sub> OH		190		
11) 15mls H <sub>2</sub> O + 15mls CH <sub>3</sub> OH + 0.3mls KCN		80		
12) 15mls carbonated water + 5mls dilute Si(OH) <sub>4</sub> + 15mls CH <sub>3</sub> OH		70		
13) 30mls carbonated water iced + 0.3mls HCOOH + 15mls CH <sub>3</sub> 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-Terpineol	0	0
18) 540mls carbonated water + 0.35mls H <sub>2</sub> SO <sub>4</sub> + 60mls Methanol-concentrated		100
19) 90mls carbonated water + 15mls xylitol	0	0
20) 25mls formamide + 5mls H <sub>2</sub> O <sub>2</sub> + 10mls CH <sub>3</sub> OH	600	100
21) 2.5mls HCOOH + 30mls carbonated water + 0.85mls NH <sub>3</sub> OH + 10mls CH <sub>3</sub> OH		1100
22) 30mls H <sub>2</sub> O + 16% CH <sub>2</sub> O + 0.65mls NH <sub>3</sub> OH + 0.31mls HCOOH		10900
23) 5mls 16% CH <sub>2</sub> O + 30mls H <sub>2</sub> O + 1.5mls NH <sub>3</sub> OH + 0.61mls HCOOH 11/23		11800
24) 15mls carbonated water + 15mls CH <sub>3</sub> OH		90
25) 15mls carbonated water iced + 0.35mls H <sub>2</sub> SO <sub>4</sub> + 15mls CH <sub>3</sub> OH iced		210
26) 10mls CH <sub>2</sub> O + 1.6mls NH <sub>3</sub> OH + 5mls H <sub>2</sub> O <sub>2</sub> + 0.91mls HCOOH		3.76%

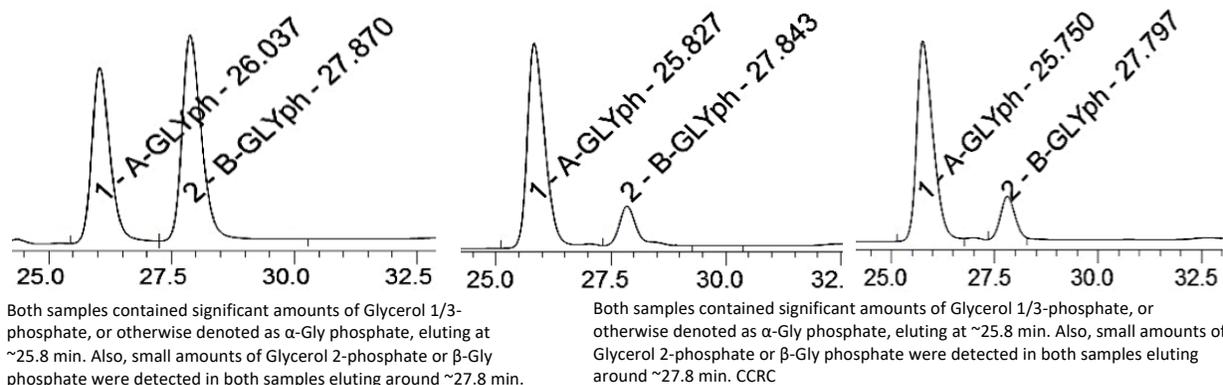
Oxygen from Carbonic Acid	Glycerol ppm	O <sub>2</sub> mg/L
1) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 15mls CH <sub>3</sub> OH	210	1.1
2) 90mls carbonated water (iced) + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 15mls butanol		0.4
3) 90mls carbonated water + 0.17mls HCOOH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

(Table 5)  
R&L Analytical

Oxygen from Carbonic Acid	O <sub>2</sub> mg/L
9) 90mls carbonated water (iced) + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 15mls maltitol	0.7
10) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 15mls butanol	0.4
11) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 5mls xylitol	0.3
12) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 5mls erythritol	0.5
13) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 5mls inositol	2.0
14) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 10mls polyethylene glycol	2.0
15) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 5mls dulcitol	2.8
16) 90mls carbonated water iced + 0.09mls H <sub>2</sub> SO <sub>4</sub> + 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 is (60mls H<sub>2</sub>O + 5mls sugar alcohol + 2.5mls H<sub>2</sub>O<sub>2</sub> + 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 H<sub>2</sub>O<sub>2</sub> + 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; (C<sub>6</sub>H<sub>14</sub>O<sub>6</sub> + H<sub>2</sub>O + H<sub>2</sub>O<sub>2</sub> + 6HCOOH ---> 2C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> + 3H<sub>2</sub>O + 3O<sub>2</sub>).

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

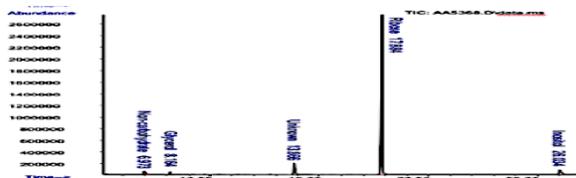


Fig 9, #4) 15mls adonitol + 15mls H<sub>2</sub>O + 10mls H<sub>2</sub>O<sub>2</sub> + 6 drops HCOOH + 4 drops NH<sub>3</sub>OH ---> 487.9 ug/mL Ribose + 6.96ug/uL ribulose + 22.81 ug/mL glycerol + non-carbohydrates + unknowns + 2,3,5-tri-O-acetyl-1,4-anhydro-D-ribitol. (CCRC)



Fig 9, #6) 30mls iced carbonated water + 3 drops HCOOH + 2 drops H<sub>2</sub>SO<sub>4</sub> + 10mls CH<sub>3</sub>OH ---> 374.2 ug/mL glycerol + non-carbohydrates. (CCRC)

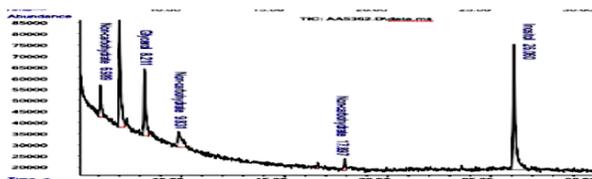


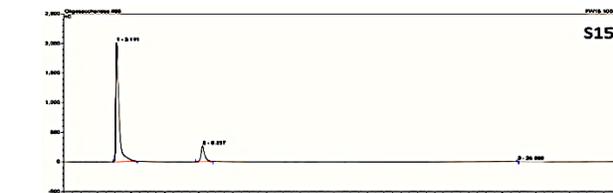
Fig 9, #7) 30mls carbonated water + 0.61mls HCOOH + 10mls CH<sub>3</sub>OH + 0.3mls NH<sub>3</sub>OH ---> 64.2 ug/mL glycerol + non-carbohydrates. (CCRC).



