

# FERTILIZER

# FOCUS

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## Delegates gather for 2014 FLA

**Biostimulants  
explained**

**Ammonia catalyst  
developments**





# Biostimulants

## All Smoke and Mirrors?

Plant biostimulants do not sit easily in the conventional thinking about crop production. Until now, substance-based classifications separated products into the realm of fertilizers or plant protection products. In recent years, agronomists have come to realize that various physiological systems in plants (and with their microbiomes) are connected in complex and previously unsuspected ways. These interactions are where plant biostimulants have their effect.

Due to the unique and emergent nature of the plant biostimulants sector, there is some confusion in the market place about the nature of plant stimulants, further compounded by the variation between national definitions and approaches to regulating plant biostimulants.

Here, Mr. Giuseppe Natale, CEO of the Valagro Group, helps to disperse the fog of confusion surrounding biostimulants by providing some details on the mechanisms by which plant biostimulants work, the effectiveness of plant biostimulants and the way in which they can assist in the sustainable intensification of agriculture in the years ahead.

**Focus:** Please outline your background, the activities of your company and your qualifications for speaking on this particular topic.

**Mr. Natale:** I am the CEO of Valagro Group and the co-founder. The company began by producing and selling fertilisers in the Sangro river valley in Abruzzo, Italy in 1980. The tendency to grow, the natural inclination towards customers and a passion for scientific research were already the solid roots with which Valagro established itself in Italy in the 1980s. During the 1990s, Valagro ventured into the European market and later the global one, from the East to South America. Today, Valagro

employs 330 people, of which 190 work in Italy, and the remainder in the Group's 11 branches around the world. In addition to its production site in Atesa, in the province of Chieti, the company has another four factories in Norway and France. In 2012, the Group achieved a sales volume of €90 million. Every year, it invests about 4% of its turnover (equivalent to around €3.5 million Euros) in research and development, in order to create its highly innovative products.

Valagro has been one of the early companies to diversify into biostimulants, and I have been President of the European Biostimulants Industry Council (EBIC)<sup>1</sup> since its first meeting in June 2011.

**Focus:** What products do you class as biostimulants? Are there specific categories of biostimulant?

**Mr. Natale:** In dialogue with policymakers, researchers and stakeholders, we have developed a claims-based definition of biostimulants. Specific substances may be included in many different products that serve a variety of purposes (agricultural and non-agricultural). In a report submitted to the European Commission when it was exploring whether to regulate biostimulants at the European level, Professor Patrick du Jardin from the University of Liège-Gembloux said, "Biostimulants are defined more by what they

<sup>1</sup> The European Biostimulant Industry Council (EBIC) was founded in June 2011 to promote the contribution of plant biostimulants to make agriculture more sustainable and resilient and in doing so promotes the growth and development of the European Biostimulant Industry. In October 2013, EBIC, which currently has 37 members, launched a Code of Conduct for Placing Plant Biostimulants on the Market to help increase clarity in the marketplace for users, producers and consumers alike.

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do than by what they are, since the category includes a diversity of substances".

Our definition of such a product is as follows: "Plant biostimulant means a material which contains substance(s) and/or micro-organisms whose function when applied to plants or the rhizosphere is to stimulate natural processes to enhance/benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, and crop quality, independent of its nutrient content."

**Focus:** *How are biostimulants produced? Are they manufactured or can they be used in their natural state?*

**Mr. Natale:** It depends on the biostimulant and the sophistication of the product. There are "straight" biostimulants like micro-organisms (also known as biofertilizers) and amino acids, but products are increasingly complex formulations. Many of the substances in those formulations are derived from nature, but we don't exclude the possibility of synthesized substances. The important thing is the biostimulant effect of the product. The production process will depend on the component(s).

**Focus:** *In general, how are the products distributed and in what quantities?*

**Mr. Natale:** The products are distributed through the usual channels for agricultural inputs. For the quantities, we don't yet have any good statistics, especially since the unit of measurement will be very different depending on the nature of the biostimulants product. Based on an informal survey conducted during 2013, we do know that the European market already has a value of more than €500 million, with more than 3 million hectares treated but with multiple applications for a total surface treated equalling about 6.2 million hectares in 2012. Both these figures are currently subject to growth rates of at least 10%.

**Focus:** *How do they operate? Do they directly improve crop yields? Or do they improve the farmers' bottom line function primarily through improving disease resistance, stress tolerance and crop quality?*

**Mr. Natale:** The claims-based definition makes this clear: biostimulants increase nutrient uptake, nutrient translocation and other processes that improve use efficiency, improve quality traits – for example the sugar content of fruit – and the tolerance to abiotic stress such as climatic conditions – a result of the enhanced vigour of the treated plants.

**Focus:** *Is their efficacy proven? Is there a body or a regulatory framework in place*

*overseeing best practice/standards in the sector?*

**Mr. Natale:** Not all of the early products were very effective and, to be honest, there is still some "snake oil" on the market. But there are also serious companies with rigorously researched and developed products. A growing body of scientific research supports the effectiveness of biostimulants. Their effects are analogous to probiotics, vitamins and functional foods in human nutrition.

The regulatory framework is just emerging since research-based biostimulants are a fairly recent phenomenon – serious research has only been going on for about 20 years - despite decades of use of "traditional" products in organic agriculture and some high-value crops.

Only a few countries currently regulate biostimulants, and they are treated very differently from one country to another, which is problematic for market development. The European Commission plans to include biostimulants in the regulation on "fertilizing materials" that is currently being prepared (which will replace the current regulation 2003/2003).

