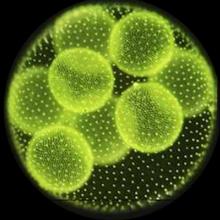


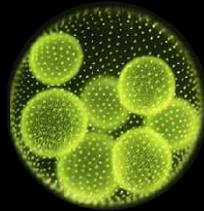


# ALGIX™

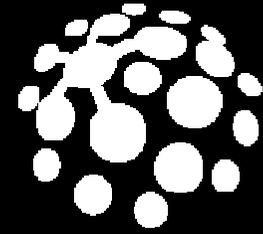
Formulating the Potential of Algae



The Feedstock of The Future is **Algae**



# Kimberly-Clark



# Mission

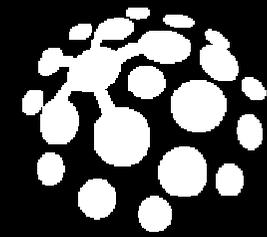
**Develop** sustainable, low-cost, bio-based plastics in the renewable plastics industry.

**Obtain** bioplastics from aquatic species, such as algae. Utilizing primarily sources from aquaculture operations & wastewater management facilities.

**Reduce** dependence on fossil fuel & food-based plastics. By blending these aquatic bioplastics with commercial polymers our biotechnology will allow our customers to reduce their own environmental footprint with their products.



# Supply Chain Aquaculture



Algae causes problems with fish yield, flavor and costs

Harvesting algae growing in existing fish/shrimp ponds

US Catfish Industry – 90,000 acres of Ponds in Southeast

Algae Production estimated at 700-900 MM pounds/yr

Dean Wilson Farms

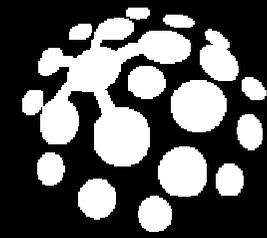
450 Acres of Ponds R&D Center



CATFISH  
FARMERS  
OF AMERICA

Large Catfish Farm in Mississippi





# Supply Chain

## Wastewater Treatment

Existing treatment ponds naturally grow algae

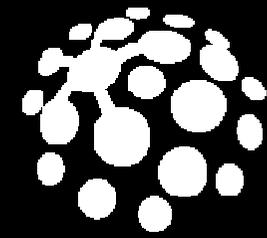
Utilizes existing infrastructure, can be modified to enhance productivity

Over 16,000 WWT Facilities in US





## Supply Chain Biofuels



### Co-Product Strategy for Biofuels

Algae meal/residue waste product after oil extraction is protein rich and ideal for Algix bioplastic technology