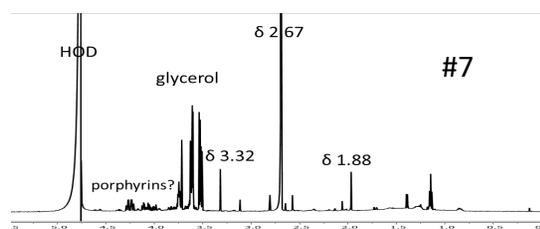
Fig 9, #14) 30mls iced carbonated water + 0.3mls HCOOH + 10mls Ethanol ---> 17 ug/10uL xylitol + noncarbohydrates. (CCRC).



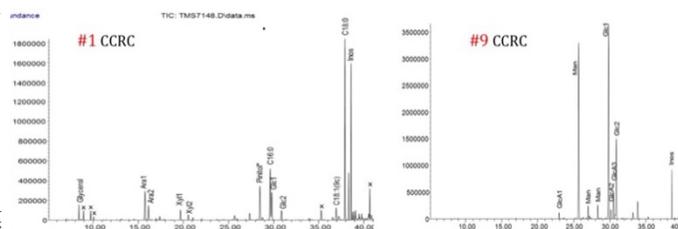
(Fig. 10) 10mls adonitol + 15mls H<sub>2</sub>O + 10mls H<sub>2</sub>O<sub>2</sub> + 5 drops HCOOH ---> 487.9 ug/mg, Ribose + 31.9 ug/uL, Ribulose + non-carbohydrates + unknowns + 2,3,5-tri-O-acetyl-1,4-anhydro-D-ribitol (CCRC)



(Fig. 10) 15mls Glycerol + 5mls H<sub>2</sub>O + 10mls H<sub>2</sub>O<sub>2</sub> + 10mls CH<sub>3</sub>OH ---> 28.4 ug/uL ribulose (CCRC)



(Fig. 11), (#7 from figure 14) 15mls carbonated water + .03mls Si(OH)<sub>4</sub> + 0.1mls H<sub>2</sub>SO<sub>4</sub> + 15mls CH<sub>3</sub>OH. (CCRC)



(Fig. 12), (#1, figure 14) 15mls carbonated water + 0.15mls H<sub>2</sub>SO<sub>4</sub> + 15mls CH<sub>3</sub>OH (#9, figure 14) 15mls carbonated water + .15mls Si(OH)<sub>4</sub> + .03mls H<sub>2</sub>SO<sub>4</sub> + 0.06mls oxalic acid + .6mls HCOOH + 15mls CH<sub>3</sub>OH. (CCRC)

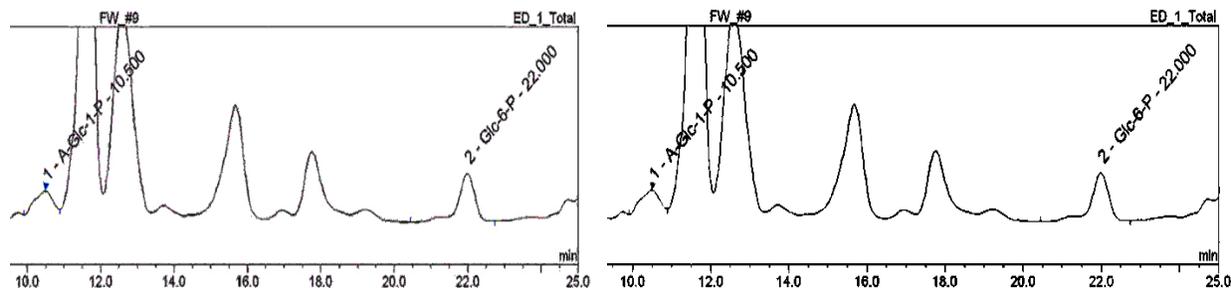
Ribulose was produced from carbonated water, hydrogen peroxide, formic acid, methanol and ammonia; 1) (2.5mls HCOOH + 30mls carbonated water + 10mls CH<sub>3</sub>OH + 2mls NH<sub>3</sub>OH ---> 26.7mg/uL ribulose), (Table 6, #14, 28, 30, 32), (CCRC and Anresco). 2) (10mls glycerol + 20mls carbonated water + 10mls H<sub>2</sub>O<sub>2</sub> + 0.95mls HCOOH ---> 17,100ppm solution of ribulose), (CCRC). (C<sub>3</sub>H<sub>8</sub>O<sub>3</sub> + H<sub>2</sub>CO<sub>3</sub> + HCOOH + H<sub>2</sub>O<sub>2</sub> ---> C<sub>5</sub>H<sub>10</sub>O<sub>5</sub> + 3H<sub>2</sub>O + 2O<sub>2</sub>). 3) (10mls Glycerol + 15mls distilled water + 5mls hydrogen peroxide + 5mls CH<sub>3</sub>OH ---> 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 H<sub>2</sub>O<sub>2</sub> + 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)<sub>4</sub> + 30mls glucose + 5mls KOCN + 10mls H<sub>3</sub>PO<sub>4</sub> + 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/CaCO<sub>3</sub>), (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).



(Fig. 13) In both samples' significant amounts of Glc 6-phosphate was 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 ml potassium hydroxide (used to raise the pH close to neutral), (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> + H<sub>2</sub>O + H<sub>3</sub>PO<sub>4</sub> + KOCN + CaCO<sub>3</sub>+KOH ----> C<sub>6</sub>H<sub>13</sub>O<sub>9</sub>P).

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 H<sub>2</sub>CO<sub>3</sub> + 0.15mls H<sub>2</sub>SO<sub>4</sub> + 15mls CH<sub>3</sub>OH.

