

## Formulation of Value Added Beef Meatballs with the Addition of Pomegranate (*Punica granatum*) Extract as a Source of Natural Antioxidant

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**Abstract :** The experiment was conducted to find out the effect of different levels of Pomegranate (*Punica granatum*) extract and synthetic antioxidant BHA (Beta Hydroxyl Anisole) on fresh and preserved beef meatballs in order to make functional food. For this purpose, ground beef samples were divided into five treatment groups. They were treated as control group, 0.1% synthetic antioxidant group, 0.1%, 0.2% and 0.3% pomegranate extract group as T1, T2, T3, T4 and T5 respectively. Proximate analysis, sensory tests (color, flavor, tenderness, juiciness, overall acceptability), cooking loss, pH value, free fatty acids (FFA), thiobarbituric acid values (TBARS), peroxide value (POV) and microbiological examination were determined in order to evaluate the effect of pomegranate extract as natural antioxidant and antimicrobial activities compared to BHA (Beta Hydroxyl Anisole) at first day before freezing and for maintaining meatballs qualities on the shelf life of beef meat balls stored for 60 days under frozen condition. Freezing temperature was -20°C. Days of intervals of experiment were on 0, 15th, 30th and 60th days. Dry matter content of all the treatment groups differ significantly ( $p < 0.05$ ). On the contrary, DM content increased significantly ( $p < 0.05$ ) with the advancement of different days of intervals. CP content of all the treatments were increased significantly ( $p < 0.05$ ) among the different treatment groups. EE and Ash content were decreased significantly ( $p < 0.05$ ) at different treatment levels. FFA values, TBARS, POV were decreased significantly ( $p < 0.05$ ) at different treatment levels. Color, odor, tenderness, juiciness, overall acceptability decreased significantly ( $p < 0.05$ ) at different days of intervals. Raw PH, cooked pH were increased at different treatment levels significantly ( $p < 0.05$ ). The cooking loss (%) at different treatment levels were differ significantly ( $p < 0.05$ ). TVC (logCFU/g), TCC (logCFU/g) and TYMC (logCFU/g) was decreased significantly ( $p < 0.05$ ) at different treatment levels and at different days of intervals comparison to control. Considering CP, tenderness, juiciness, overall acceptability, cooking loss, FFA, POV, TBARS value and microbial analysis it can be concluded that pomegranate extract at 0.1%, 0.2% and 0.3% can be used instead of synthetic antioxidant BHA in beef meatballs. On the basis of sensory evaluation, nutrient quality, physicochemical properties, biochemical analysis and microbial analysis 0.3% Pomegranate extract can be recommended for formulation of value added beef meatball enriched with natural antioxidant.

**Keywords :** antioxidant, pomegranate, BHA, value added meat products

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