# AGENT





# ALGIX Harvesters

MOD-0 : 37 GPM



MOD-1 : 125 GPM



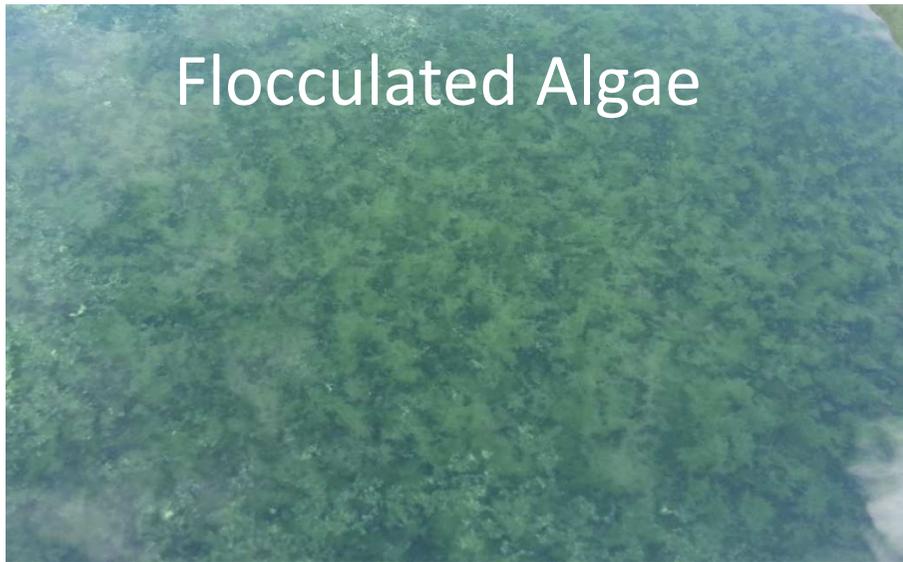
MOD-2 : 200 GPM



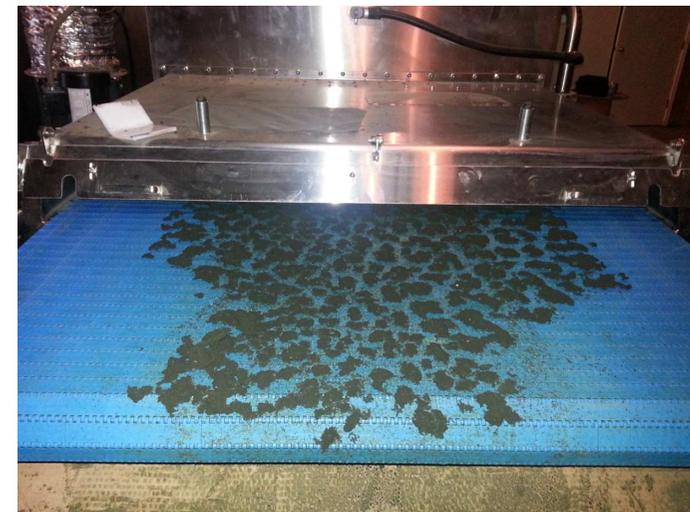
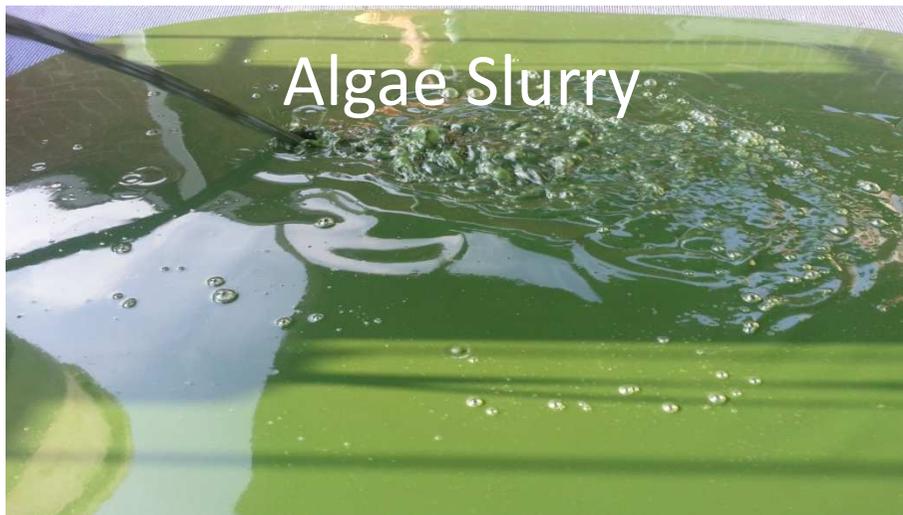


# Algae Drying

Flocculated Algae



Algae Slurry





# SOLAPLAST





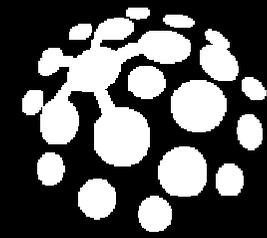
# Processing and Storage

Algae Plastic  
Compounding



Supersacks of  
Algae storage





## Product Advantage

**Aquatic Biomass is very attractive for use as feedstock for bioplastics**

**Highest** growth rate of all plants, regular harvesting & year round growth in warmer climates

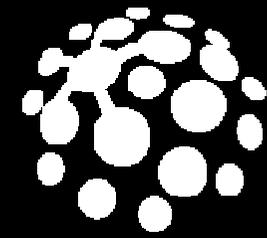
**Contains** natural protein and carbohydrate-based polymers

**Utilizes** wastewater nutrients and CO<sub>2</sub> as a nutrient source

**Capitalizes** on algae's higher protein content

**Does not** compete with food production





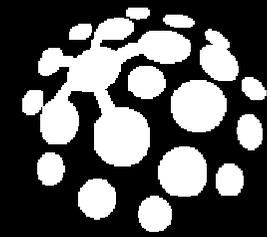
## Foodstuff vs. Feedstock

- Food sources being used for bioplastics increase price and heavily impact animal feed & food markets.