**Sample #2:** 15mls H<sub>2</sub>CO<sub>3</sub> + 5mls CH<sub>3</sub>OH + 0.15mls cyanogen + 0.15mls KSi(OH)<sub>4</sub>

**Sample #3:** 15mls H<sub>2</sub>CO<sub>3</sub> + 0.61mls KSi(OH)<sub>4</sub> + 15mls CH<sub>3</sub>OH + 0.15mls KCN + 0.15mls CN<sub>2</sub>H<sub>2</sub>

**Sample #4:** 15mls H<sub>2</sub>CO<sub>3</sub> + 0.61mls KSi(OH)<sub>4</sub> + 15 ml CH<sub>3</sub>OH

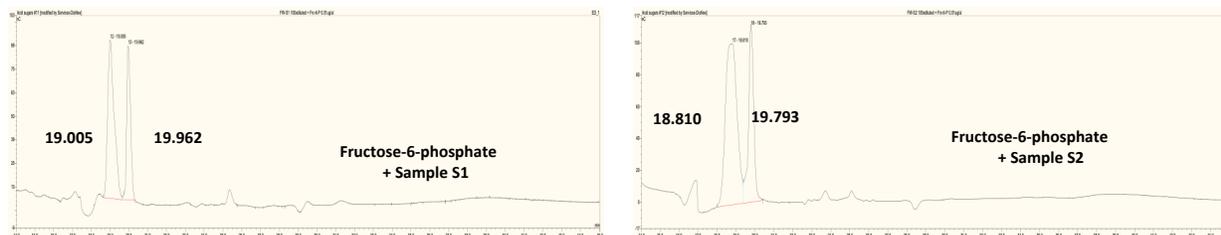
**Sample #5:** 15mls H<sub>2</sub>CO<sub>3</sub> + 0.61mls KSi(OH)<sub>4</sub> + 0.15mls ZrCO<sub>3</sub> + 15 ml CH<sub>3</sub>OH + 0.15mls KCN

**Sample #6:** 15mls H<sub>2</sub>CO<sub>3</sub> + 0.15mls KSi(OH)<sub>4</sub> + 15 ml CH<sub>3</sub>OH

**Sample #7:** 15mls H<sub>2</sub>CO<sub>3</sub> + H<sub>2</sub> gas + 0.15mls KSi(OH)<sub>4</sub> + 0.17mls H<sub>2</sub>SO<sub>4</sub> + 15mls CH<sub>3</sub>OH

**Sample #9:** 15mls H<sub>2</sub>CO<sub>3</sub> + 0.15mls KSi(OH)<sub>4</sub> + 2 drops H<sub>2</sub>SO<sub>4</sub> + 0.61mls oxalic acid + 0.61mls HCOOH + 15mls CH<sub>3</sub>OH.

(Fig 15) CCRC

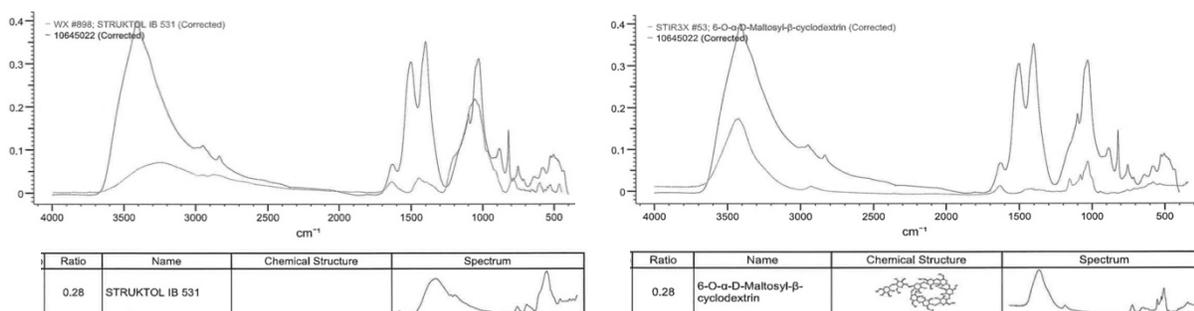


(Fig 14) Sample #1 & 2 were mixed with fructose-6-phosphate standard and separated by CarboPac PA20 column (CCRC).

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

Cyclodextrin (6-O- $\alpha$ -D-Maltosyl- $\beta$ -Cyclodextrin), glycogen and STRUKTOL 1B 531 were produced from 60mls warm carbonated water, 0.1ml potassium silicic acid and a 1.5-volt battery. By ionizing aluminum or copper wire electrodes in a mason jar filled with either warm carbonated water, warm ocean water or warm distilled water with sodium chloride hooked up to a 1.5-volt battery with carbonic acid. A 1.5-volt battery was used to mimic the electricity produced by the plant and cyanobacteria during photosynthesis. Hypothesized as  $(\text{H}_2\text{O} + \text{CO}_2 \leftrightarrow \text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{cyclodextrin, glycogen and STRUKTOL 1B 531})$ . (Fig. 1, 7, 14-18), (RJ Lee Group), (Creative Proteomics), (Arnold, 1976), (Porcellinis, 2017).

Could electricity produced by plants and cyanobacteria during photosynthesis also produce cyclodextrin, glycogen and STRUKTOL 1B 531 from the ionization of aluminum ( $\text{Al}^{3+}$ ) or other metals with carbonic acid. Cyclodextrin ( $54\text{H}_2\text{CO}_3 + 1.5\text{-volts (e}^-) + \text{Al}^{3+} \rightarrow \text{Al}(\text{C}_{54}\text{H}_{90}\text{O}_{45}) * 9\text{H}_2\text{O} + 54\text{O}_2$ ), (RJ Lee Group). Glycogen was detected using chemical analysis procedures for glycogenesis metabolism ( $6\text{H}_2\text{CO}_3 + \text{Cu}^{2+} + 1.5\text{-volts (e}^-) \rightarrow \text{Cu}(\text{C}_6\text{H}_{10}\text{O}_5)_n + \text{H}_2\text{O} + 6\text{O}_2$ ), (Creative Proteomics), (Fig. 1, 2, 7, 16-20), (Schmitt, 2016), (Clayton, 1965), (Dhar, 1935).



(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  $95^\circ\text{C}$  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  $25^\circ\text{C}$ , collect the supernatant sample to each tube separately. Add with 240 ul anthraquinone solution into each tube, incubated for 10 minutes at  $95^\circ\text{C}$ , 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, 12-volt battery, 6-volt AC transformer, silicic acid, methanol, warm carbonated water, warm ocean water, warm distilled water with sodium chloride, sodium hydrosulfate, copper wire, steel wire, stainless-steel wire, magnesium wire and aluminum wire.

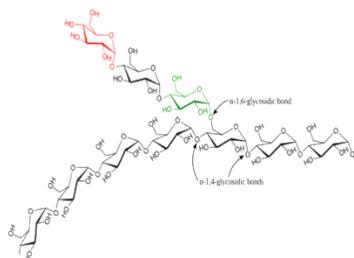
Carbon dioxide in water was replicated with warm carbonated water, warm ocean water or warm distilled water with sodium chloride.

**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.

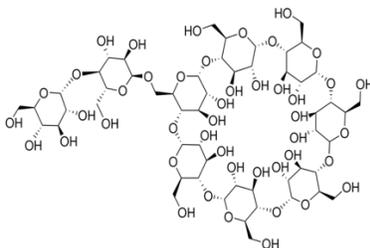
### Glycogen Structure



$\alpha(1\rightarrow4)$ -glycosidic and  $\alpha(1\rightarrow6)$ -glycosidic linkages. Core protein of glycogenin is surrounded by branches of glucose units.

