

# Reverse Earth

Restoring Resiliency.



## REVERSE EARTH AGRICULTURE

POWERED BY EVE INSTITUTE FOR WOMEN IN AGRICULTURE

# The Problem

There are numerous ongoing national and international security crises regarding food and energy.

With ever-growing population demands and more significant environmental events the system strain is effecting people and the planet on multiple fronts.

Wars, droughts, viruses, politics, and supply chain problems clearly make matters more difficult.

We need diverse and nimble solutions which secure physical necessities for all people, while also educating and inspiring positive action and universal ethics towards the environment and each other.

The solutions need to be locally secured and also part of an international community cooperation which integrates the best efforts of all.

# Devastating Soil Degradation

The widespread and decades-long use of chemical fertilizer and pest control treatments in agriculture has led to massive soil degradation worldwide.

As a result, soil conditions are increasingly disease-friendly and non-aerobic, which lead to problems with compaction, erosion and an overall decline of soil quality.

Current solutions, such as the application of manure, often have adverse effects on the surrounding environment. Runoff carries excess nutrients such as phosphate into local waters, creating toxic algae blooms that harm wildlife.

Simultaneously, the population continues to grow, and with it the demand for increased farm productivity (as much as 70% by the mid-century). The conventional toolkit is unequipped to meet this need.

Today's "solutions" not only often cause more harm than good, but they lack a critical component: soil biology science.



# Reverse Earth Agriculture



**REVERSE EARTH  
AGRICULTURE**

POWERED BY EVE INSTITUTE FOR WOMEN IN AGRICULTURE

Reverse Earth is an agriculture technology and sustainability company with a focus on food security, soil transformation/re-greening/beautification, carbon markets, and providing people healthful nutrient dense diet options.

We harness the ability to access a robust portfolio of proven technologies and green solutions both independently and in collaboration with partners worldwide.

The systems include:

Biologically complete soil amendments

Bio stimulants, pesticide, atmospheric water generation, autonomous irrigation, solar energy devices, and remote re-greening systems.

# ProBioGrow

Gaining Ground.

Our flagship and product is the biologically complete soil amendment.

## ProBioGrow

is a specialized soil enrichment that converts natural materials into products that enhance soil health and the productivity without the need for pesticides or fertilizers.

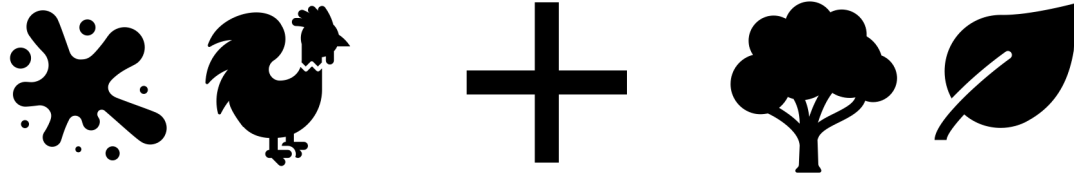
We are focused on the “probiotics” of the soil: a highly-efficient and sustainable symbiosis between plants and a vast multitude of microorganisms inhabiting the soil.

The properly balanced soil will increase yields, sequester carbon, increase fertility, retain proper moisture and enable growth in previously depleted areas.

**ProBioGrow is gaining ground!**

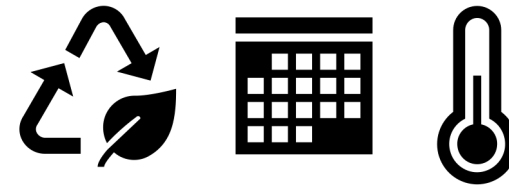


# ProBioGrow Product



Chicken litter and plant waste are combined

A composting process takes place for 45-60 days in which pathogens, seeds, etc are eliminated while temperature and moisture are monitored to create a unique organic mulch matter



A proprietary process and key inputs are applied that consists of a healthy compilation of microbial life for natural symbiotic balance

Our biologically complete soil amendment is completed



# The Science Behind the Products

Our highly-specialized production process involves composting locally-sourced chicken manure in a controlled environment and enhancing it with healthy soil microorganisms. As a result of this increased microbial activity during decomposition, organic soil compounds including phosphate become insoluble in water and therefore do not affect local waterways.

