The aim of the study was to identify the influence of hydrodensified nanosilica particles on the
binding of water by milled plant raw materials in neutral and acidic media. Flowers of *Hibiscus sabdariffa*
and
*Calendula officinalis* were used as the model materials. According to the microphotographs and low temperature
$^1$H NMR spectroscopy data, the silica film forms on the surface of the milled plant particles, and it can significantly influence their hydration. According to the suggested scheme, some of the water from the inner cavities of plant raw materials moves (as evidenced by the decreasing radius of water-filled pores) to the zone of contact of the composite components (the radius of clusters of adsorbed water increases). In studies of desorption of active substances from milled medicinal herbs and their composites by the initial and hydrodensified nanosilica, it has been shown that the formation of a composite significantly reduces the rate of desorption. Minimal desorption is observed in composites containing hydrodensified nanosilica. The studied composite systems are promising for biomedical researches.

**Key words:** $^1$H NMR spectroscopy, hydrodensified silica, *Hibiscus sabdariffa, Calendula officinalis*.

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4. Chuiko A. A., Pogorelyy V. K., Barvinchenko V. N., Lipkovskaya N. A., Kovtyuhova N. I., Turov V. V.
   Chemical and clinical verification of efficiency of drugs belonging to the phytosil family. 
   *Chemistry, physic and technology of surface* 

5. Turov V. V., Gun'ko V. M., Barvinchenko V. N., Rugal A. A., Turova A. A., Fedyanina T. V.
   Hydration of cellulose in the presence of quercetin and organic solvents 
   *Chemistry, Physics and Technology of Surface* 

6. Shulga O. V., Kerchhoff J., Turov V. V. 

7. Gun'ko V. M., Turov V. V., Horbyk P. P. 

8. Turov V. V., Gun'ko V. M. 

9. Gun'ko V. M., Turov V. V. 
   Nuclear Magnetic Resonance Studies of Interfacial Phenomena. *New York: Taylor & Francis* 
   2013, 1070 p. 
   [https://doi.org/10.1201/b14202](https://doi.org/10.1201/b14202)

10. Strange J. H., Rahman M., Smith E. G. 
   Characterisation of porous solids by NMR. *Phys. Rev. Lett.* 
   [https://doi.org/10.1103/PhysRevLett.71.3589](https://doi.org/10.1103/PhysRevLett.71.3589)


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