**ENVIRONMENTALLY FRIENDLY NANOCOMPOSITE SYSTEMS FOR PRE-TREATMENT OF CROP SEEDS**

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A new type of the complex nano-biocomposite materials for seeds pre-treatment is provided. Their effectiveness will be determined by some main factors influencing the faster growth of the root system and sprouts of crops: the presence in the zone of germination of balanced composition of mainly organic fertilizers, environmentally friendly growth stimulators and nanofungicides hampering the development of fungoid diseases, the effect of which will be enhanced by the growth of biological activity of the components induced by the surface forces which appear due to the presence of hydrophobic and hydrophilic nanosiliceous components in the composite. Combination of these factors will provide the constant increase in productivity of crops by 10-20%.

Depending on the usage conditions one will introduce into the composition of nano-biocomposites environmentally friendly growth stimulators (quercetin, terpenoids vitamin complexes), nanofungicides, naturally occurring organic fertilizers and series of microelements, the composition of which will be varied in accordance with the type of crops, peculiarities of the soil texture and climate characteristics.

It can be assumed that the final products will exhibit selective biological activity and low toxicity accordingly to structural similarity of designed quercetin, terpenoids vitamin complexes to their natural analogues. The innovative character of the project also consists in the biocompatibility of these compounds and large area of their application, together with the renewable nature of used raw material.

Scientific purposes of the project is to investigate the ways of improvement of the effectiveness of the product «XM15» based on the application of complex of physico-chemical and spectral methods (thermogravimetry, NMR spectroscopy, DSC, electron microscopy, etc.); the processes of retention of mineral salts solutions, some types of organic compounds, terpenoids and silver on the boundary of nanosilica, hydrophobic properties of which will be varied by the creation of composites of hydrophobic and hydrophilic silicas; influence of addition of nano-sized particles of microelements, terpenoids and nano-Ag on the germination of some types of crop seeds, as well as the applicability of liquid hydrophobic carbohydrates for increase in retention of nanoparticles of protective and stimulating compound «XM15» by crop seeds. As a result of these studies, nanocomposite systems which will allow to increase productivity of many crops by 10–20% and to decrease host susceptibility at the same time will be created.