Thanks to natural plant-microbe symbiosis, the insoluble organic compounds are readily broken down by soil microbes to make them “plant available” when needed. The plant gets exactly what it needs, when it needs it, and no soluble phosphate is left over.

This process also applies to carbon sourced from the atmosphere, most of which plants deliver to the soil microbes, thus creating promising potential to turn healthy soil into large-scale carbon sequestration sites.



# The Key: Soil Biology Science

Reverse Earth employs soil biology science to develop 100% natural soil amendments that more efficiently and effectively increase land productivity (as asserted by USDA) while having no adverse effects on the soil or surrounding environment. Due to the soil science behind our products, we are able to prevent and reverse soil degradation while keeping common fertilizer nutrients from entering adjacent water systems to negative effect.



We leverage the natural process of plant-microbe symbiosis to optimize soil conditions, promoting root growth and water absorbency while suppressing disease and erosion.

Our technology has the potential to reclaim soils that have been depleted and even sequester carbon from the air into the ground at a rate greater than the oceans: all leading to a striking effect on plant growth potential and crop yields.

Chemicals either kill the microbial community or cause it to atrophy.



## PRODUCT INGREDIENTS - SUMMARY

INGREDIENT	WHAT IT PROVIDES
Chicken Litter - co-composted in a highly controlled process together with hi-carbon materials (wood, straw)	<ul style="list-style-type: none"> <li>- <b>Macronutrients</b>, in great quantity – chief among them: Nitrogen, Phosphorus, Potassium, Carbon</li> <li>- <b>Soil Microorganisms</b>: a broad spectrum community, deficient in a few types, which we add specifically (below)</li> <li><b>Notes:</b></li> <li>- <u>Animal manures</u> are #1 natural source of nutrients &amp; microbes</li> <li>- <u>Chicken litter</u> contains more (by multiples) than other farm animal manures (horse, cow, pig)</li> </ul>
Azomite & Coral calcium	<ul style="list-style-type: none"> <li>- <b>Micronutrients</b>, the full complement (70+), mined from deposits left by ancient seas</li> <li>- antimony to zirconium, which the National Research Council has recognized to be essential for completion of the nourishment regime</li> <li>- encourage robust microbiological life in the soil and enables plants to express their full genetic potential</li> </ul>
Microbial Tea	<ul style="list-style-type: none"> <li>- Additional beneficial <b>bacteria</b> specific to plant growth</li> <li>- <b>Nutrient cycling in the soil</b>, and <b>delivery</b> to roots in precisely the amounts and time required by the plant.</li> <li>- Aeration (de-compaction) of the soil</li> <li>- Disease suppression</li> <li>- Atmospheric carbon sequestration</li> </ul>
(Endo)Mycorrhizal Fungi	<ul style="list-style-type: none"> <li>- They live in <b>symbiosis</b> with plants</li> <li>- Vast expansion of the <b>mineral and water absorption</b> capabilities of plants</li> <li>- Central to carbon sequestration</li> <li>- Chicken litter has a natural deficiency in this fungus. This component fills it.</li> </ul>
Biochar	<ul style="list-style-type: none"> <li>- <b>Safe harbor</b> environment for microorganisms</li> <li>- Additional carbon in the soil (aids carbon sequestration from the atmosphere)</li> </ul>
Humic Acid	<ul style="list-style-type: none"> <li>- Maximizes storage of water in dry periods</li> <li>- Reacts with certain soil micronutrients, creating a chemical net connecting soil particles which resists erosion</li> <li>- Resulting <b>retention of oxygen &amp; water</b> creates optimal environment for beneficial microbe development</li> </ul>

### The Importance of Soil Microorganisms – summarized...

*Quote from the introduction on the USDA Nat'l Resource Conservation Service website:*

"The creatures living in the soil are critical to soil health. They affect soil structure and therefore soil erosion and water availability. They can protect crops from pests and diseases. They are central to decomposition and nutrient cycling and therefore affect plant growth and amounts of pollutants in the environment. Finally, the soil is home to a large proportion of the world's genetic diversity."



