

## APPLICATION OF WHEY FOR PLANT BIOLOGICALLY ACTIVE SUBSTANCES EXTRACTION

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### Abstract

The relevance of plant raw materials application for functional food design is due to the wide range of biologically active substances included in its composition. A promising direction of functional dairy product technology development is the enrichment of plant extracts rich in phenolic compounds. Phenolic compounds have antiviral, anti-inflammatory, bactericidal, hepatoprotective, and capillary-strengthening effects. Whey is a source of a wide range of biologically active substances (BAS). The beneficial effect of using a combination of plant raw materials with secondary dairy raw materials containing valuable whey proteins has been proven. The introduction of whey into the beverage formulations in combination with plant extracts allows the resulting product to add nutritional value, as well as original organoleptic characteristics. This research aimed to study the efficiency of whey application as an extractant for BAS recovery from plant raw materials.

Targets of research were cheese whey, plant raw materials (milk thistle, peppermint, sage, purple coneflower), their water, and whey extracts. The research was carried out in the scientific laboratory of "Food and Industrial Biotechnology" of North Caucasus Federal University and the scientific laboratory of "Applied Issues of Biology" of Belarusian State University. ABTS radical antioxidant activity and total concentration of phenolic compounds of plant extracts were determined using spectrophotometric methods (reducing power method and Folin-Denis technique respectively). The quantitative and qualitative composition of extracts was studied by gas chromatography with mass spectrometry detector method.

The following parameters of the BAS extraction process from plant raw materials were established: temperature: 55 - 60 °C; duration - 2 hours; the oscillation amplitude of the thermoshaker (RM) = 70 min<sup>-1</sup>. The optimal values of the ratio of solid and liquid phases for studied types of plant raw materials have been established: milk thistle and peppermint - 1 : 8; sage and purple coneflower - 1 : 10. It was found that the antioxidant activity of whey extracts of plant BAS is greater in comparison with water extracts.

The analysis of experimental data allows us to conclude that the application of whey as an extractant for BAS extraction from plant raw materials is promising in terms of its organoleptic and physico-chemical parameters and the possibility of additional enrichment of extracts with valuable components. The results of the study allow us to recommend the use of plant extracts for fermented dairy products technology development.

**Key words:** *Whey, plant extracts, Biologically active substances, Antioxidant activity, Phenolic compounds.*