Biostimulants and Real Importance to Increase the Agricultural Yield

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The agriculture of the future known how 4.0 came on time to assume the main role in national and worldwide scenario, since acquisition of new technologies linked with biotechnology, devices of high sophistication for map pests, diseases, fertility of soil and leaves, and this way for agriculture area how harvest machines, sower machines and tractors with automatic pilot, drones, biological control, less impact from molecules of agricultural defensives and your efficient discharge of empty package to the recycle process.

Among all the actual factors of importance in agribusiness, related with less environmental impact, the world search with several international certifications, products made with less environmental impact, being made in sustainable way involving always the target economic, social and environmental, linked with productivity chain between growers and industries that work with this process.

Some decades before, the agriculture started with use of agrochemical products known like poison with popular language in agricultural area, this product has high toxicology power with impact over microflora and microfauna of soil and in many different situations where the growers not followed the roles of need to use Individual Device Protection, causing serious health problems, chronic intoxication in most cases raised by clinical tests.

Nowadays, another item that has been growing steadily over the years is the environmentally friendly product range, not requiring the use of equipment of protection, with allow no residues on fruits, grains, tubers and soil, allowing a qualitative and quantitative aggregation in the agricultural productivity, being represented here as biostimulants.

These products have in their composition natural components that stimulate plant physiology to work better according to their productive needs, provided they maintain the other adequate conditions of water, fertility and phytosanitary management, being they active in mitigating stresses caused by pests and diseases or by hostile climatic influence and soil salinity, helping to maintain productivity.

The natural components may be seaweed extract such as Ascophyllum nodosum (main algae) and other algae such as Lithothamnium sp and humic and fulvic acids, some plants such as Quillaja saponaria, Yuca and agave which are some of the main sources of raw materials for the manufacture of these products used via soil and leaves to increase a better productive management.

We also have amino acids and vitamins, hormones or precursors hormones and microorganisms that when applied in the root region allow a better absorption of nutrients, and the model plant used for laboratory evaluation by many companies is Arabidopsis thaliana, serving as a reference for use in the most diverse agricultural crops with economic interest.

The main sources of raw material are cited in figures 1-4.

Figure 1: Ascophyllum nodosum
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Figure 2: Ágave.

Figure 3: Yuca.

Figure 4: Quillaja saponária.

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These sources of raw material undergo the most diverse conditions of climatic hostility and resist these stresses of lack of water, high or extremely low temperature, serve as indicative that something has occurred at the level of genomic expression to tolerate these conditions, so they serve as sources for the synthesis of specific commercial products to work in plant physiology, adding improvements in the field, reflecting on the productivity and quality of agricultural production, bringing a better profitability to the farmer using these products and next we have the model plant used *Arabidopsis thaliana* (Figure 5).

The main multinational companies involved in the global biostimulants market in 2018 are BASF, Haifa, Novozymes, Isagro, Sapec Group, Platform Specialty Products Corporation, Biolchim, Valagro, Koppert and Italpollina with estimated global sales of US $2.8 billion in 2021.

Faced with an increasingly technological and challenging scenario in solving the most varied problems, biostimulants are an important tool to contribute to agricultural quality and productivity, a fact that a few decades ago did not even take part in the technical discussions with the agricultural producer that has always used traditional inputs for production such as lime, phosphate, macro-formulated fertilizers and micronutrients essential to the development of each crop without any other supplement to add productive increase.

Agriculture 4.0 comes every day seeking to aggregate new productive technologies to meet the world food demand for a population that grows at an average of 210,000 people per day until 2030, leading to immediate needs to find alternatives that avoid as much as possible the use of preserved agricultural areas, increasing productivity by cultivar improvements, soil management with the use of inputs and adequate techniques and products by foliar routes, in the seeds and roots in the most diverse climatic conditions, contributing here the biostimulants in the increase of the profitability to the rural producer.

**Figure 5: Arabidopsis thaliana.**

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