Most growers and agricultural industry professionals are familiar with humic and fulvic acid. To put this into perspective, the original “humin” is formed due to physiochemical, geological, chemical and biological humification of plants and animals by microorganisms. They are complex molecules and super mixtures that dwelled for thousands of years in soil, peat, and other humate layers such as lignite, leonardite and humilite, etc. When humic manufacturers from various countries make humic and fulvic acid, the settled material from the process which is called “humin”, retains 50% of functional carbon and is subsequently disposed. Thus far, Humic Growth Solutions is the only manufacturer that uses Humeomics applied technologies for solubilization of “humin” and meticulously documents the results. “Humeomics” refers to the progressive separation and structural characterization of molecules contained from the complex “humin” matrix.

Humin is a vital part of humic substances (humic acid, fulvic acid & humin). This reflects a physiochemical and biological intelligence of nature, which makes healthy and productive soils with the stable humus from humin. 1 gram of humin contains 5000 calories and provides energy that can be used for enhancing plant health and metabolisms. Humin also possesses algal and microbial lipids and contains hopanoid & steroid biomakers. Humin pyrolysates have pristene, steranes, and hopenes. It is important to mention that pristene is a marker of photosynthesis activities. Hopenes are mainly inherited from bacteria heptanols. Humin is also noted for its high molecular weights, charger transfers, H bonding and ligand exchange, which in turn enhance soil’s physical, chemical & biological properties.
Humic Growth Solutions Innovative Biochemical Technology (Humeomics)

Our proprietary processes completely solubilize the humin component of humic substances. For structural characterization of our end products, we use carbon C13 NMR spectroscopy for distribution of carbon types. As a result, we have effective functional carbons, which can aid proteins, carbohydrates, and lipid metabolisms. HGS also employs gel permeation chromatography (GPC) size exclusion for determination of different molecular weights. We have molecular weights varying from less than 1000 to 800,000 Daltons. This makes nutrient translocation, chelation, complexation and aggregate stability very effective.

Influence of SM-10 on crop production, yield and quality

- In 2017 we used SM-10 with an assortment of crops. We observed great success in terms of overall yield, quality and return on investment (ROI). We have replicated plots (utilizing 4 replications) on potatoes and applied 4 gallons/acre during the season. Despite the grower’s high fertility inputs, we observed a yield increase of 160 hundred weight (160*100=16,000 LBS. per acre). This translates to 23.36% yield increase plus good quality potatoes with excellent specific gravity.

- In 2018, potato field trials in Canada were conducted using SM-10. Soil field consultants fertigated 4 gallons/acre of SM-10 and in turn observed an increase of 72 hundred weight yield. This translates to $720 return on investment.

- In 2018 in Canada, we applied one liter/acre on a dry land farm (for pea fields). The yield was 75 bushels. This translated to 25 bushels more, compared with other farms.

- In 2018, during the season, SM-10 was applied to silage corn. In comparison with controlled plots, we observed a yield increase of 10 tons, with high crude protein and relative feed value.

- In 2018 4 gallons of SM-10 were applied on alfalfa at the grower’s field. We observed a yield increase of 2.5 tons, with high relative feed value.
Summary

Influence of SM-10 on Soil Health, Fertilizer and Water Use Efficiency

1. Because of stable humus, it creates better aggregate stability.
   - Prevents nutrient and water losses in sandy soils
   - In heavy soils it creates aeration and improves compaction

2. Reduces the phosphor’s precipitation with Ca, Fe, Mg and Al and liberates them into a more accessible form.

3. Excellent medium for salt remediation, as it complexes salts.

4. Enhances root architecture, root hair, root exudates, and enzyme production.

5. Possesses plant biostimulant properties and enhances soil and plant metabolisms

6. Excellent source of carbon and energy for soils and plant metabolisms.

7. Solubilization of micronutrients (e.g. Fe, Zn, Mn) and some macronutrients (e.g. K, Ca, P)

8. Increases buffering properties of soils.
   - Prevents nutrient and water losses in sandy soils

9. Helps to release carbon dioxide from soil calcium carbonate in the root zone, which enhances its use in photosynthesis.

10. Increases crop production by 10-40%.

11. Accelerates the ripening period 5-10 days.

12. Increases plant resistance to disease, frost damage, and drought.