(Fig.18)

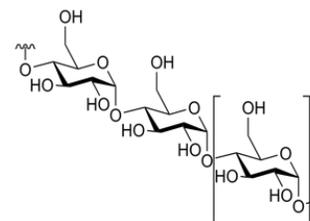
### 6-O- $\alpha$ -D-Maltosyl- $\beta$ -Cyclodextrin Structure



6-O- $\alpha$ -D-Maltosyl- $\beta$ -Cyclodextrin  $\beta$ -Cyclodextrin;  
 $(54\text{H}_2\text{CO}_3 + 1.5\text{-volts} + \text{Al}^{3+} \rightarrow \text{Al}(\text{C}_{54}\text{H}_{90}\text{O}_{45}) * 9\text{H}_2\text{O} + 54\text{O}_2)$ .

(Fig.19)

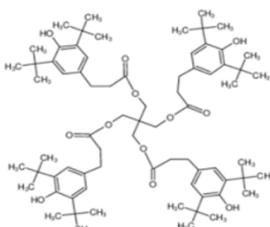
### Starch Structure



Amylose is a linear polymer of glucose mainly linked with  $\alpha(1\rightarrow4)$  bonds. It is one of the two components of starch, the other being amylopectin.  $(\text{C}_6\text{H}_{10}\text{O}_5)_n$

(Fig.20)

### STRUKTOL A60 Structure



(Fig.21)

**Results:** Cyclodextrin (6-O- $\alpha$ -D-Maltosyl- $\beta$ -Cyclodextrin), STRUKTOL 1B 531 and glycogen were produced from 45mls warm carbonated water, 0.3mls sodium hydrosulfide, 0.1mls silicic acid and a 1.5-volt or 12-volt battery. (Fig. 1, 7, 16-20), (Creative Proteonics), (RJ Lee Group).

Polysaccharides 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) Warm ocean water, aluminum wire electrodes and a 1.5-volt battery. 7) Warm distilled water, 0.6mls NaCl, 1.5-volt battery and aluminum wire electrodes. 8) Distilled water, sodium chloride, aluminum wire and a 1.5-volt battery. Copper electrodes produced a blue/green polymer, aluminum electrodes produced a white polymer and steel electrodes produced a red to brown polymer (Fig. 7, 14-18).

**Discussion:** Could the abiotic synthesis of 6-O- $\alpha$ -D-Maltosyl- $\beta$ -Cyclodextrin, STRUKTOL 1B 531 and glycogen from carbonic acid and the electrolysis of aluminum or copper wires with a 1.5-volt battery open up a new prospective on the physiology of cyanobacteria and plant growth. (Fig. 1, 2, 7, 16-21), (Arnold, 1976), (Clayton, 1965), (Dhar, 1935).

Adding cyanide, cyanate, silica and other early earth compounds needs to be explored to see how these compounds and others influence the results.

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

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

Acetone (CH<sub>3</sub>COCH<sub>3</sub>) 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. (3HCOOH + NH<sub>3</sub>OH → C<sub>3</sub>H<sub>6</sub>O + 2H<sub>2</sub>O + 2O<sub>2</sub>), (4CH<sub>3</sub>OH + 2NH<sub>3</sub>OH + H<sub>2</sub>O → 2C<sub>2</sub>H<sub>6</sub>O + 5H<sub>2</sub>O), (C<sub>2</sub>H<sub>4</sub>O<sub>2</sub> + 3NH<sub>3</sub>OH → C<sub>2</sub>H<sub>6</sub>O + 4H<sub>2</sub>O).

Acetone	isopropyl ug/L	CH <sub>4</sub> 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) <sub>4</sub> + 2.5 mls acetic acid + 10 mls NH <sub>3</sub> + 0.6mls NaSi(OH) <sub>4</sub> + 1.5 mls NH <sub>3</sub> . pH 7	ND	ND		44000 D		
2) 7oz carbonated water + 9 drops NaSi(OH) <sub>4</sub> + 2mls HCOOH + 17.5mls NH <sub>3</sub> . pH 7			ND	220 ppb		
3) 30mls water + 0.6mls NaSi(OH) <sub>4</sub> + 2mls HCOOH + 60mls NH <sub>3</sub> . pH 7				13000000 D		
4) 45mls Carbonated water + 0.6mls NaSi(OH) <sub>4</sub> + 2.5mls HCOOH + 30mls NH <sub>3</sub>	ND	ND	0.63	49000 D		
5) 30mls water + 5mls acetic acid + 2.5mls NH <sub>3</sub> OH 6-21				320		
6) 30mls water + 15mls dilute NaSi(OH) <sub>4</sub> + 2mls HCOOH + 5mls NH <sub>3</sub> OH ALS 11-20				1200		
7) 30mls H <sub>2</sub> O + 20 drops HCOOH + 5mls NH <sub>3</sub>				1400		
8) 30 mls CH <sub>3</sub> OH + 10 mls H <sub>2</sub> O <sub>2</sub> + 0.6mls NH <sub>3</sub>				2200		
9) 40mls CH <sub>3</sub> OH + 0.1mls NH <sub>3</sub> OH				5400		
10) Fig 16, #18) 25mls formamide + 5mls acetone + 10mls H <sub>2</sub> O <sub>2</sub>					31.8	
11) 30mls cold carbonated water + 0.61mls HCOOH + 10mls acetone						709.2
<b>Dilute: 8oz H<sub>2</sub>O + 5mls KSi(OH)<sub>4</sub> or 5mls NaSi(OH)<sub>4</sub></b>						

(Table 7)

**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.

**Results:** Acetone was produced from; 1) Formic acid, distilled water and ammonia (30mls H<sub>2</sub>O + 1.8mls HCOOH + 5mls NH<sub>3</sub>OH → 1,400ug/L of acetone). 2) Methanol, distilled water and ammonia (30mls H<sub>2</sub>O + 5mls CH<sub>3</sub>OH + 0.61mls NH<sub>3</sub>OH → 5,400ug/L of acetone). 3) Acetic acid, distilled water and ammonia (30mls water + 5mls CH<sub>3</sub>COOH + 2.5mls NH<sub>3</sub>OH → 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 or is the production of acetone a means to detoxify ammonia ( $\text{HCOOH}/\text{CH}_3\text{OH}/\text{CH}_3\text{CHOOH} + \text{NH}_4 \text{ ---> } \text{CH}_3\text{COCH}_3$ ), (Fincheira, 2018). Possibly explaining acetone's 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), ( $2\text{CaCO}_3 + \text{H}_2\text{O} + 2\text{H}_3\text{PO}_4 + 2\text{NaSH} \text{ ---> } \text{C}_2\text{H}_6\text{O} + \text{H}_2\text{O} + 6\text{O}_2 + 2\text{P} + 2\text{Na} + 2\text{S} + 2\text{Ca}$ ). 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).

