

DESTRUCTION OF THE SURFACE OF PEPPER SEEDS USING THE CAVITATION METHOD

Mircea BOLOGA¹, ORCID ID 0000-0002-5262-9666

Tatiana KUBRITSKAYA^{1*}, ORCID ID 0000-0003-2769-3137

Tatiana SHEMYAKOVA¹, ORCID ID 0000-0003-1668-0082

¹*Institute of Applied Physics USM, Chisinau, Moldova*

*Corresponding author: Tatiana Kubritskaya, email tkubrik@yannex.ru

The need for these studies is due to the fact that pepper seeds containing steroid glycosides of furostan series exhibit biological activity. Derivatives of furostanol saponins and polyphenols are the active components responsible for the antimicrobial and antioxidant effects of pepper seeds. Capsicosides isolated from pepper seeds can also be used as a natural compound to prevent obesity. At the same time, pepper seeds have a hard shell that prevents the extraction of biologically active substances (BAS).

A series of experiments were conducted on the extraction of pepper seeds of two batches using traditional technology and processed by ultrasound in order to investigate: 1) the effect of ultrasonic treatment (ultrasound) in cavitation mode on the yield of biologically active substances (BAS) and 2) the presence or absence of changes in the chemical composition of pepper seeds during ultrasound-assisted extraction (UAS).

All samples processed using traditional technology and UAS were extracted in 70% alcohol 4 times for 4 hours each. The combined extracts were evaporated on a Heidolph rotary evaporator at a vacuum of 10 - 15 Torr and at a temperature of 58-65 °C. The optimal parameters of ultrasonic treatment were determined: the duration of 60 min, amplitude of 20 microns, and temperature of 55 °C.

It is shown that the use of ultrasonic cavitation treatment of pepper seeds reduces the duration of the extraction process of biologically active compounds by 9 times and lowers the process temperature to 35-55 °C.

The action of ultrasound considerably accelerates the swelling of the seed walls and induces the cell destruction.

The study of pepper seed samples by IR spectroscopy was carried out. IR spectra were recorded using the Spectrum 100 FT-IR infrared spectrometer (PerkinElmer, USA) with an ATR-NPVO device within the wavelength range of 4000-650 cm⁻¹.

Comparison of IR spectra of the samples obtained from pepper seeds subjected to cavitation treatment in the range of the studied amplitudes with the IR spectra of the samples obtained using traditional technology showed their absolute identity.

When extracting biologically active compounds from pepper seeds using ultrasonic cavitation treatment at a temperature of 55 °C no changes in the chemical composition of the extracted substances were registered.

Keywords: nightshade seeds, ultrasonic cavitation

Acknowledgments: The work was carried out within the framework of the ANCD Project 20.80009.5007.06