

Effect of the incorporation of apple pomace extract on the rheology of wheat flour doughs

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Adding value to food processing by-products is an important step towards economic, social and ecologically friendly progress. Apple pomace is the by-product from apple juice production, and includes the peels and the seeds of the fruit, that are rich in bioactive compounds. These compounds may have interesting technological and nutritional effects in products such as bread. However, it is important to evaluate the effect of their incorporation through an extract on the rheological properties of wheat flour doughs. Thus, the aim of this work was to evaluate whether the incorporation of apple pomace extract influences the performance of wheat flour. Wheat flour ideal for breadmaking was obtained from an industrial mill and the apple by-product from an apple juice processing factory. For the production of the apple pomace extract, a multi-step ultrasound-assisted extraction procedure using water and ethanol as solvents was carried out, followed by concentration in a rotary evaporator. The concentrated extract was then diluted in water at a 1:5 ratio (v/v). The farinographic and extensographic properties were evaluated using pure wheat flour as control, and 2.5, 5.0 and 7.5 % diluted extract replacing part of the water required for the control sample to reach ideal consistency for breadmaking (500 FU). The farinographic analyses indicated the behavior of a medium (water absorption) to strong flour (development time, stability and mixing tolerance index), with and without the addition of the extract, even though the increase in the mixing tolerance index (MTI) with extract incorporation suggested a possible weakening of the gluten network. The extensographic properties did not indicate variations with the extract after 45 minutes. However, after 90 minutes, the resistance to extension (R) of wheat flour alone was higher than that of the other samples, and the lowest was with 2.5 and 5.0% extract. Extensographic analysis again indicated the strength of the flour as medium-strong, with or without the addition of the extract. Therefore, the results indicate that apple pomace extract can be used in bread formulations, as incorporation up to 7.5% did not alter flour classification, but application trials are important.