APPLE POMACE AND THEIR IMPACT ON WHEAT BREAD PROPERTIES

Jolita Jagelavičiūtė, Gustė Staniulytė, Dalia Čižeikiene, Loreta Bašinskenė

Department of Food Science and Technology, Kaunas University of Technology, Lithuania
jolita.jagelaviciute@ktu.lt

Apple pomace is the solid remain after juice processing and is the major by-product of apple juice industry, representing approximately 25% of the fruit weight. Apple pomace is a good source of dietary fibre and the antioxidants [1]. By-product that contains high amounts of dietary fibre can be used for the improvement of nutritional value of bread.

Apple pomace has been used in the bread not only for enrichment with dietary fibre but also for sensory properties improvement [2, 3]. However, high content of dietary fibre has negative impact on taste, texture and colour of the bread [4]. Enzymatically hydrolysed dietary fibres of pomace can change technological properties of pomace and improve bread characteristics. This study aimed to evaluate the technological properties of enzymatically hydrolysed apple pomace and their impact on wheat bread properties.

The apple pomace (protein 3.8 g/100g; fat 1.27 g/100g; ash 2.23 g/100g; soluble dietary fibre 9.26 g/100g; insoluble dietary fibre 25.92 g/100g; other carbohydrates 49.48 g/100g; moisture 8.46 g/100g) was hydrolysed with commercially available Novozyme A/S enzymes (Viscozyme® L, Pectinex® Ultra Tropical, Celluclast® 1.5L) for 1 h at 50 °C. The technological properties (oil and water retention capacity, solubility) of apple pomace were determined. Dietary fibre content was determined using the Megazyme kit (AOAC 991.43 and AACC 32-07.01 methods), while reducing saccharide content was determined by 3,5-dinitros-acylic acid (DNS) colorimetric method. Wheat bread (control I) and wheat bread with apple pomace (5% of wheat flour was replaced with apple pomace (control II) or enzymatically treated apple pomace) were produced and the technological properties were evaluated.

Apple pomace after enzymatic treatment show reduced oil retention capacity, in most cases. The water retention capacity was decreased in sample treated with Pectinex® Ultra Tropical, while enzymatic hydrolysis with other enzymes did not affect the water retention capacity. The dietary fibre ratio was significantly changed after enzymatic hydrolysis and content of reducing saccharide was increased in all enzymatically hydrolysed samples. The addition of apple pomace to wheat bread dough decreased specific volume, pH value and increased total titratable acidity. Porosity in most cases also was decreased after the addition of apple pomace. The lowest porosity was obtained using apple pomace previously enzymatically hydrolysed with Viscozyme® L, while apple pomace enzymatically hydrolysed with Celluclast® 1.5L increased the bread porosity. Apple pomace significantly affected the texture properties of the bread. Hardness of the bread was increased in most cases after the addition of apple pomace, while apple pomace enzymatically hydrolysed with Celluclast® 1.5L did not increase the hardness. Overall acceptability of bread was higher of enzymatically hydrolysed apple pomace with Pectinex® Ultra Tropical comparing with other bread samples. In summary, enzymatic hydrolysis changed apple pomace technological properties. The addition of apple pomace enzymatically hydrolysed with Celluclast® 1.5L improved the technological properties of wheat bread and had not a negative impact on sensory properties.

[1] M. L. Sudha Apple Pomace (By-Product of Fruit Juice Industry) as a Flour Fortification Strategy (Agricultural and Biological Sciences 2011)