

## EFFECT OF *AGARICUS BISPORUS* ON GEL PROPERTIES AND MICROSTRUCTURE OF CHICKEN BATTERS

Haijuan Nan<sup>1,2</sup>, Tetiana Stepanova<sup>2\*</sup>, Bo Li<sup>1</sup>, Natalia Kondratiuk<sup>3</sup>

<sup>1</sup>School of Food Science, Henan Institute of Science and Technology, Eastern Hualan Avenue 90, 453003 Xinxiang, China

<sup>2</sup>School of Food Technology, Sumy National Agrarian University, Herasima Kondratieva street 160, 40021 Sumy, Ukraine

<sup>3</sup>School of Food Technologies, Oles Honchar Dnipro National University, pr. Haharina 72, 49010 Dnipro, Ukraine

\*e-mail: tetiana.stepanova@snaeu.edu.ua

### Abstract

Adding animal fat to emulsified meat products can increase the gel properties, juiciness and flavor of the product. *Agaricus bisporus* are rich in protein, polysaccharide, cellulose and flavor substances, which have the effect of absorbing water, gel and can enrich flavor. The purpose of this research was to study the effects of *Agaricus bisporus* on gel properties and microstructure of chicken batters and evaluate its potential as a fat substitute.

This study took chicken breast as raw material and *Agaricus bisporus* as a fat substitute to replace 2, 4, 6, 8, 10, 20, 30, 40, and 50% of animal fat in chicken batters respectively. The cooking loss was calculated by weighing the chicken batters before and after cooking, fat-losing and water-losing were calculated by weighing the exudate before and after drying. pH was measured by pH meter. The color was measured by determining the value of L\*, a\* and b\* of samples using a CR-400 chromatograph. Texture profile were analyzed by TA.XT Plus textural analyzer. Microstructure of chicken batters was observed by environmental scanning electron microscope. The difference and significance of each treatment group were analyzed by IBM SPSS Statistics 20 software.

The results showed that cooking loss and water-losing rate were significantly ( $p < 0.05$ ) reduced when the amount of fat replacement is more than 4% and 10% respectively. Fat-losing rate and pH value were significantly ( $p < 0.05$ ) increased when fat replacement rates were 6 to 30 percent and 4 to 50 percent respectively. The values of L\*, a\* and b\* increased significantly ( $p < 0.05$ ) at all substitution levels because of the color of *Agaricus bisporus*. Hardness and chewiness were significantly ( $p < 0.05$ ) increased when the rates were 20% to 50%. Springiness was significantly ( $p < 0.05$ ) increased when the rates were 8% to 20%. The microstructure of the sample with 20% fat replacement amount was the densest and most uniform compared with the control group.

From the above, appropriate addition of *Agaricus bisporus* was considered to be beneficial to the gel properties and microstructure of chicken batters. In conclusion, *Agaricus bisporus* can be used as a fat substitute to produce low-fat healthy chicken products. The ideal amount of fat replacement is considered to be 20%.

**Key words:** *Agaricus bisporus*, Gel properties, Microstructure, Chicken batters.