SERS identification of Fusarium fungi

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Fusarium disease affects wheat, barley and rye – it is a disease of grain crops. Its causative agents are fungi of the genus *Fusarium*. This is explained by the fact that at different periods of their development they infect all parts of the plant: ear, leaves and roots. Mycelia and spores remain in the soil and on plant debris for a long time. *Fusarium* reduces the quality of grain, its nutritional value, as well as the germination capacity and germination weight of seed material [1]. In the early stages of fungal development, visual inspection of plants does not allow one to determine the presence of the disease. However, this is very important, as it will both save money spent on fungicide treatment and improve the ecological condition of plants and soil. The use of the SERS technique made it possible to determine the presence of fungi in very low concentrations. In our work, we made flushes from fungi of the genus *Fusarium*, adding a solution of nanoparticles and coagulum. Next, the Raman spectrum of the resulting solution was recorded.

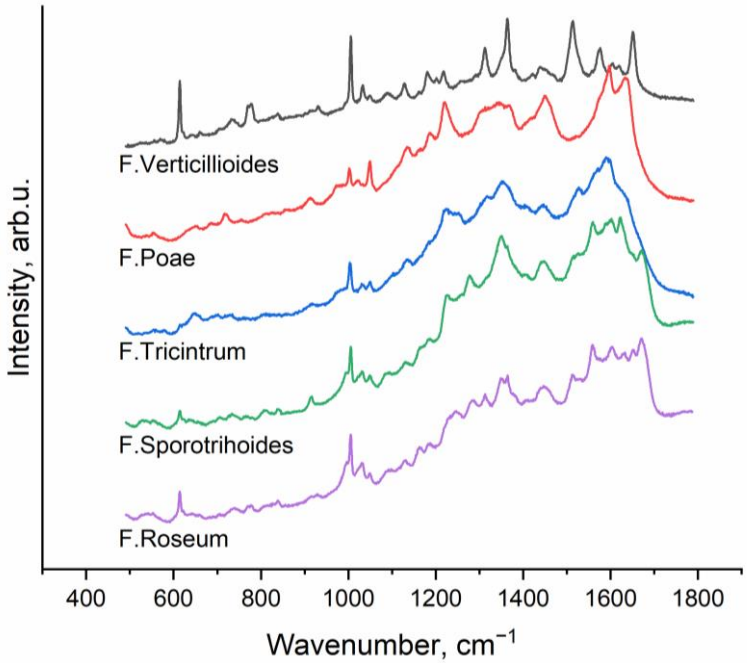

Fig. 1. SERS spectra of Fusarium fungi flush with nanoparticles of silver.

We recorded Raman spectra of 12 samples of fungi of the genus *Fusarium*. Fig. 1 shows spectra of five Fusarium fungi as an example. We found that the spectra of different fungi differ from each other, which makes it possible not only to detect the presence of fungi, but also to determine the type of fungus.

[1] M. Moskovskiy, A. Sibirev, A. Gulyaev, et al, Raman Spectroscopy Enables Non-Invasive Identification of Mycotoxins p. Fusarium of Winter Wheat Seeds, Photonics, vol. 8(12), 587 (2021).