Evaluation of the antioxidant and antimicrobial activity of rosemary (Rosmarinus officinalis L.) preparations in meat balls from "Baader" meat

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Introduction: Poultry industry offers a wide range of convenience food products. The raw material for their production is both hand-trimmed poultry and "Baader"-type mechanically deboned poultry meat (MDM). Due to the relatively short shelf-life of poultry meat convenience food, special attention should be paid to their protection against adverse chemical and microbiological changes. Safety and stability of these products during distribution and storage can be achieved via heat treatment, appropriate packaging and by the use of natural substances isolated from plants.

In the available literature, there is little information on the use of rosemary preparations in poultry products containing MDM from chickens in the recipe composition. Moreover, there are no results of comparative studies on the application possibilities of alcoholic extracts and rosemary essential oil in ready-to-eat poultry products.

The aim of the study was to assess the antioxidant and antimicrobial activity of rosemary (Rosmarinus officinalis L.) preparations in baked, vacuum-packed meat balls from "Baader" meat during 14 days of storage at (+ 4 ± 1) °C.

Materials and methods: The raw materials for the production of the meat balls were: "Baader" meat from chickens (50 g / 100 g), chicken thighs meat (35 g / 100 g) and pork jowl (15 g / 100 g). In each of three experimental series, five treatments of meat balls differing in the type and amount of rosemary preparation were produced. Rosemary was added to the meat batter - in relation to the batter mass - in the form of dried spice (1.0 %), ethanol extracts (2.0%): 40 % (v/v) and 70 % (v/v), and essential oil (0.1 %). The control product did not contain added rosemary. The thiobarbituric acid reactive substances (TBARS) value and the microbiological quality were determined in meat balls after 1, 7, and 14 days of storage. The value of TBARS indicator was determined using the extraction method. Microbiological tests included the determination of the number of the following groups of bacteria: mesophilic aerobic microorganisms, psychrotrophic bacteria, Enterobacteriaceae, coliform bacteria and enterococci.

Results: It was found, that the strongest antioxidant activity in chicken meat balls with "Baader" meat after 14 days of storage exhibited 70 % (v/v) ethanol extract of rosemary. Compared with the control product, inhibition of growth of most of the tested groups of bacteria was found in all products with the addition of rosemary preparations. At the end of the storage period of chicken meat balls, the growth of mesophilic aerobic microorganisms, Enterobacteriaceae, and coliform bacteria was most effectively slowed down by 70 % (v/v) ethanol extract of rosemary, and the growth of psychrotrophic bacteria by rosemary essential oil.

Conclusions: The obtained results show that due to their bioactive properties, rosemary preparations such as 70 % (v/v) ethanol extract and essential oil can be applied in order to extend the shelf-life and safety of convenience foods from chicken meat.

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