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Biological activity of colloidal solutions of silver, obtained by means of sálix cáprea extract

© **Maria B. Nikishina**,[1]* **Evgenia V. Ivanova**,[1+] **Yury M. Atroschenko**,[1] **Irina V. Shahkeldyan**,[1] **Konstantin I. Kobrakov**,[2] **Igor V. Blohin**,[1] **Loik G. Mukhtorov**,[1] and **Georgy V. Pestsov**[1,3]
[1] *Department of Chemistry. Tula State Lev Tolstoy Pedagogical University.*
Lenina St., 125. Tula, 300026. Russia. Phone: +7 (4872) 35-78-08. E-mail: reaktiv@tspu.tula.ru
[2] *Department of Organic Chemistry. Moscow State University of Design and Technology.*
Sadovnicheskaya St., 33. Moscow, 117997, Russia. Phone: +7 (495) 955-35-58. E-mail: kobrakovk@mail.ru
[3] *All-Russian Research Institute of Phytopathology. Big Vyazemy. Moscow Region. Russia.*
Phone: +7 (9509) 03-91-44. E-mail: georgypestsov@gmail.com

*Supervising author; +Corresponding author
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Abstract

The presented publication is devoted to the study of the biological activity of silver colloids synthesized based on extracts obtained from various parts of the goat willow plant (Sálix cáprea). The ability of colloidal silver solutions of various concentrations to stimulate growth processes in wheat seeds at the germination stage is analyzed. The effect of colloidal solutions on the catalytic effect of amylase was studied. The fungicidal activity of synthesized silver particles was studied.

For the study, colloidal silver particles were obtained by the "green synthesis" method. Extracts of goat willow bark, leaves and buds of varying degrees of dilution were used as a reducing agent.

The analysis of sugar content and pH of solutions of plant extracts before and after colloid formation was carried out in order to establish the participation of sugars and acids in the process of silver recovery.

The biological activity of colloids was analyzed on the seeds of winter wheat cultivar "Moskovskaya-39". The germination energy of wheat seeds was determined on the 3rd day after sowing by counting the germinated seeds. Amylase activity was measured in the roots and shoots of wheat plants by the amount of undecomposed starch by spectrophotometry.

Fungicidal activity was studied with respect to fungi: *F. moniliforme*, *F. oxysporum*, *S. sclerotiorum*, *V. inaequalis*, *R. solani*, *B. sorokiniana*, *P. ostreatus*.

The data obtained show that the sugars that make up the initial extracts of various parts of goat willow are completely consumed in the process of silver recovery and the formation of colloidal particles. A change in the acid content at the stage of colloid formation does not allow us to draw an unambiguous conclusion about the mechanism of participation of these compounds in the process of colloid formation.

A study of the biological activity of synthesized silver colloids showed their high ability to stimulate growth processes in wheat seeds. A study of enzymatic catalysis also shows, in general, the positive effect of silver colloids on amylase activity within 1 minute of the starch hydrolysis reaction.

An analysis of the data obtained in the study of fungistaticity suggests that silver colloids obtained in extracts from leaves, bark and willow inflorescences exhibit high fungicidal activity against *F. moniliforme*, *S. sclerotiorum*, *P. ostreatus* and *B. sorokiniana*.

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