

ANTIMICROBIAL NUTRACEUTICALS: RASPBERRY PRESS CAKES COMBINATIONS WITH ESSENTIAL OILS AND LAB FERMENTED BOVINE COLOSTRUM

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Raspberries press cake (RPC) possesses many beneficial properties for the human health related with their high content in phenolic compounds such as ellagic acid. The antimicrobial effect of RPC and essential oils mixture (“Eunutrittech”) against human pathogens was examined. The antimicrobial effect was determined using the agar diffusion method. Besides, in the formulations of antimicrobial nutraceuticals with *L. plantarum* fermented (LAB) and dehydrated bovine colostrum, showing antimicrobial effect, was included [1]. Phenolic compounds in lyophilized RPC and carvacrol, thymol and menthol in essential oils were evaluated for quantitative and qualitative composition by HPLC. Chromatographic separation was performed using an ACE C18 column (250 mm x 4.6 mm, 5.0 µm; Pennsylvania, USA) [2]. The total content of phenolic compounds has been evaluated using the Folin - Ciocalteu method [3].

During the experiment, two types of gels were prepared using different formulations: (a) RPC (10 %) with LAB fermented bovine colostrum (14 %); (b) RPC (10 %) with essential oils (1 %). In both cases, various combinations of jelly-forming substances (agar, pectin, gelatin) and sweeteners (erythritol, maltitol, sorbitol), were tested and selected for nutraceutical production based on texture analysis (TAXT plus texture analyzer) and optical microscope view. Gels were tested using *in vitro* digestibility assays to evaluate the release of their phenolic compounds at pH 2,0 and 7,5 [4,5].

The RPC extracts demonstrated sufficient antimicrobial effect against the inhibitory microorganisms: *Escherichia Coli*, *Salmonella Typhimurium*, *Staphylococcus Aureus*, *Bacillus Cereus*, *Pseudomonas Aeruginosa*. The study showed that susceptible structure was following RPC gel formulations: (a) sorbitol, maltitol and agar with immobilized “Eunutrittech”; (b) sorbitol and agar with fermented bovine colostrum. In gels with essential oil mixture thymol was dominant antimicrobial compound (38,7 mg/50 g), while the of carvacrol and menthol concentrations were lower (0,8 mg/50 g and 18,5 mg/50 g). The highest release of phenolic compounds at different pH (2,0 and 7,5) during *in vitro* studies was obtained in nutraceuticals with RPC and LAB fermented bovine colostrum.

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