Date: 10-1-18, 11-14-18, 1-4-19 and 4-2-21	ALS	$\text{CH}_2\text{O}$ ug/L	$\text{HCOOH}$ mg/L	$\text{CH}_4$ ug/L	$\text{CH}_3\text{OH}$ ug/L	Acetone ug/L	Acetic acid mg/L
1) $\text{CO}_2$ , 240mls carbonated water + 2.5mls $\text{NaSi}(\text{OH})_4$ + 0.3mls $\text{NaHS}$ + 0.25mls $\text{HCL}$ + 0.3mls $\text{H}_2\text{SO}_4$		ND	ND	ND	ND	ND	ND
2) $\text{CO}_2$ , 12 volt, 7 oz $\text{H}_2\text{CO}_3$ + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.5mls $\text{H}_2\text{SO}_4$ + 0.2mls $\text{HCL}$ + 0.15mls $\text{KCN}$ . Base $\text{NaSH}$ 0.15mls + 0.1mls $\text{NH}_3$ + 0.15mls $\text{FeCN}$ + 0.1mls $\text{NaSi}(\text{OH})_4$ + 0.6mls $\text{KHCO}_3$ .		ND	370	1.6	ND		1
3) $\text{CO}$ gas, No 12 volt, no $\text{NaSH}$ . 0.15mls $\text{NH}_3$ + 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 $\text{H}_2\text{SO}_4$ + 0.3mls $\text{HCL}$ + $\text{NaSH}$ 0.15mls + 0.1mls $\text{NaSi}(\text{OH})_4$ + 0.1mls $\text{NH}_3$		ND	9.1	ND	ND		1.2
5) 12-Volt, $\text{CO}_2$ . 7oz Carbonated water + 0.6mls $\text{NaSi}(\text{OH})_4$ + 0.3mls $\text{H}_2\text{SO}_4$ + 0.1mls $\text{HCL}$ + 0.15mls tsp $\text{KCN}$ + 0.15mls $\text{FeCO}_3$ , $\text{NiCO}_3$ , $\text{CuCO}_3$ , $\text{AlOH}$ , $\text{KHCO}_3$ + 0.3mls $\text{H}_2\text{SO}_4$ + 0.3mls $\text{KSi}(\text{OH})_4$ + 0.2mls $\text{NH}_3$		ND	100	ND	ND		2
<b>Dilute: 240mls <math>\text{H}_2\text{O}</math> + 5mls <math>\text{KSi}(\text{OH})_4</math> or 5mls <math>\text{NaSi}(\text{OH})_4</math></b>							

(Table 8)

**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.

**Results:** Ethanol was produced from (60mls distilled water + 0.61mls dilute  $\text{NaSi}(\text{OH})_4$  + 0.3mls  $\text{H}_3\text{PO}_4$  + 0.61mls  $\text{CaCO}_3$  + 0.3mls  $\text{NaSH} \text{ ---> } 1600\text{ug/L}$  of ethanol), (Table 9, #11-12, ALS). Without sodium hydrosulfide no ethanol was produced. 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 ---> 26ug/L of isopropyl), (ALS). Isopropyl alcohol was found to produce non-carbohydrates (30mls iced carbonated water + 0.61mls HCOOH + 10mls isopropyl ---> 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 ( $\text{CH}_3\text{COOH}$ ) 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 ( $2\text{HCOOH} + \text{H}_2\text{O} + 3\text{KOH} + \text{H}_2\text{O}_2$  --->  $\text{CH}_3\text{COOH} + 4\text{H}_2\text{O} + 2\text{O}_2$ ). From methanol ( $2\text{CH}_3\text{OH} + \text{H}_2\text{O} + 2\text{KOH} + \text{H}_2\text{O}_2$  --->  $\text{CH}_3\text{COOH} + 5\text{H}_2\text{O}$ ), (Table 9, #2, 4, 9).

**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  $\text{H}_2\text{O}$  + (1.23mls  $\text{CH}_3\text{OH}$  and or  $\text{HCOOH}$ ) + 0.61mls KOH + 15mls  $\text{H}_2\text{O}_2$  ---> 0.3g/L of  $\text{CH}_3\text{COOH}$ ), (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  $\text{NH}_3\text{OH}$  ---> 320ug/L acetone), (Table 7, #5). Acetic acid was found to produce glucose and monosaccharides when substituted for formic acid.

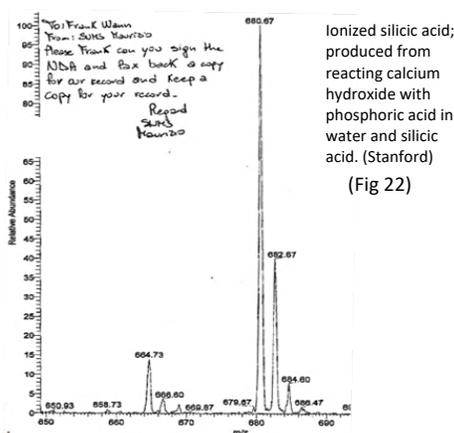
**Discussion:** Raising the pH of the solution aided in the formation of acetic acid. In the experiments that did not use potassium hydroxide, the yields of acetic acid were substantially reduced. Substituting methanol for formic acid resulted in the same yields of acetic acid produced.

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

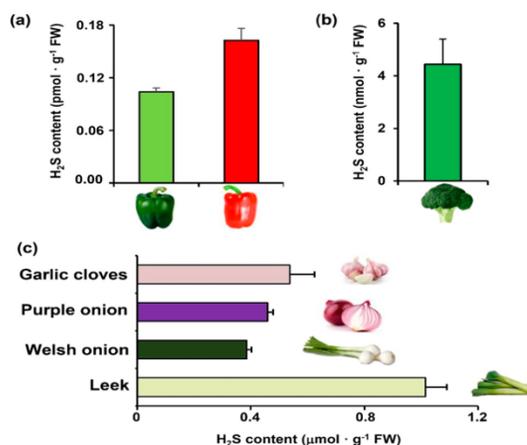
Hydrogen peroxide was added last in all the experiments to produce acetic acid. Could the formation of acetic acid be another means to detoxify hydrogen peroxide.

