بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

MAXIMUM UTILIZATION OF KARKADE IN FOOD PROCESSING

By

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M.Sc. Agric. Sc. (Food Sci. & Tech.), Fac. of Agric., Ain Shams Univ. (2014)

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ABSTRACT

Walaa Mohamed Ahmed El-Sayed: Maximum Utilization of Karkade in Food Processing. Unpublished PhD., Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2020.

Roselle or karkade (*Hibiscus sabdariffa* L.) were analyzed for its chemical and nutritional characteristics of plant parts (seeds, leaves, stems and roots). The effect of the replacement of wheat flour with roselle seeds cake powder (0, 10, 20 and 30%) or roselle leaves powder (0, 2.5, 5 and 7.5%) on the nutritional quality properties of biscuits was studied. Also, the effect of the replacement of soybean flour with roselle seeds powder (0, 25, 50, 75 and 100%) on the nutritional quality properties of beef burger, either before storage or after 15, 30, 60 and 90 days of freezing storage was studied. The obtained results proved that roselle seed, cake and leaves is a rich source of valuable nutrients, i.e., protein (12.32 – 29.06%), lipids (4.45 – 27.83%), ash (5.53 – 15.13%) and crude fiber (14.52 – 20.53%) as well as higher content of essential minerals. Potassium, calcium and phosphorus were recorded the highest concentrations in roselle parts, they ranged between 7.94 - 46.30 mg/g (potassium), 5.29 - 28.80 mg/g (calcium) and 3.23 - 22.10 mg/g (phosphorus). Total phenolic compounds ranged between 155.04 - 3288.33 ppm as gallic acid, so it was the highest in roselle leaves being 3288.33 ppm followed by stems (2086.78 ppm); therefore roselle plant could be used as natural antioxidant. The oxidation stability measured by the induction period at 100◦c using rancimat operates of sunflower supplemented with different ratios of roselle seeds was measured. The results showed that, roselle seeds oil had relatively high stability and increased oxidation stability of sunflower oil with increasing the ratios of roselle seeds oil. The replacement of roselle seeds cake or leaves powder in biscuit formula improved the nutritional profile and physical characteristics of biscuits. Increasing the replacement of roselle seeds cake or leaves powder, increased the nutritive value of prepared biscuits. Sensory evaluation revealed that the best replacement ratio was 10% of roselle cake and 2.5% of roselle leaves

which gave suitable attributes for panelists and scored the highest level of biscuit quality. Fortification of roselle cake powder in beef burger improved the nutritional profile and cooking characteristics of beef burgers. Sensory evaluation showed that the best replacement ratio was 100% of roselle seeds cake which gave suitable attributes for panelists which scored the highest level of beef burger quality and increased their acceptability during storage. However, increasing the replacement of roselle cake powder, increased the nutritive value, quality and stability of prepared beef burger. The antioxidant effect of roselle cake powder that kept and protect beef burger against fats degradation by oxidation. Roselle could be became an excellent economic and valuable source of the nutritional factors which can be used in food supplementation. Roselle seeds and cake could be considered a good source of protein and can replaced animal protein, especially for vegetarians.

Key Words: Roselle, proximate composition, nutritional value, mineral, phenolic compounds, biscuits, beef burger, antioxidant effect, sensory evaluation, fat peroxidation.

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