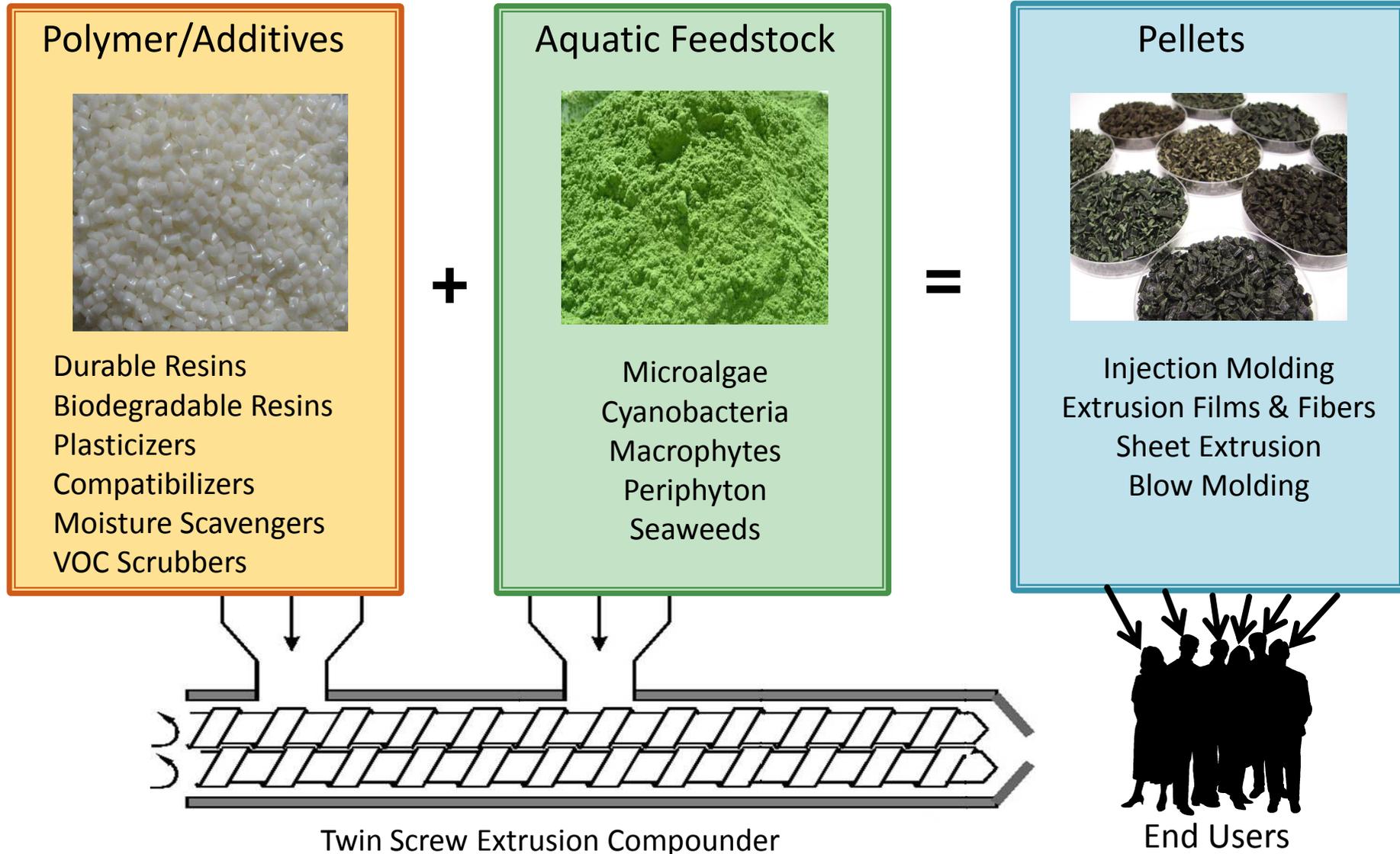


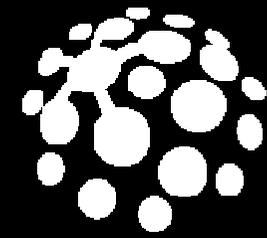
- Algae does not impact food pricing like traditional foodstuffs, and can be harvested as a waste product from agricultural operations.





# Technology





# Algae Bioplastics

Developed through collaboration with Kimberly-Clark Corporation & the University of Georgia.

Can be formed into articles, sheets, and films.

Applications in packaging, agriculture, carpets, consumer goods, construction, electronics, automotive, etc.