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 <sub>2</sub> O <sub>2</sub>	0.2		
2) 60mls air bubbled water + 0.6mls CH <sub>3</sub> OH + 15mls H <sub>2</sub> O <sub>2</sub>	0.17		
3) 60mls air bubbled water + 0.6mls HCOOH + 15mls H <sub>2</sub> O <sub>2</sub>	0.18		
4) 60mls air bubbled water + 0.6mls CH <sub>3</sub> OH + 0.6mls HCOOH + 0.3mls KOH + 15mls H <sub>2</sub> O <sub>2</sub>	0.19		
5) 60mls air bubbles water + 0.6mls CH <sub>3</sub> OH + 0.6mls HCOOH + 15mls H <sub>2</sub> O <sub>2</sub>	0.16		
6) 60mls air bubbled water + 2.5mls dilute KSi(OH) <sub>4</sub> + 0.3mls NaThioSulfate + 0.6mls HCOOH + 15mls H <sub>2</sub> O <sub>2</sub>	0.17		
7) 60mls air bubbled water + 0.6mls HCOOH + 0.6mls CH <sub>3</sub> OH + 2.5mls dilute KSi(OH) <sub>4</sub> + 15mls H <sub>2</sub> O <sub>2</sub>	0.18		
8) 60mls air bubbled water + CH <sub>4</sub> + 0.65mls HCOOH + 0.3mls KOH + 15mls H <sub>2</sub> O <sub>2</sub>	0.21		
9) 60mls air bubbled water + 1.25mls CH <sub>3</sub> OH + 0.31mls KOH + 30mls H <sub>2</sub> O <sub>2</sub>	0.30		
10) 60mls air bubbled water + 1.25mls HCOOH + 0.3mls KOH + 30mls H <sub>2</sub> O <sub>2</sub>	0.23	Below MRL	
11) 60mls water + 0.6mls NaSi(OH) <sub>4</sub> + 0.25mls H <sub>3</sub> PO <sub>4</sub> + 0.55mls CaCO <sub>3</sub>		340	
12) 30mls water + 0.7mls NaSi(OH) <sub>4</sub> + 0.25mls H <sub>3</sub> PO <sub>4</sub> + (0.61mls CaCO <sub>3</sub> & 0.3mls NaSH)		1600	
13) CO, 12volt, 75mls carbonated water + 0.6mls HCL + 0.6mls NaSi(OH) <sub>4</sub> + 0.61mls NaSH			26
14) 40mls H <sub>2</sub> O + 0.2mls NaSi(OH) <sub>4</sub> + 0.3mls H <sub>3</sub> PO <sub>4</sub> + 0.3mls CaCO <sub>3</sub>		ND	
15) 40mls cold H <sub>2</sub> CO <sub>3</sub> + 0.1mls dilute NaSi(OH) <sub>4</sub> + 0.3mls H <sub>3</sub> PO <sub>4</sub> + 0.61mls CaCO <sub>3</sub>		ND	
16) 40mls Cold H <sub>2</sub> CO <sub>3</sub> + 0.3mls H <sub>3</sub> PO <sub>4</sub> + 0.5mls CaCO <sub>3</sub> 11/23/21		ND	
17) 40mls H <sub>2</sub> O + 3 drops H <sub>3</sub> PO <sub>4</sub> + (0.61mls CaCO <sub>3</sub> & 0.3mls NaSH)		ND	
18) 40mls Carbonated water + 0.2mls H <sub>3</sub> PO <sub>4</sub> + (0.61mls CaCO <sub>3</sub> & 0.3mls NaSH)		ND	
<b>Dilute: 240mls H<sub>2</sub>O + 5mls KSi(OH)<sub>4</sub>, or 5mls NaSi(OH)<sub>4</sub></b>			

(Table 9)



Ionized silicic acid; produced from reacting calcium hydroxide with phosphoric acid in water and silicic acid. (Stanford) (Fig 22)



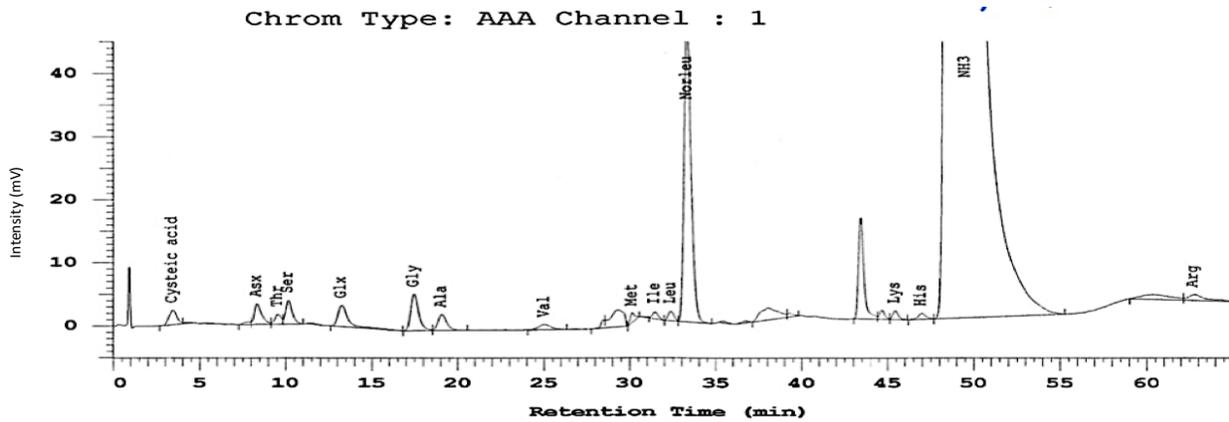
(Fig.23). Endogenous H<sub>2</sub>S content (Munoz-Vargas, 2022).

## The Abiotic Synthesis of Amino Acids

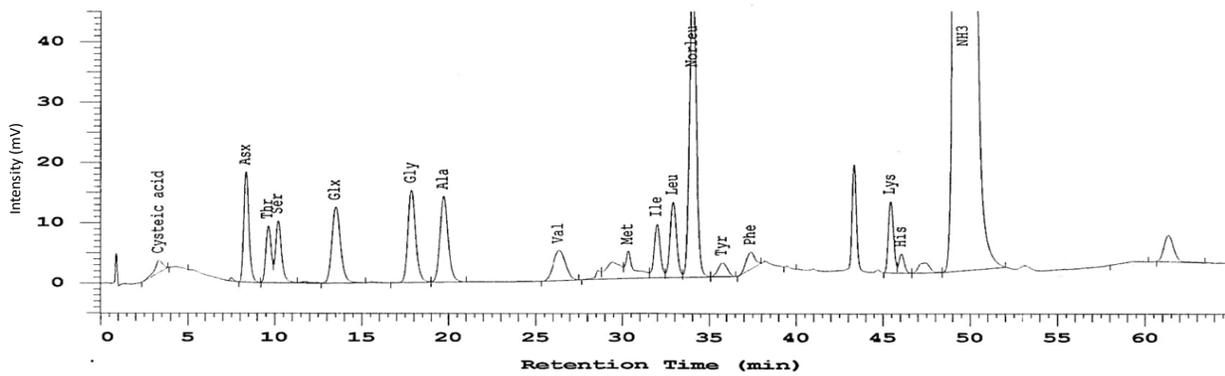
Amino acids were produced from nitriles, ammonia and nitrogen; 1) nitrogen gas, phosphoric acid and calcium carbonate (Fig. 24, 25), (UC Davis). 2) From ionized silicic acid, formaldehyde, potassium cyanide and ammonia (Fig. 6), (Stanford). 3) Carbonated water, nitrogen, propane, potassium cyanide, and sodium hydrosulfide.