**Focus:** *Are they particularly important for use with certain crops or particular cultivation practices?*

**Mr. Natale:** Biostimulants were originally associated with organic agriculture and then high-value crops, like fruits and vegetables produced in the Mediterranean basin for export. But we are beginning to see biostimulants being applied to cereal crops as crop prices rise and farmers face ever more stringent environmental restrictions. High-value crops currently drive the largest share of demand.

**Focus:** *How large is the biostimulants sector? How many companies are involved?*

**Mr. Giuseppe Natale,  
CEO, Valagro Group.**



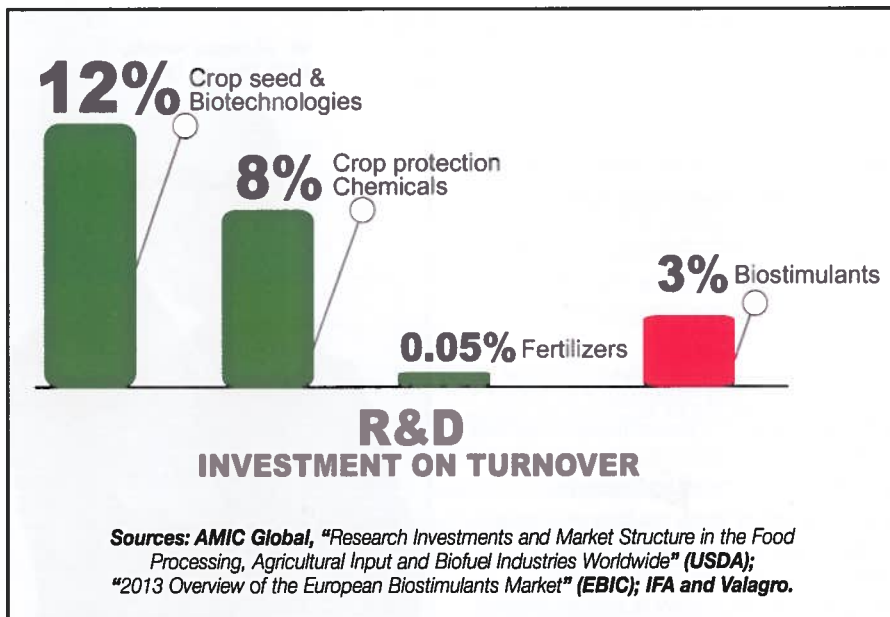
*What is their average size? What is your best estimate of the combined turnover of the sector?*

**Mr. Natale:** It's difficult to know how many companies there are because most of them are small – even micro - or medium companies. The European Biostimulants Industry Council already has 37 members, and new members are joining all the time. There are probably at least 120 serious companies in Europe. Considering that there are also fast-growing markets in China, India, Brazil, the United States, Canada, Mexico and other Latin American companies, we can safely say that there are hundreds of companies worldwide. With regard to the sector's turnover, EBIC's latest estimate put the European market at more than €500 million. I've seen global estimates at around €900 million. Ten percent per annum growth is considered a fairly conservative estimate in almost all markets.

*Yields increase when potatoes are treated with a biostimulant (right). Photograph courtesy Omex.*







**Focus:** What is your best estimate of the land area to which biostimulants are currently applied?

**Mr. Natale:** Based on EBIC's survey of its members, biostimulants are applied to at least 6 million hectares in Europe, but about half of those are repeat applications. Globally, the figure is likely to be in the neighbourhood of 10 million hectares.

**Focus:** How can biostimulants contribute to sustainable agriculture? And how does this translate into added value?

**Mr. Natale:** It is difficult to generalise because the exact level of the impacts depends on the crop in question, the original state of the soil, how well managed crops already are and a number other factors.

However, there is a broad documentation of the effects below:

- Minimum yield increases related to biostimulant use are being reported at 5-10%;
- Fertilizer use efficiency is being documented to increase by 5% at a minimum (and may go as high as 25% or more);

- Quality characteristics, such as fruit setting, homogenous colour and increased size are enhanced in some cases by as much as 15%. Increased quality has downstream benefits as well: farmers may be able to garner higher prices for their produce, and produce is likely to be more tolerant of storage and handling.

The enhanced fertilizer use efficiency mentioned above reduces nutrient losses to the environment. Biostimulants also improve water use efficiency, and the greater vigour of treated crops seems to reduce the need for crop protection in the same way that adequate fertilization does. In addition to increasing efficiency of achieving the same yields, biostimulants support higher yields and better quality, so they help farmers produce more with less. Last year, we estimated that biostimulant use in the EU-27 had increased yields by 4 million tonnes and raised the value of agricultural output by €1.7 billion while saving 0.8 million tonnes of CO<sub>2</sub> equivalent.

**Focus:** What research is being undertaken into biostimulants? Is it being undertaken at a company level or at an industry level?

**Mr. Natale:** Biostimulant products are becoming more sophisticated and differentiated, so most research today is done by individual companies, although often in partnership with universities and public research centres. Roughly 3% of the biostimulant sector's turnover is reinvested in research & development. That compares to about 8% for crop protection chemicals, 12% for seeds and genetic modification and only 0.05% for mineral fertilizers.

**Focus:** Looking ahead, how do you see the future of the biostimulants sector?

**Mr. Natale:** One important change is likely to be the mainstreaming of biostimulant technologies into production systems as their demonstrated impact becomes better known. The creation of predictable and harmonized regulatory frameworks is critical for several reasons:

- To reassure farmers that the products are safe and effective;
- To protect consumers and the environment;
- To signal to investors that there is a stable and predictable context for investment;
- To give companies confidence that their innovations will have a fair chance to be profitable in their home markets, but also abroad-the market for biostimulants is already truly global.

**Focus:** Thank you, Mr. Natale. ■

