Studies on the Relationships between the Protein Composition of Wheat Flours and the Qualities of Oil-Fried Gluten Balls

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ABSTRACT

In this study, wheat flour with different alveographic dough tenacity values (P) were used as testing materials. Their proximate and protein compositions, alveographic dough properties, and the quality of oil-fried gluten balls made from these flours were analyzed to investigate the effects of proximate and protein compositions on the alveographic dough properties and the quality of oil-fried gluten balls. It was observed that the alveographic dough values had significant correlations to the moisture, ash, crude proteins, and wet gluten of the flours. It was also observed that the quality of oil-fried gluten balls had significantly positive correlations to the alveographic P, P/L, and W values, and significantly negative correlations to the L value. In the extraction experiment of flour proteins with different solvents, it was found that the extractability of flour proteins was the highest when 1% and 2% sodium dodecyl sulfate (SDS) solution buffered with phosphate at pH 6.9 were used, and the molecular structure of the extracted proteins was less destroyed. The gel permeation chromatogram of the flour proteins extracted with SDS buffer solution showed three peaks. The first peak can be recognized as high-MW glutenin, the second peak as gliadins and some low-MW glutenins, and the third peak as albumins and globulins. By comparing the areas of the flour protein peaks with the quality of oil-fried gluten balls, it was found that the quality of oil-fried gluten balls had positive correlations to the area of peak 2, and negative to the peak 1 and 3. The network of wheat gluten is formed by glutenins complexed with gliadins and low-MW proteins, therefore, the quality of oil- fried gluten balls should be affected deeply by the interactions of the proteins in the three peaks on gel permeation chromatogram. In this study, the content of gliadins in the peak 2 showed statistically positive effects on the quality of oil-fried gluten balls.

Keywords : Alveograph 特性 ; 醇溶穀蛋白 ; 麥穀蛋白 ; 麵筋球 ; 油炸 ; 麵粉 ; Alveograph Properties ; Gliadin ; Glutenin ; Gluten Balls ; Oil-

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