**REVERSE EARTH**  
AGRICULTURE



Account No. : 933

Compost (TMECC) Analysis Report

**BIDDLE, TONY**  
**MID ATLANTIC MICROBIALS**  
 PO BOX 630  
 CENTREVILLE MD 21617

Invoice No. : 1129549  
 Date Received : 10/08/2021  
 Date Analyzed: 10/11/2021

Lab No. : 13698

Results For : OHRYN VALEANT  
 Sample ID : MAM BOX 44

	Analysis Dry Basis	Analysis As Is Basis	Lbs / Ton		Available First Year
			Dry Basis	As Is Basis	
Organic N, % N	1.62	0.82	32.4	16.5	4.1
Ammonium, % N	0.027	0.0140	0.5	0.3	0.3
Nitrate, % N	0.081	0.0410	1.6	0.8	0.8
Total N, % N	1.73	0.88	34.6	17.6	5.2
Phosphorus, % P <sub>2</sub> O <sub>5</sub>	1.90	0.96	38.0	19.3	13.5
Potassium, % K <sub>2</sub> O	1.91	0.97	38.2	19.4	17.5
Sulfur, % S	0.59	0.30	11.8	5.0	2.4
Calcium, % Ca	7.53	3.82	150.5	76.4	53.5
Magnesium, % Mg	0.98	0.50	19.7	10.0	7.0
Sodium, % Na	0.24	0.12	4.8	2.5	2.5
Sodium Adsorption Ratio (SAR)	2.20				
Zinc, ppm Zn	366.1	185.8	0.7	0.4	0.3
Iron, ppm Fe	3837.5	1947.1	7.7	3.9	2.7
Manganese, ppm Mn	1813.8	920.3	3.6	1.8	1.3
Copper, ppm Cu	301.7	153.1	0.6	0.2	0.3
Aluminum, ppm Al	4058.2	2059.1	8.1	4.1	2.9
Boron, ppm B	60.0	30.4	0.1	0.1	0.1
Soluble Salts, (EC 1:5) dS/m		6.66			
pH		8.0			
Moisture, %	49.26				
Dry Matter (TS), %	50.74				
Ash, %	50.15	25.45			
Organic Matter LOI 550C, %	49.85	25.29			
Organic Carbon, %	28.91	14.67			
Organic C:N Ratio	16.7				
Bulk Density, lbs / cubic foot		35			

L.D. Severson - AgroLab Inc

10/11/2021

Copy : 1

Page 1 of 2

Bus: 302/566-6094  
 Email: admin@agrolab.us

web site  
[www.agrolab.us](http://www.agrolab.us)

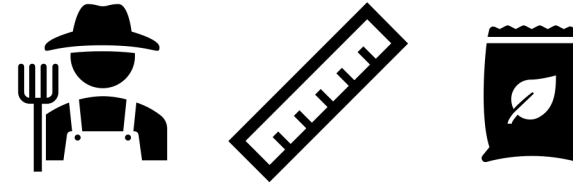
101 Clukey Dr.  
 Harrington, DE 19952

# ProBioGrow Application



A simple or more advanced analysis is taken of the existing location where product is to be applied

The product is measured and applied at the appropriate rates



Proper irrigation maintenance is administered based on the desired outcome for soil enhancement or crop growth



