Studies on the Antioxidant and Antibacterial Properties of Phyto By-products and Gum Arabic Extracts in Cooked Beef Meatballs

Hanan Rdwan[1], Dalia Abd El-Khalik[2] and Yousif Elhassaneen[3]

[1]Department of Home Economics, Faculty of Specific Education, Zagazig University, Zagazig, Egypt, [2] Department of Home Economics, Faculty of Specific Education, Fayoum University, Fayoum and [3]Department of Nutrition and Food Science, Faculty of Home Economics, Minoufiya University, Shebin El-Kom, Egypt.

Abstract

The present study was carried out in a trial to open up new horizons for the use of phyto by-products and gum arabic (GA) extracts in some food processing applications. Such methanolic extracts were mixed with beef meatballs (MB), one of the most important meat products, in a trial to enhance its chemical, microbiological and sensory properties during cold storage time. Egyptian-style beef MB was formulated as a control samples. A set of 5 treatment samples differing only by the phyto by-products (onion skin, pomegranate peel, potato peel and their mixture) methanol extract mixed in beef MB formula by 0.1 % (w/w). Another 5 treatment samples were prepared by adding gum arabic (GA) methanol extract to the all previous treatment by a concentration of 0.1% (w/w). The obtained data indicated that initial malonaldehyde (MDA), lipid oxidation/rancidity parameter, values and lactic acid bacteria (LAB) counts for MB samples with the all tested extracts were significantly ($P \leq 0.05$) lower than those for the control MB samples. Also, the addition of GA with the phyto by-product extracts to the MB samples induced more decreasing in MDA formation and reduced the LAB counts when compared with the similar samples without GA addition. On the same time, an improvement in sensory evaluation scores recorded in cooked meatballs samples as the result of phyto by-products and GA addition. All of these effects could be attributed to the high antioxidant activities as the result of high content of many bioactive compounds in the all selected phyto by-products and GA methanol extracts. Such finding provides a

basis for the use of phyto by-products extracts and GA as a functionally food additives in different food technology applications.

Keywords: Onion skin, pomegranate peel, potato peel, total phenolics, lipid oxidation, lactic acid bacteria, sensory evaluation.