PHYSICO-CHEMICAL AND TECHNOLOGICAL STUDIES ON SOME FOOD LEGUMES

BY

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B.Sc. Agric. Sc. (Food Science and Technology), Ain Shams University, 1980

M.Sc. Agric. Sc. (Food Science and Technology), Ain Shams University, 1999

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ABSTRACT

Khaled Ismail Abd EL- Salam Ahmed. Physico – chemical and technological studies on some food legumes. Unpublished Ph.D. Dissertation, University of Ain Shams, Faculty of Agriculture, Department of Food Science, 2005.

Four food legumes (faba bean, cawpea, soy bean and lentil), from different growing locations obtained by the General Organization for Export and Import Control, Cairo, Egypt, were studied in comparison with the Egyptian cultivars. With respect to their physical and chemical characteristics, antinutritional factors content, supplementation raw and germinated legumes flour with wheat flour to prepare salt biscuit and application in meat products. On the other hand, the effect of soaking process at different temperatures (25, 50 and 80 °C) on hydration coefficient, swelling coefficient and hardness, was also studied. Significant variation in proximate composition in such legumes samples were found among the growing location. Soaking, germination and fermentation have affected on the legume samples content of antinutritional factors such as trypsin inhibitor, phytic acid and oligosaccharides. The higher significant effect was found in fermented legumes followed by germination and soaking treatments. Significant reduction in trypsin inhibitor content was found in all samples with increasing soaking, germination and fermentation time. The same reduction was observed in oligosaccharides content in samples, while phytic acid content was reduced after 3 days of germination process. Supplemented wheat flour samples at 20% and 30% with either raw or germinated faba bean, cowpea, soybean, lentil and their mixtures were used in biscuit making. The effect of such supplementations on the reheological properties (using farinograph and extensograph) of the resulting dough as well as the baking quality and nutritional properties of the produced biscuits were studied. It was found that the use of legume flours at 20% improved the reheological properties of the dough. Also,

supplementation with legume flours has improved the baking quality and nutritional properties of produced biscuits, especially when germinated legume flours were used. Sensory evaluation proved that the use of supplemented wheat flour in biscuit formula gave the acceptable scores for most sensory attributes, except for that samples supplemented with lentil flours. Using of raw and germinated legumes at 30% for all legume samples and 40% for only lentil in preparation of beef burger improved the water holding capacity, plasticity, cooking yield, hardness and sensory properties of the produced samples. it could be noticed that, beef burger samples prepared with addition of the same levels of legume flours showed enhanced organoleptic acceptability.

Key words: Faba bean – Cowpea - Soy bean – Lentil – Physical and Chemical Properties - Soaking- Germination – Fermentation – Antinutritional Factors – Sorption isotherm's.

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