

THESIS INFORMATION

INTRODUCTION

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Thesis topic: **FRIED CORN SNACK WITH HIGH FIBER CONTENT: EFFECTS OF MATERIALS AND EXTRUSION PARAMETERS ON THE PRODUCT QUALITY**

Major: **Food Technology**

Major code: **62.54.02.01**

Training institute: **Ho Chi Minh City University of Technology, VNU-HCMC**

Scientific supervisor: **Prof. Dr. Lê Văn Việt Mẫn**

CONTENT

The objective of this study was to clarify the effects of commercial fiber preparations as well as the extrusion conditions on the quality of the fried corn snack. In addition, the study also focused on the effects of commercial natural antioxidants as well as the antioxidant content on the quality of palm olein oil during the frying of snack food. Finally, the obtained high fiber snack was in-vivo tested with the hyperlipidemia mice model to clarify its healthy benefits.

Scientific contributions:

From the fundamental science point of view:

Addition of commercial fiber preparations such as polydextrose, xanthan gum, gum acacia, inulin, resistant starch and resistant maltodextrin to the extrusion blend changed physical and sensory properties of the obtained snack but the color of the product remained almost constant. When the polydextrose content in the blend varied from 0 to 10%, the bulk density of the fried extrudate increased by 22% while its radial expansion ratio and crispness decreased by 13% and 38%, respectively; the increase in fiber and lipid content was also quantified by 166% and 20%, respectively in comparison with that of the control sample. When the screw speed was increased from 150 to 180 rpm, the radial expansion ratio and the crispness of the fried extrudate were enhanced by 18% and 74%, respectively while the bulk density and the hardness were reduced by 42% and 39%, respectively. The increase in screw speed resulted in increasing the water absorption index and the water solubility index of the product. The specific mechanical energy of the extrusion process also increased with the increased screw speed.

Increase in the die temperature from 60 to 100°C reduced the product bulk density by 17% whereas enhanced the radial expansion ratio, the hardness and the crispness by

9,8%, 13% and 32%, respectively; high die temperature also resulted in large air cells and thin cell walls in the product texture as well as high absorption and water solubility index of the snack food.

The use of commercial oil preparations including citronella, nutmeg, clove and rosemary oil successfully prevented lipid oxidation of palm olein oil during the heating and extrudate frying process. Notably, the addition of nutmeg oil to palm olein oil resulted in the best oxidation stability among the tested natural antioxidant preparations.

The use of snack food enriched in polydextrose resulted in significant reduction of the body weight of mice induced by the high fat diet. The high fat and fiber diet also decreased the liver weight, the accumulation of lipid droplets in liver and the liver damage of the hyperlipidemic mice. On the other hand, the use of high polydextrose snack in the high fat diet reduced the content of triglyceride, total cholesterol and low density lipoprotein cholesterol as well as the alanine aminotransferase and aspartate aminotransferase activities in the mice serum. Moreover, the diet with polydextrose added snack increased the high density lipoprotein cholesterol content in the mice serum.

From the applied science point of view:

From the applied science point of view, it can be concluded that the appropriate ratio of polydextrose in the mixing blend, extrusion die temperature and screw speed were 7,5%, 100°C and 180 rpm, respectively. The use of commercial fiber preparation in the extrusion has improvement in the fiber content of snack food.

Among the tested antioxidants, nutmeg and rosemary oils were more effective than tocopherol and BHT and the sample with nutmeg oil showed the highest oxidation stability. For the extrudate frying, the nutmeg oil concentration of 4,0 g/kg was able to prevent oil degradation. The diet with high polydextrose snack generated hepatoprotective and hypolipidemic effect on the hyperlipidemic mice.

The obtained results would contribute to development in healthy food product as well as green processing for industrial application.

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