



Management of graduate education

School of Agriculture

Department of Food Science and Industry

Dissertation for obtaining a master's degree in the field of food science and industry

**Investigation of different levels of extruded whole flour and DATEM  
emulsifier on texture and sensory characteristics of biscuit**

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## **Abstract**

Biscuit is a type of food with main ingredient is flour. Whole wheat flour is one of the types of flour used in making biscuits. Due to the fact that the bran content of whole wheat flour is very high, it is used in the preparation of bran or digestive biscuits. Considering the high nutritional properties of wholemeal flour, special attention has been paid to it in bakery products. Therefore, considering the benefits of consuming pre-processed wholemeal flour on the health of the community and the importance of the extrusion process on improving the technological, sensory and nutritional characteristics and reducing the anti-nutritional compounds of all kinds of cereal and legume flours, including wholewheat flour, as well as the positive effects of emulsifier datum on Better dispersibility of shortening and other ingredients in the formulation and on the other hand preventing the expansion of the gluten network and helping to create a crispy and desirable texture in the biscuit, the purpose of this research is to use extruded whole wheat flour and datum emulsifier in the biscuit formulation. In order to statistically analyze the data, from a completely random statistical design based on the factorial of two factors, the first factor is different levels of extruded flour (zero, 10, 20 and 30%) and the second factor is different levels of emulsifier datum (zero, 0.5 and 1 percent) was used. Also, in order to compare data averages, Duncan's multiple range test was used at the 95% confidence level and SPSS version 20 software. According to the obtained results, the variables had a significant effect on the investigated factors, so that by increasing the levels of extruded whole wheat flour and DATEM emulsifier in the biscuit formulation, the hardness, stickiness, and energy of the biscuit dough increased significantly. the consistency of biscuit dough decreases significantly. Also, the results showed that by increasing the levels of extruded whole wheat flour and DATEM emulsifier in the biscuit formulation, the amount of water activity and moisture content of the biscuit has significantly increased and the spreading coefficient of the biscuit has significantly decreased. Colorimetric tests showed that L\* and b\* Factors or indicators increased significantly with increasing the level of extruded whole wheat flour and datum emulsifier, and a\* component decreased significantly. Also, the findings of the sensory evaluation showed that increasing the level of extruded whole wheat flour and date emulsifier in the biscuit formulation has a negative effect on the sensory indicators and overall acceptance of the biscuit. In general, it can be concluded that adding 10% of extruded whole wheat flour and 0.5% of DATEM emulsifier to the biscuit formulation leads to the improvement of the mentioned indicators.

**Keyword:** Extruded flour, DATEM emulsifier, biscuit, bakery products