

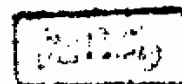
MICROBIOLOGICAL STUDIES ON SAUSAGE

BY

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Approval Sheet

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ABSTRACT.

The present study aimed to evaluate the microbial quality and chemical composition of local market fresh sausage. A second objective was to investigate the combined effects of soy protein (as meat extender), nitrite and sodium chloride on the keeping quality of laboratory sausage to find out the best formula.

The first part of study was carried out on thirty fresh sausage samples collected from Cairo and Giza markets. Samples were subjected to determine aerobic plate count, coliforms, lactics, Staphylococcus aureus, anaerobic spore-formers, moulds and yeasts, enterococci and salmonellae counts. Chemical analysis included moisture, protein, fat, ash, carbohydrate, salt and nitrite. Microbial populations, particularly those of public health significance, greatly

varied between sausage samples. A wide variation in chemical composition was also noticed. Specific recommendations have been given to avoid or limit microbial pollution.

With regard to the second part of study, microbiological and chemical changes were determined during storage, of 18 different laboratory prepared sausage formulas, at different temperatures. Growth of spoiling and pathogenic organisms was faster in soy-extended sausage treatments than non-extended samples. The highest microbial densities were observed in samples containing the least examined levels of sodium nitrite (150 ppm) and sodium chloride (2%). Chemical analysis indicated that soluble nitrogen, free amino nitrogen, free fatty acids and thiobarbituric acid value were higher in soy-beef sausage than in non-extended beef sausage. Moisture and residual nitrite contents decreased during storage period.

Sausage formula containing 15% soy protein, 150 ppm nitrite and 3% sodium chloride was the best, as it had fair microbial quality with limited residual nitrite content. Storage of that sausage formula at refrigeration (4c) for limited period (10 days) or freezing (-18c) for extended period (60 days) was the most convenient from the microbiological point of view.

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INTRODUCTION

INTRODUCTION

Fresh sausage is one of the main meat products in Egypt. It is usually prepared in butchers' shops by stuffing chopped seasoned meat into natural or artificial casings. Fresh sausage is considered to be perishable food capable of supporting rapid and progressive growth of infectious or toxigenic microorganisms. It is dependent upon chemical preservatives and refrigeration or freezing to protect its quality and avert food poisoning.

Nowadays, soy proteins are increasingly used to extend ground beef for preparation of sausage and other meat products. The effect of soy proteins on textural and physical properties of meat products have been extensively investigated, but little has been published on the microbial quality of soy-beef mixtures, and this point is still questionable. Whatever, ground beef and soy protein can provide good nutritive medium for microbial growth, but the overall microbial quality is also influenced by other various factors, e.g., initial microbial flora, sanitation during processing, chemical preservatives, storage temperature and storage period.

Consequently, the aim of the present study was to evaluate the microbial quality and chemical composition of local market fresh sausage. A second objective was to determine the effect of some combined factors on the microbial stability of laboratory sausage. These factors were soy

protein, nitrite and sodium chloride, in different levels, as well as temperature and time of storage. This trial was undertaken to find out the optimal sausage formula and the best storage conditions that minimize the activities of undesirable microflora.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Sausage is made of finely ground meat to which salt and spices have been added. It is usually encased into natural or artificial casings. There are different types of sausages according to the method used in their processing and curing such as salami, bologna, smoked links, frankfurters and others. Most of the sausage types undergo lactic acid fermentation during curing process. Some sausages are smoked, dried, cooked and refrigerated. On the other hand, fresh sausage does not gain any curing or thermal treatment before selling. Thus, fresh sausage is a perishable food that must be preserved by refrigeration and then can be kept only a relatively short time without spoilage.

The following review will be focused on the microbial quality of sausage, particularly fresh sausage, its chemical composition and changes that may occur during storage. Furthermore, studies on the use of soy bean as meat substitute in sausage manufacturing and the effect of its level on the microbial and chemical properties of soy meat sausage have been also reviewed.

1.1. Microbiological quality of sausage:

The microbiological examination of sausage is usually performed to control one or more of its characteristics such as; keeping quality, state of freshness, hygienic standards,