INFLUENCE OF VEGETABLE POWDERS ON THE RHEOLOGICAL PROPERTIES OF PASTA DOUGH

Aliona GHENDOV-MOȘANU[1], Georgiana CODINA[2]

[1]*Technical University of Moldova, Chisinau,* ***Moldova***
[2]*"Ştefan cel Mare" University of Suceava, Suceava,* ***Romania***

Technologies for the manufacture of functional flour products must ensure their quality and consumption properties (sensory characteristics, structure, consistency, etc.), reduce the negative impact of food ingredients, which are not compatible with the functional properties of the protein-carbohydrate complex of flour and increase food security. Currently, an important role in expanding the range of pasta is the use of non-traditional raw materials. To meet the needs of consumers, pasta is fortified with protein, dietary fiber, trace elements, etc. The rheological properties of the dough can be chemically improved, using oxidizing agents (ascorbic acid, azodicarbonamide, calcium peroxide, etc.), acidic substances (lactic, acetic acids) or enzymes. The aim of the presented research is to investigate the influence of rosehip and chokeberry powders on the rheological properties of pasta dough.

The research focused on the following directions: determination of physico-chemical and organoleptic indices of wheat flour and rosehip and chokeberry powders; the chemical composition of vegetable powders, in particular the content of sugar, fat, starch and dietary fiber. Total content of polyphenols, anthocyanin's and carotenoids was achieved by the spectrophotometric method. Identification of the individual profile of polyphenols, anthocyanin's, carotenoids by HPLC method. In the case of organic acids, the capillary electrophoresis method was used. The rheological behaviour of the empirical properties of the doughs was performed using the Alveograph apparatus. The first-order Sobol index sensitivity analysis was used to study the influence of powder concentration on dough rheology. Vegetable powders of chokeberry and rosehip were used in quantities of 1.5%, 3% and 5% of the mass of wheat flour. It was shown that in relation to the control

sample, the introduction of vegetable powders significantly influenced the increase of the maximum pressure, P, or toughness of the dough and led to the formation of the dough with maximum resistance to deformation.

This phenomenon is due to ascorbic acid in berries, which in the presence of oxygen included in the dough to knead oxidizes the sulfhydryl groups –SH, which belonging to two protein molecules form disulfide bridges –S-S- strengthening the gluten in wheat flour. The increase in dough toughness can also be influenced by the presence of berries. The increase in the L value of the dough is explained by the fact that pectins from powders in water form a strong carcass due to the convergence of hydrophobic methoxyl groups, and free carboxylic groups dissociate into ions, which interact with $–NH_3^+$ groups on the protein surface, thus improving structural and mechanical properties. Of the dough. The content of pectin and organic acids had a significant influence on G. The addition of vegetable powder to wheat flour leads to an increase in the deformation energy. The sensitivity analysis showed that in rosehip powder the greatest influence of the concentration is on W (0.561), and the least on the P / L ratio (0.15). For chokeberry powder the greatest influence is on L and P / L (0.561), and the least – on W (0.270). It is also found that for chokeberry powder the influence of concentration is generally higher than for rosehip powder. Thus, in the rosehip samples the presence of the increased amount of ascorbic acid and organic acids had a predominant effect on gluten proteins, leading to an increase in the dough P. In the case of samples with aronia, pectic substances had an essential effect, which improved the dough.

Acknowledgment: The authors would like to thank the State Project 20.80009.5107.09 "Improving of food quality and safety through biotechnology and food engineering", running at Technical University of Moldova.