

What distinguishes Humentos[®] from other humic-acid based soil conditioners?

What are humic acids? Humic acids, fulvic acids and humins are fractions of the complex mixture known as humic substances or natural organic matter (NOM). These large molecular biopolymers are built during the degradation of organic material and are defined on their solubility in either acid or alkali. The quality and characteristics of humic acids therefore highly depend on their origin.

Influence of the parent material on the characteristics of humic acid products: Various authors showed that the characteristics of humic acids depend on the parent material they are extracted of. RICE und MACCARTHY (1991) presented such diversity by the statistical evaluation of more than 600 humic and fulvic acids. LOBARTINI et al. (1992) showed differences in the elemental composition, acidity, molecular weight, content of functional groups, the structure and position of elements and the chemical/physical characteristics of humic acids depending on the parent material. The source material also has an influence on the content of essential trace elements and possible contaminants.

Humentos[®] is exclusively extracted from Lusatian brown coal (from eastern Germany), which is rich in trace elements but – unlike many other brown coals in the world - has a negligible content of heavy metals. Humentos[®] made from Lusatian brown coal has moreover numerous functional groups that positively influence soil characteristics and plant growth.

Influence of the extraction method on the quality of humic acids: The extraction method for humic acids play an important role for the character of the produced humic acid fraction (MAKAROV, 1990). For instance, an increased extraction temperature leads to the degradation of amino acids in the molecular chain of the humic acid. Also YAMAMOTO et al. (1994) stated that the temperature during humic acid extraction has a decisive influence on the quality of the produced humic acid fraction. Overheating even can cause the complete destruction of the humic acid molecule (KENNETH, 1993).

The patented production procedure of **Humentos[®]** does not imply an additional heating. Therefore, less humic acids are extracted in total; however, the end-product is of higher value.

Durable humus: Due to the gentle extraction conditions during the production of **Humentos[®]**, part of the humic acids are stored as durable humus in the product. The humic acids remaining in the durable humus are then set free in the soil due to chemical, physical and microbiological processes over an extended period of time. Therefore, **Humentos[®]** also has a long-term effect next to its instant plant growth promoting effect.

In other humic acid products the not extracted residues are removed from the end-product and are not further available.

Nutrient combination: Before the plant growth stimulating effect, humic acid application often leads to an initial growth depression. This effect is due to a reversible binding of plant nutrients to the humic acids and a consequent competition for nutrients between plants and humic acids.

The complementation of **Humentos[®]** with important plant nutrients countervails this effect. The humic acids are saturated with nutrients that are instantly available to the plant.

Additionally, diverse nutrient demands of different cultures are considered by the availability of various Humentos[®] varieties. For instance, **Humentos[®] for Lawns** is rich in nitrogen, which gets removed from the culture due to frequent mowing of the grass. **Humentos[®] for flowers/fruits/vegetables** delivers sufficient potassium, a plant nutrient essential for the formation of flowers and fruits.

The pH-value: Although the word "humic acid" suggests an acid pH, humic acid products are of alkaline nature due to the extraction process. Plants prefer a neutral to slightly acidic soil-pH (6-7,5), since nutrients are more easily available in this range.

Many commercial humic acid products have an extreme alkaline pH (8-11). Contrarily, the pH of **Humentos**[®] is in a plant-pleasant range between 7 and 7.5. Particularly in many golf countries, this is of importance due to present rather alkaline soil conditions.

Dosage: Many companies offering humic acid products recommend "homeopathic" dosages of 3-5 kg/ha of their products. This equals 0,3-0,5 g/m² or approximately 8-13 drops per square meter.

According to our experience in extensive greenhouse and field experiments with **Humentos**[®] and other commercial humic-acid products, such minor application quantities do not have any significant effect on plant growth under realistic cultivation conditions.

Additionally, our opinion is that the application of soil conditioners must be adapted to the local climatic and edaphic conditions, since soils vary a lot in their chemical, physical and biological characteristics. Therefore, we offer an individual consultancy for the application quantities and frequencies of our products (in general between 60 and 200 kg/ha).

References:

Rice, J.A. and MacCarthy, P. 1991: "Statistical evaluation of the elemental composition of humic substances". *Organic Geochemistry* 17 (5): 635-648.

Lobartini, J.C., Tan, K.H., Rema, J.A., Gingle, A.R., Pape, C., Heimmelsbach, D.S. 1992: "The geochemical nature and agricultural importance of commercial humic matter" *The Science of the Total Environment* 113: 1-15.

Makarov, M.I. 1990: "Studies of amino acid composition of soil humic acid: methodological aspects" *Moskov-University-Soil-Science-Bulletin* 45(3): 26-31.

Yamamoto, S., Honna, T., Snatani, N., Limura, K. 1994: Influence of temperature on diluted sodium hydroxide soluble humus properties. Denaturation of humus extracts caused by heating in boiling water" *Pedologist* 38 (2): 31-38.

Ziechmann, W. 1980: "Huminstoffe – Probleme, Methoden, Ergebnisse"