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

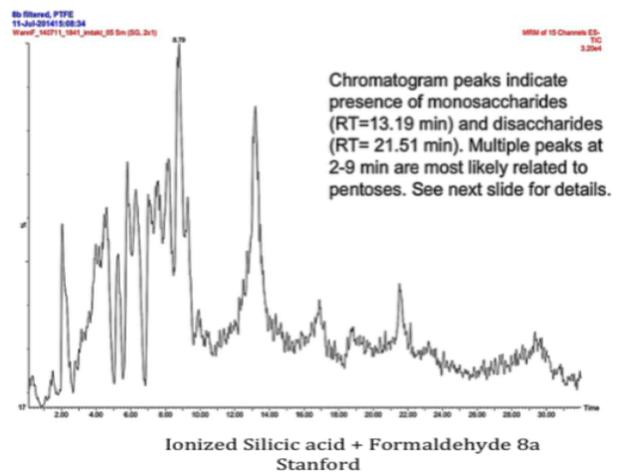
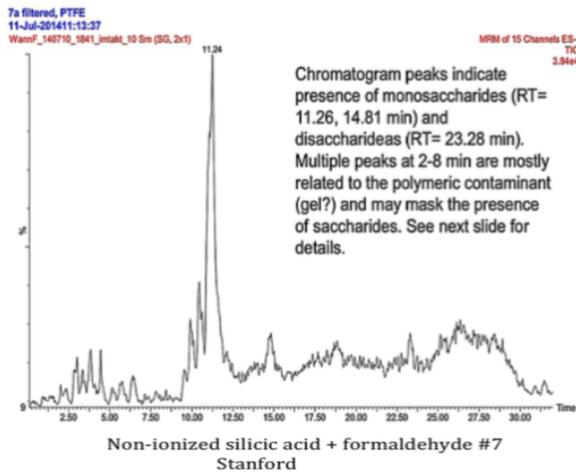
**Methods:** Producing amino acids from carbonated water, ammonia, nitriles and nitrogen gas. Mixing carbonated water, distilled water, nitrogen, dilute silicic acid, ammonia and cyanide containing compounds; producing amino acids and other unknowns.



(Fig 24) UC Davis, Molecular Structure Facility  
 (3,000mls Carbonated Water + N<sub>2</sub> + H<sub>2</sub> + propane + 9.9mls HCN + 31mls NaSH), (sample concentrated to 12 ounces)



(Fig. 25) UC Davis, Molecular Structure Facility  
 90mls Water + N<sub>2</sub> gas + 0.01mls H<sub>3</sub>PO<sub>4</sub> + 0.61mls CaCO<sub>3</sub>



(Fig.26)

**Results:** Amino acids were synthesized from; 1) Nitrogen gas bubbled into distilled water, phosphoric acid and calcium carbonate ( $N_2 + H_2 + \text{distilled water} + H_3PO_4 + CaCO_3 \rightarrow$  amino acids, ammonia and nitrates (Fig 21), (UC Davis). 2) From cyanide (Carbonated water + KCN + NaSH  $\rightarrow$  formic acid + amino acids), (Table 2, #1-16), (Fig. 24, 25 (UC Davis, Anresco). 3) (Distilled water +  $CH_2O + NH_3 + KCN +$  ionized silicic acid  $\rightarrow$  Fig. 6), (Stanford).

**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. 24, 25).

### **Final Discussion:**

It was found that the abiotic synthesis of cyclodextrin, glycogen, STRUKTOL 1B 531, formaldehyde, formic acid, methanol, glycerol, oxygen and unknowns were produced from carbonic acid, atmospheric gases, early earth compounds and a 1.5-volt battery. Where carbonic acid was found to react with atmosphere gases and early earth compounds in a low voltage electrical environment;  $H_2O + CO_2 \rightleftharpoons H_2CO_3 +$  (hydrogen sulfide, methane, methanol, cyanide, cyanate, urea, sodium chloride, ammonia, silicic acid, 1.5-volt & 12-volt battery ( $e^-$ ), aluminum, copper and other atmospheric gases and compounds). Hypothesized as ( $H_2O + CO_2 \rightleftharpoons H_2CO_3 +$  atmospheric gases & early earth compounds + 1.5-volts ( $e^-$ ) +  $Al^{3+} \rightarrow$  formaldehyde, formic acid, methanol, glycerol, oxygen, amino acids, cyclodextrin, glycogen, STRUKTOL 1B 531 and unknowns), (Clayton, 1965), (Dhar, 1935).

From these initially produced compounds from carbonic acid; (formaldehyde, formic acid, methanol, oxygen, glycerol, cyclodextrin, STRUKTOL 1B 531, glycogen, amino acids and unknowns). Stearic acid, palmitic acid, acetic acid, glycogen, fatty acids, ribose, acetic acid, monosaccharides, ribulose, nucleosides, nucleotides, glycolic acid, lactic acid, methane, glycogen, porphins, acetone, methanol, glycerol, amino acids and more were produced (Stanford's mass spectrometry department), (Complex Carbohydrate Research Center), (Anresco), (ALS), (ETS), (Avomeen Analytical), (RJ Lee Group), (R&L Analytical).

Cyclodextrin, glycogen and STRUKTOL 1B 531 were produced from carbonic acid and ionized aluminum ( $Al^{3+}$ ) wire electrodes in a mason jar filled with either warm carbonated water or warm ocean water hooked up to a 1.5-volt battery. A 1.5-volt battery was used to mimic the electricity produced by plants and cyanobacteria during photosynthesis (Fig. 1, 2, 7, 16-20), (Creative Proteomics), (RJ Lee Group). Could the electricity produced by plants and cyanobacteria during photosynthesis also produce cyclodextrin, glycogen and STRUKTOL 1B 531 from the ionization of aluminum ( $Al^{3+}$ ) and other metals with carbonic acid. Hypothesized as ( $CO_2 + H_2O \rightleftharpoons H_2CO_3 + 1.5\text{-volts } (e^-) + Al^{3+} \rightarrow$  cyclodextrin + glycogen + STRUKTOL 1B 531), (Fig 1, 2, 7), (Clayton, 1965), (Dhar, 1935).

