

# FUSICOCCINE EXTRACTION ON NOVEL CARBON-MINERAL SORBENT

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In nanocarbon materials laboratory of Combustion Problem Institute carbon-mineral sorbent (Sorbent carbonized from vegetable raw materials –2) based on carbonised raw materials, which contain carbon and silicon oxide and also has nanosized morphology, has been synthesized. This material has specific and unusual properties due to presence of these components. If carbon is hydrophobic material and silicon oxide is hydrophilic one absolutely new combination of hydrophobic-hydrophilic properties emerges. These unusual properties allow offering the given material as a unique nanostructured sorbent for separating bioorganic compounds.

Sorbent carbonized from vegetable raw materials –2 was synthesized by carbonisation of vegetable raw materials in rotating steel reactor in the temperature range of 300-800 ° C for 5-60 min in inert medium. It is was found that specific surface of samples rises with increase in temperature reaching maximum at 650 ° C (920 m<sup>2</sup>/g) and then decreases.

To separate fusicoccine the technique developed at M.A. Aitkhozhin Institute of Molecular Biology and Biochemistry was used.

Taking into account tough climatic conditions of Kazakhstan it was very interesting to study action of biostimulator on stress resistance of the most important grain crops of Kazakhstan. So we studied action of purified fusicoccine on germinating capacity of seeds of wheat of *Nadezhda* sort by adding 2 % of NaCl, that creates condition of strong chloride salinization. Experimental results are presented in table 1.

Table 1

Action of fusicoccine on of the seeds of *Nadezhda* sort wheat

Variants	% of germination
2. 2% NaCl	67
2. 2% NaCl+MIQ	86

As follows from the table, fusicoccine increases germinating capacity of seeds under by 19 % conditions of salinization. Also fusicoccine increases root system of a plant.

Table 2

Influence of biostimulator on yielding capacity

№	Variations	Yield output from 0.1 hundred part, kg	%	Weight of 1000 seeds, g	%
1	control	2.950	100	43.73	100
2	Biosti-mulator	3.250	110	50.41	115

The experiment carried out in the Scientific-industrial center of agriculture and plant growing of the Republic of Kazakhstan in 2004-2005 has showed that application of biostimulator for increasing winter resistance of winter wheat is very promising.

The carried out experiments have showed that application of biostimulator increases mass of 1000 grains by 15 % and productivity by 10%.

In the course of further test there were carried out field trials of fusicoccine. The wheat treated by biostimulator was noted to ripen 15 days earlier than the wheat without treating with biostimulator (green sprouts).

One can say with great confidence that application of preparation will allow:

1. accelerating the ripening of wheat, i.e. to start harvesting two weeks earlier;
2. increasing yield in average by 15 %.

Presently, on the world market there are no sorbents suitable for obtaining biologically active compounds in large scales. There are sorbents which are extremely expensive - their cost varies from several hundreds to a few thousands dollars – they are used mainly for analytical purposes. Very complicated and extremely expensive chromatographic systems are necessary for their application. All of this is a serious deterrent for a wide application of biostimulator in agriculture.

Production of novel nanostructured carbon-containing materials with various properties is a major task. Creation of materials with desired structural and chemical properties remains a modern problem. It also concerns carbon-containing materials – active alternative coals as their use leads to tougher requirements to their stability and structural characteristic (R.M. Mansurova, 2001).

One of the investigation directions conducted in the Combustion Problem Institute (CPI) at the Kazakh National University after al-Farabi is a study of nanostructured carbon and carbon-mineral materials based on local raw materials of Kazakhstan (R.M. Mansurova, 2001; Z.A. Mansurov, 2002; M.M. Yemuranov 2005, 2006).

In CIP laboratory of nanocarbon materials the material representing a composite C-SiO<sub>2</sub> which has nanosized morphology has been synthesized. This material has specific and unusual properties due to the presence of silicon oxide. If carbon is a hydrophobic material and silicon oxide is a hydrophilic one absolutely new combination of hydrophobic-hydrophilic properties appears. These extraordinary properties allow offering the given material as a unique nanostructured composite for separating bioorganic compounds.

Reasoning from above said it was extremely interesting to test developed C-SiO<sub>2</sub>-composite material for purifying novel biostimulator – cytokinin mediator to be similar by its properties and structure to fusicoccine one which has the following formula.

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