## REVERSE EARTH AGRICULTURE

POWERED BY EVE INSTITUTE FOR WOMEN IN AGRICULTURE

- From the **USDA**: *“The creatures living in the soil are critical to soil health. They affect soil structure and therefore soil erosion and water availability. They can protect crops from pests and diseases. They are central to decomposition and nutrient cycling and therefore affect plant growth and amounts of pollutants in the environment.”*
- **Our products** are the result of our mission to develop practical applications of this soil biology science, to create Healthy Soil. They are in both dry and liquid forms, and can be tailored to the specific needs of the field, according to soil tests. Key inputs are:
  - A uniform organic waste stream, high in macro-nutrients (nitrogen, phosphorus, potassium).
    - Examples: Chicken manure (best) ; food waste
  - Carbon (woody material) + biochar
  - Beneficial soil microbe infusion (bacteria, protozoa, fungi, nematodes, etc.), to balance and complete the community residing in the waste stream.
  - A proprietary blend of additives, to: 1) optimize the micro-environment for maximum biological activity; 2) provide safe-harbor for the microbes during periods of distress; 3) provide micro-nutrients (70+ “trace elements” essential for completion of the plant nourishment regime).
- **Our process** begins with a highly controlled composting step, which:
  - Kills weed seeds, and all harmful (disease-bearing) microorganisms, leaving only beneficial species;
  - Chemically reforms nutrients into stable organic compounds;
  - Creates the bulk input to final dry & liquid products (extracts & “teas”).
- **In the field**, thanks to natural plant-microbe symbiosis, the stable organic compounds are sourced, and readily broken down by soil microbes to make them “plant available” when needed – all on signal from plant roots. The plant gets exactly what it needs, in the quantity it needs, when it needs it.
  - No man-made chemical regime can match this elegant efficiency.
  - Chemicals either destroy the microbial community, or cause it to atrophy – in either case, stopping this process.
- **To ensure replenishment of organic nutrients** (nutrient cycling), a regime of farming “Best Practices” is recommended – to include: “no-till”, crop diversity, cover crops.
- **In SUMMARY :**
  - A robust Soil-Microbial Community + Best Practices = Healthy Soil
    - Fertile
    - Disease & pest resistant
    - Water absorbent & retentive
    - Productive
    - Self-sustaining (ever-improving)
  - And... HEALTHY SOIL = HEALTHY PLANTS

Reverse Earth systems touch every SDG in some manner and has significant impact within (10) SDGs including: 2, 3, 6, 7, 11, 12, 13, 14, 15, and 17.



# Government Support

ANDY HARRIS, M.D.  
FIRST DISTRICT, MARYLAND

COMMITTEE ON APPROPRIATIONS

SUBCOMMITTEES  
AGRICULTURE, RURAL DEVELOPMENT,  
FOOD AND DRUG ADMINISTRATION  
LABOR, HEALTH AND HUMAN SERVICES,  
EDUCATION



Congress of the United States  
House of Representatives  
Washington, DC 20515

February 28, 2023

The Honorable Thomas J. Vilsack  
Secretary of Agriculture  
United States Department of Agriculture  
1400 Independence Avenue SW  
Washington, D.C. 20004

RE: MidAtlantic Microbials LLC, application to the Fertilizer Production Expansion Program.

Dear Secretary Vilsack:

I write to you in support of MidAtlantic Microbials' (MAM) application for a grant award under the United States Department of Agriculture's (USDA) Fertilizer Production Expansion Program (FPEP).

As you may know Maryland's First Congressional District contains a thriving agricultural sector. An object of pride in our region is the burgeoning poultry production sector which processes 4.4 billion pounds of chicken a year, according to the Delmarva Chicken Association. Combined with our seafood sector and farms growing produce for consumers and feed for livestock, the poultry sector is vitally important.

Despite the general health of our agricultural sector, it is facing a few problems that MAM's technology may be able to address. The first is an issue for farmers throughout the country: high costs and shortages of fertilizer due to disruptions in our import-reliant supply chains. Second, while our farmers have been our greatest partner in protecting the Chesapeake Bay, the phosphorus in manure is an inevitable byproduct of the poultry sector, contributing to algal bloom issues impacting both the environment and our seafood industry.

MidAtlantic Microbials' production model centers around on-site production of fertilizer at farms, streamlining the supply chain and reducing transportation costs. Moreover, MAM's fertilizer includes chicken manure as a significant input and primary source of phosphates. I have been informed that this method renders expensive imported synthetic phosphates irrelevant, while the production process MAM uses makes organic phosphates insoluble and inaccessible to algae.