Chemosynthesis ( $CO_2 + 4H_2S + O_2 \rightarrow CH_2O + 4S + 3H_2O$ ) and the origin of life chemistry is hypothesized as originating from carbonic acid reacted with atmosphere gases and early earth compounds in a electrically charged environment. Hypothesized as ( $H_2CO_3 +$  atmosphere gases & early earth compounds + ( $e^-$ ) +  $Al^{3+} \rightarrow$  formic acid, formaldehyde, amino acids, methanol,

glycerol, cyclodextrin, glycogen, STRUKTOL 1B 531, oxygen and unknowns). **Hydrogen sulfide** and carbonic acid produced formaldehyde ( $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 + 2\text{H}_2\text{S}_{(\text{aq})} \rightarrow \text{CH}_2\text{O} + 2\text{S} + 2\text{H}_2\text{O}$ ). Carbonic acid, **hydrogen sulfide** and cyanide produced formic acid ( $\text{H}_2\text{CO}_3 + \text{KCN} + [\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-] \rightarrow \text{HCOOH} + \text{unknowns}$ ), (Clayton, 1965), (Dhar, 1935).

Carbonic acid from 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 unknowns ( $\text{HS}^-$ ), ( $\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$ ), ( $\text{NaSH}_{(\text{aq})} \rightleftharpoons \text{Na} + \text{HS}^-$ ), (Fig. 3). 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, 23).**

Formaldehyde was produced from carbonic acid from warm carbonated water and sodium **hydrosulfide** ( $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-\} \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$ ). And from a 12-volt battery, distilled water and methane or carbon monoxide (Table 1, #21, 22).

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 + ( $\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons \text{H}^+ + \text{HS}^-$ )  $\rightleftharpoons$  HCOOH + unknowns). And from a 12-volt battery, distilled water and methane or carbon monoxide (Table 1, #21, 22). Formic acid was also produced from formaldehyde. Formic acid was found to produce acetic acid, acetone, glycerol, rhamnose, monosaccharides and unknowns (Table 1-3, 6).

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 1, 2, 3, 7). 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).

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, 22-24). 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 chemosynthesis and the origin of life chemistry was possibly demonstrated from the following experiments: 1) (3,000mls carbonated water + 12-volts +  $N_2$  + propane + 10mls KCN + 31mls NaSH ---> formic acid, ribose, ammonia and amino acids). This sample was concentrated to 120mls with a rotary vacuum evaporator (Fig. 24, 25), (UC Davis, Stanford, ALS and Anresco). 2) (Distilled water +  $N_2$  +  $H_3PO_4$  +  $CaCO_3$  ---> amino acids + ammonia + nitrates + organic acids). 3) (Distilled water + ionized silicic acid +  $CH_2O$  + KCN +  $NH_3$  ---> amino acids, fatty acids, lactic acid, glycolic acid, porphine and more were produced), (Fig. 6, 22, 26), (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. 11) What is the maximum and minimum voltage that will produce these polysaccharides. 12) What can be produced from cyclodextrin, glycogen or acitretin. 13) If using different metals and compounds produce differences in the polysaccharides or STRUKTOL produced. 14) Try using ocean water instead of carbonated water for all the experiments. 15) Could the synthesis of glycogen, cyclodextrin and STRUKTOL be possible on the early earth from the electricity produced in the environment ionizing metals with carbonic acid. 16) Producing formaldehyde and formic acid from a 12-volt battery, distilled water and methane or carbon monoxide must be questioned.

Nothing should be taken at face value and that there is a daunting amount of work that needs be done.

## Summary:

Abiotic synthesis of cyclodextrin, STRUKTOL 1B 531, glycogen, formaldehyde, formic acid, methanol, glycerol, oxygen and unknowns were produced by reacting carbonic acid with atmospheric gases and early earth compounds in a low voltage electrical environment. Hypothesized as ( $\text{CO}_2 + \text{H}_2\text{O} \rightleftharpoons \text{H}_2\text{CO}_3 + \text{atmosphere gases \& early earth compounds} + (\text{e}^-) + \text{Al}^{3+} \rightarrow \text{formaldehyde, formic acid, methanol, glycerol, cyclodextrin, glycogen, oxygen, amino acids, STRUKTOL 1B 531 and unknowns}$ ).

From these initially produced compounds from carbonic acid; (formaldehyde, formic acid, methanol, oxygen, glycerol, cyclodextrin, glycogen, STRUKTOL 1B 531, amino acids and unknowns). Stearic acid, palmitic acid, acetic acid, glycogen, fatty acids, ribose, monosaccharides, ribulose, nucleosides, acetic acid, nucleotides, glycolic acid, lactic acid, methane, glycogen, porphine and more were produced. (Stanford's mass spectrometry department), (Complex Carbohydrate Research Center), (Anresco), (ALS), (ETS), (Avomeen Analytical), (RJ Lee Group), (R&L Analytical).

Cyclodextrin, glycogen, STRUKTOL 1B 531 and unknowns were produced from carbonic acid, silicic acid and the electrolysis of aluminum wire electrodes in a mason jar filled with either warm carbonated water or warm ocean water hooked up to a 1.5-volt battery. A 1.5-volt battery was used to mimick the voltage produced by plants and cyanobacteria during photosynthesis. Hypothesized as ( $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3 + 1.5\text{-volts } (\text{e}^-) + \text{Al}^{3+} \rightarrow \text{glycogen} + \text{cyclodextrin} + \text{STRUKTOL 1B 531}$ ).

Formaldehyde was produced from warm carbonated water and sodium hydrosulfide ( $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-\} \rightarrow \text{CH}_2\text{O} + 2\text{H}_2\text{O} + 2\text{S}$ ). And from a 12-volt battery, distilled water and methane or carbon monoxide. Formaldehyde was found to produce formic acid, methanol, glycerol and unknowns.

Formic acid was produced from carbonated water, cyanide and sodium hydrosulfide ( $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 + \text{KCN} + \{\text{H}_2\text{S}_{(\text{aq})} \rightleftharpoons 2\text{H}^+ + 2\text{HS}^-\} \rightarrow \text{HCOOH} + \text{unknowns}$ ). And from a 12-volt battery, distilled water and methane or carbon monoxide. 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 derivates.

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 duratives and deoxyribose.

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), water, phosphoric acid, potassium cyanate and potassium hydroxide or calcium carbonate.

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