

Comparative study of the efficacy of chemically and biologically extracted humic substances from various materials on the development of Poinsettia.

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There is a lot of research proving the positive influence of humic substances on the development of plants in combination with soil isolates such as *Pseudomonas* and *Bacillus*. Humic substances obtained by chemical extraction and biosolubilization of various sources of organic materials were tested for their effect on the growth of *Poinsettia* (*Euphorbia pulcherrima*) cultivar „Mirat red“.

The test included the following variants:

1. Humic substances chemically extracted from “Humintech” leonardite (Ht);
2. Humic substances obtained from “Humintech” leonardite by biosolubilization with *Pseudomonas putida* (Pp) and *Bacillus pasteurii* (Bp) (Ht Bp Pp);
3. Humic substances chemically extracted from “Sachalin” leonardite;
4. Humic substances obtained from “Sachalin” leonardite by biosolubilization with *Pseudomonas putida* (Pp) and *Bacillus pasteurii* (Bp) (Sachalin Bp Pp);
5. Fulvic substances extracted after biosolubilization of “Staniantsy” lignite with *Pseudomonas putida* (Pp) and *Bacillus pasteurii* (Bp) (FB Plantagra);
6. Humic substances extracted after biosolubilization of “Staniantsy” lignite with *Pseudomonas putida* (Pp) and *Bacillus pasteurii* (Bp) (Lignohumat);
7. Biohumax – commercial product of “Project Studio” EOOD, Varna Bulgaria;
8. Vermicompost inoculated with *Pseudomonas putida* and *Bacillus pasteurii* (Strong BG);
9. Control - Nutrient solution (background of nutrition).

The test results indicate that as a result of microbial activity active bacterial compounds are probably present in the composition of the extracted humates, thus affecting the formation of red leaves. The application of all tested substances results in red leaves area increase of treated plants compared to the control plants, except the humates chemically extracted from Humintech leonardite. The ration between humic and fulvic acids determines the effect on the treated plants. The biosolubilized preparations contain more fulvic acids. Plants treated with them form up to three times more anthocyanins compared to the control plants.

The results from the experiment show that humic substances, being biologically active, are capable of regulating the growth of microorganisms. A combination of bacterial and humic compositions applied to poinsettia plants has a positive effect on their development. Obviously the biosolubilization of leonardite and other organic materials to humic substances is more promising than the chemical one