Altogether, the process MAM has developed has strong potential to expand fertilizer production across America, make fertilizer more affordable to farmers, and reduce the impact of phosphates on the Chesapeake Bay and other waterways. This technology has already been proven successful, and consequently demand from farmers to work with MAM is outpacing its current capacity to expand. An FPEP grant would allow MAM to readily meet demand and expand considerably in the near future.

Therefore, I would be grateful if you would review MidAtlantic Microbials request and extend all favorable consideration consistent with USDA regulations to it. Thank you for your prompt consideration. Please feel free to contact me through my Bel Air District Office staff member, Leo Thuman at: [Leo.Thuman@mail.house.gov](mailto:Leo.Thuman@mail.house.gov) with any questions.

Sincerely,

Andy Harris, M.D.  
Member of Congress

APH/J.T.

2334 RAYBURN HOUSE OFFICE BUILDING  
WASHINGTON, D.C. 20515  
PHONE 202 225-5311

15 EAST CHURCHVILLE ROAD, SUITE 102B  
BEL AIR, MARYLAND 21014  
PHONE 410.588.5670

100 EAST MAIN STREET, SUITE 702  
SALISBURY, MARYLAND 21803  
PHONE 443.944.8924

100 OLDE POINT VILLAGE, SUITE 101  
CHESTER, MARYLAND 21619  
PHONE 410.643.5425  
[WWW.HARRIS.HOUSE.GOV](http://WWW.HARRIS.HOUSE.GOV)



**REVERSE EARTH  
AGRICULTURE**

POWERED BY EVE INSTITUTE FOR WOMEN IN AGRICULTURE



Maryland  
Department of Agriculture

Office of the Secretary

Larry Hogan, Governor  
Boyd Rutherford, Lt. Governor  
Joseph Bartenfelder, Secretary  
Mary Ellen Setting, Deputy Secretary

The Wynne A. Cowley, Jr. Building  
50 Harry S. Truman Parkway  
Annapolis, Maryland 21401  
[www.mda.maryland.gov](http://www.mda.maryland.gov)

AgSignature | The Wynne A. Cowley, Jr. Building

410.841.5880 Baltimore/Washington  
410.841.5894 Fax  
800.492.5590 Toll Free

April 16, 2015

Mr. Peter Ettinger  
Managing Director  
MidAtlantic Microbial  
146 Coursevall Drive  
Centreville, MD 21617

Dear Mr. Ettinger:

Developing economically smart ways to deal with the issues surrounding the use of chicken litter and turning this waste product into a valuable sustainable asset is a key priority for our department.

We believe your proposal for "Scientific Thermal Composting" has merit and provides a solution that, in specific applications, will provide benefits to soil health and the potential to improve nutrient utilization in certain soil conditions.

We look forward to our role in partnering with you to provide guidance in project design and implementation of a trial that, in concert with a variety of solutions, we hope will bring positive results for our farmers, our environment, and the State of Maryland.

Sincerely,

Joseph Bartenfelder  
Secretary of Agriculture

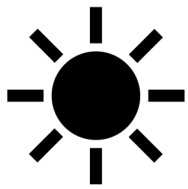


## Food Security, Sustainability and Healthful Nutrition

Our products can increase indoor and outdoor crop yields up to 150% while also increasing nutrient density and quality of foods.

Water is saved by up to 70% when soil is properly balanced and a healthy soil can sequester more carbon.





# Remote Re-Greening Systems



Our systems enable solar powered atmospheric water generation units to autonomously irrigate property where our amendments have been applied to remotely and systematically re-green arid soils for the purpose of agriculture, beautification, or carbon markets.





## Beautification of Real-Estate, Gardens, Parks & Recreation Areas

Our soil amendments and re-greening systems increase the visual appeal and resilience of public and private spaces while saving up to 70% of water.







Reverse Earth attended this year's COP 27 and also exhibited at the Abu Dhabi Sustainability Week.

We are currently in a desert tech beta site in Masdar as well as several other pilot projects worldwide.