**Aquatic Biomass**



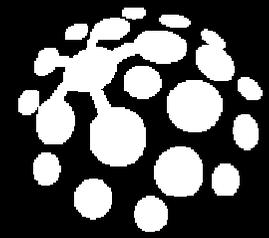
**Bio-Resins**



**Injection Molding**



**Sheet Extrusion**

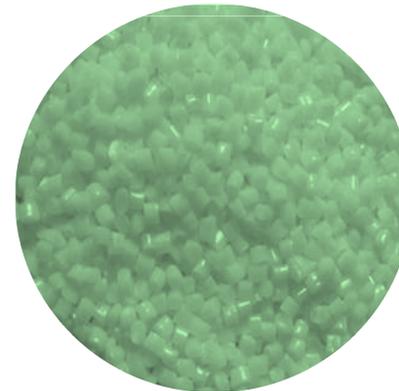


# Options

Durable  
Polymers



Biodegradable  
Polymers

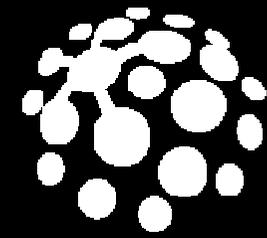




# Cast Films

Micronized algae loaded from 4-12%



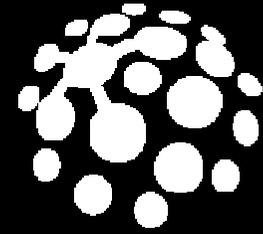


# Color Modification





# Algae Polymerization

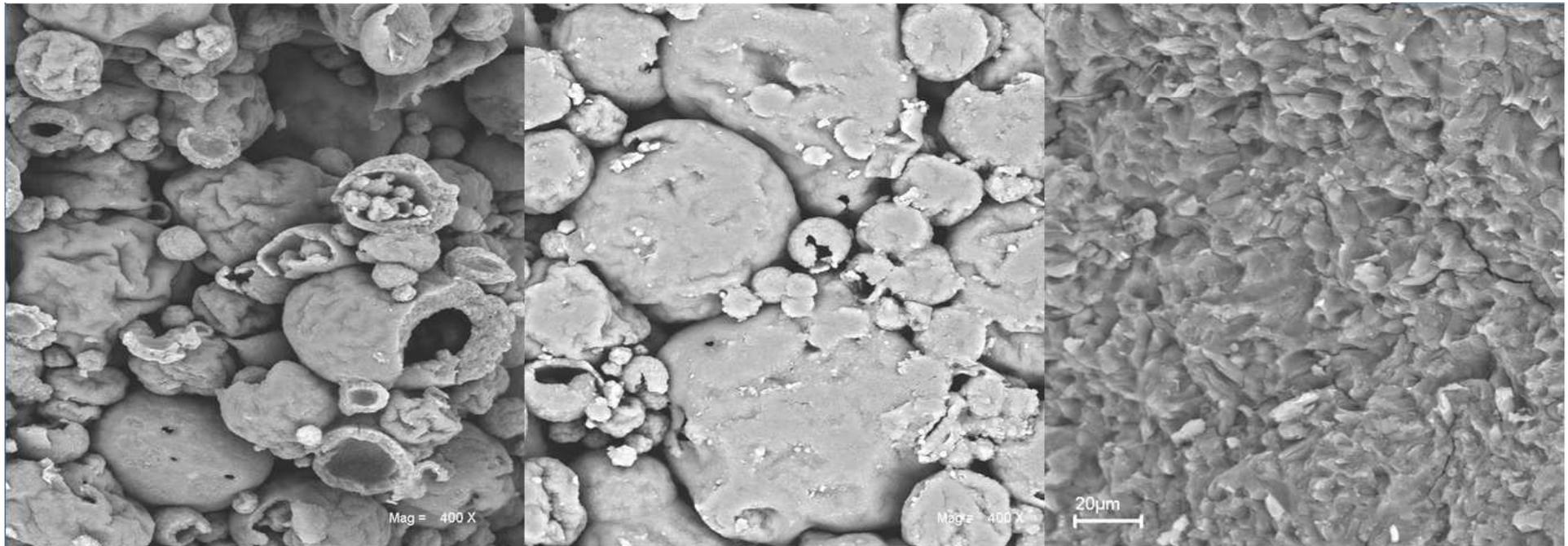


SEM Images of bioplastic surface from 100% microalgae compression molded

Incomplete

Partial

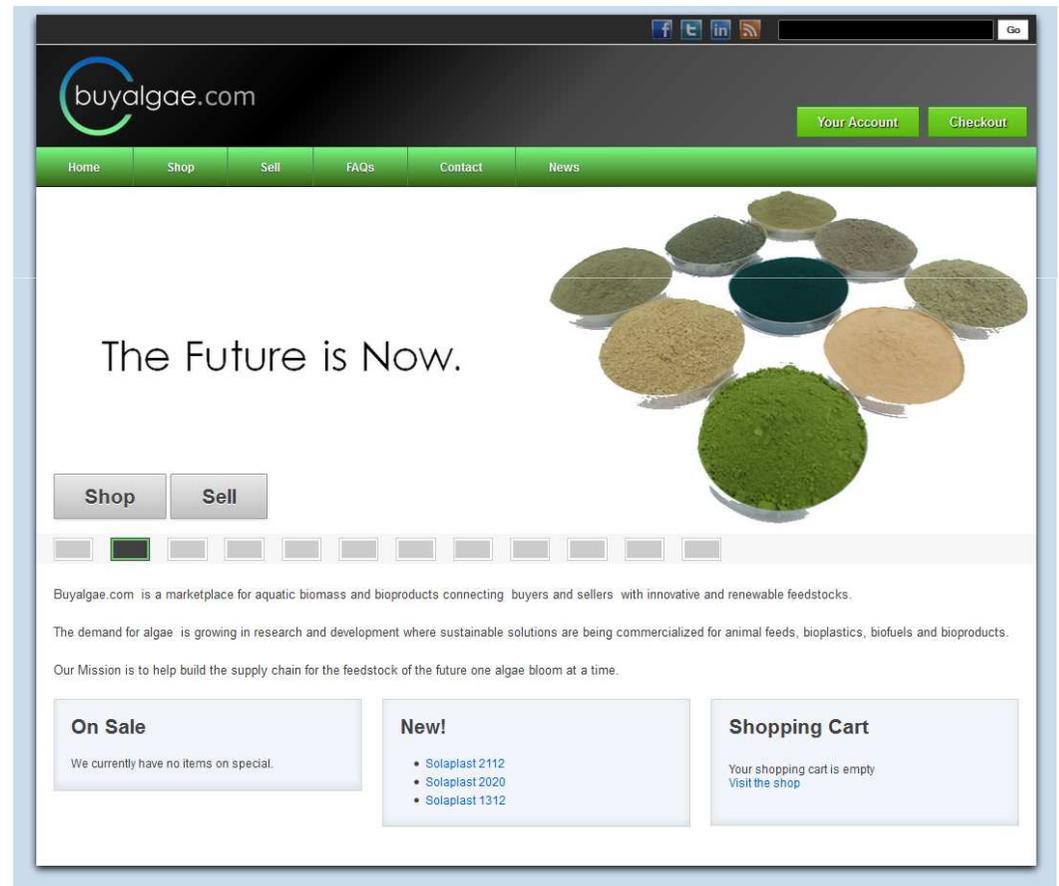
Complete

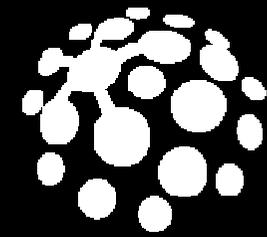




# eCommerce Marketplace

- Helping build the aquatic biomass supply chain
- Connecting feedstock end users with algae producers
- Initial focus on Academic and Corporate R&D, product development
- Provide detailed feedstock characteristics and compositional analysis
- Help commoditize the feedstocks and grow the industry

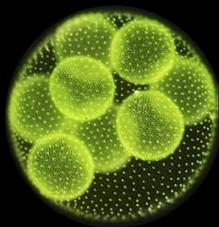




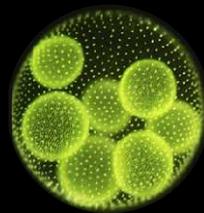
# Thank You

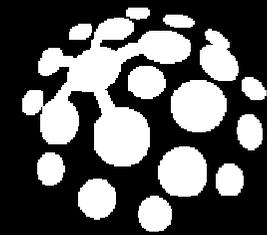
Bo Shi  
James Wang  
Mike Gross  
Bailey Green  
Butch Wilson  
KT Hessler  
Jeff Cernohous

Kimberly-Clark Corporation  
Kimberly-Clark Corporation  
Kimberly-Clark Corporation  
GO<sub>2</sub> Water Solutions, Inc  
Catfish Farmers of America  
Custom Processing Solutions  
Interfacial Solutions



The Feedstock of The Future is **Algae**





**Ryan W. Hunt**

**Chief Technical Officer**

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www.Algix.com

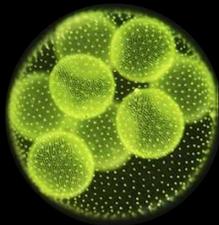
**John Dekker**

**Business Development Director**

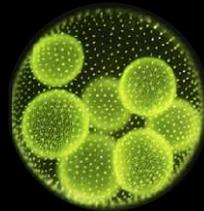
Phone: 706.410.5082

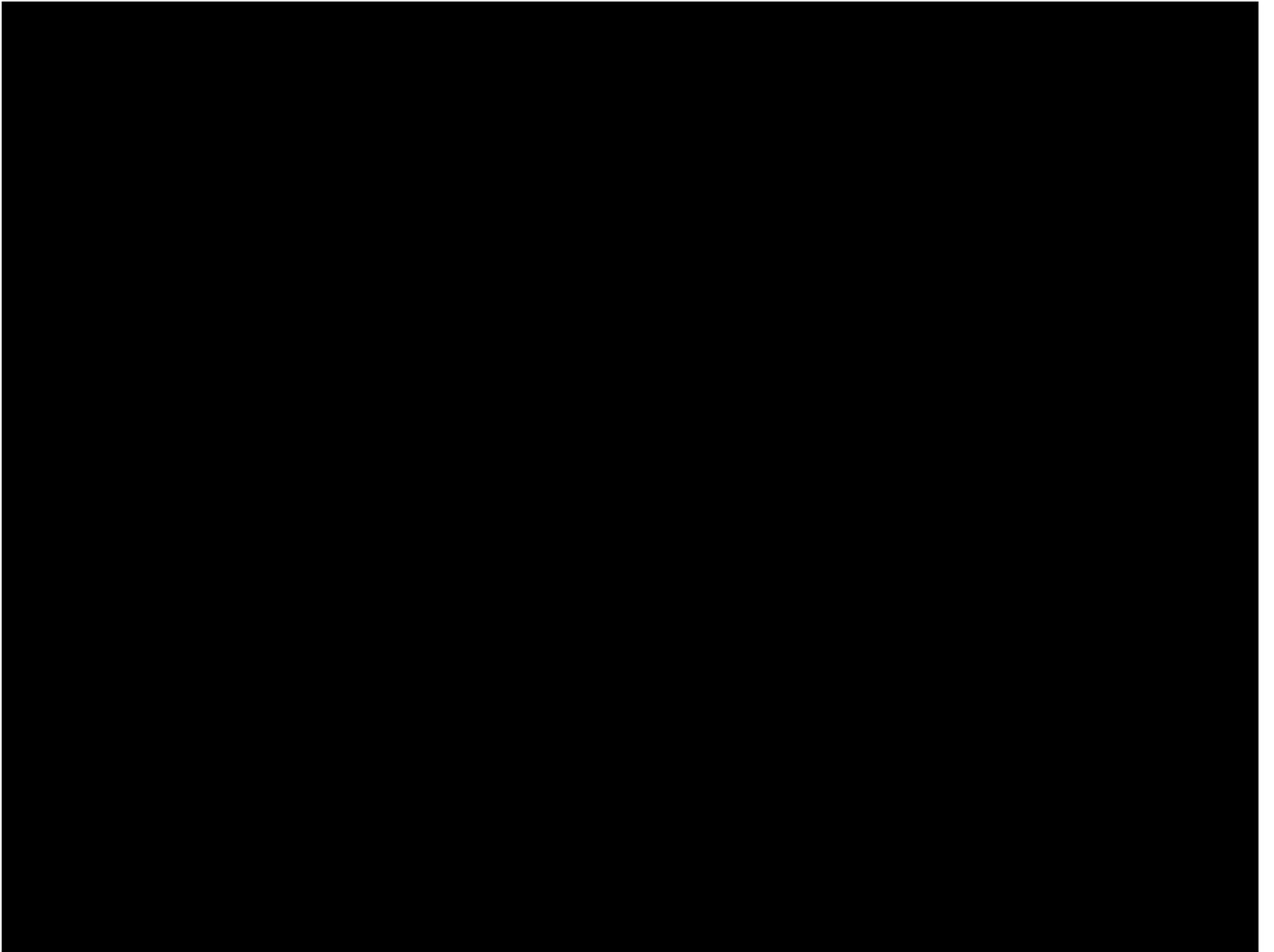
john.dekker@Algix.com

www.Algix.com



The Feedstock of The Future is **Algae**





**Table 1 - Chemical *Composition* of *Algae* Expressed on A Dry Matter Basis (%)**

Strain	Protein	Carbohydrates	Lipids	Nucleic acid
<a href="#">Scenedesmus obliquus</a>	50-56	10-17	12-14	3-6
<i>Scenedesmus quadricauda</i>	47	-	1.9	-
<i>Scenedesmus dimorphus</i>	8-18	21-52	16-40	-
<i>Chlamydomonas reinhardtii</i>	48	17	21	-
<a href="#">Chlorella vulgaris</a>	51-58	12-17	14-22	4-5
<i>Chlorella pyrenoidosa</i>	57	26	2	-
<i>Spirogyra sp.</i>	6-20	33-64	11-21	-
<i>Dunaliella bioculata</i>	49	4	8	-
<i>Dunaliella salina</i>	57	32	6	-
<i>Euglena gracilis</i>	39-61	14-18	14-20	-
<i>Prymnesium parvum</i>	28-45	25-33	22-38	1-2
<i>Tetraselmis maculata</i>	52	15	3	-
<a href="#">Porphyridium cruentum</a>	28-39	40-57	9-14	-
<a href="#">Spirulina platensis</a>	46-63	8-14	4-9	2-5
<i>Spirulina maxima</i>	60-71	13-16	6-7	3-4.5
<i>Synechococcus sp.</i>	63	15	11	5
<i>Anabaena cylindrica</i>	43-56	25-30	4-7	-

Source: Becker, (1994)