Survey of the chemical, physical, and sensory characteristics of currently produced mortadella bologna

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In recent years, formulations of the Italian cold cut mortadella have changed to meet evolving tastes and nutritional trends. The aim of the present study was to analyze the physical, chemical, and sensory characteristics of currently produced mortadella. Representative samples of Italian mortadella (13 brands, 3 samples/brand) were analyzed. Three groups of products were identified according to their chemical compositions. The median cluster was composed of 54.80% moisture, 26.19% fat, and 15.02% protein, whereas the other two clusters were characterized by a higher percentage of moisture or fat. These results indicate that, on average, the current products are characterized by less fat (−5%) and salt (−10%) content compared to products 20 years ago.

1. Introduction

Mortadella is a common Italian cold cut that traditionally has been made with poor cuts of pork, including both muscle and nonmuscle parts. Most mortadella is produced in North and Central Italy, and the regulation of Mortadella PGI (Protected Geographical Indication), permits production in only these regions. The production of mortadella is characterized by a specific procedure: meat is forced through a special mincing machine, named “exterminator,” obtaining a meat mixture that however is not an emulsion. A particularly long and intense cooking process allows the meat to develop its typical organoleptic characteristics and stabilizes the microbiology of the product, ensuring a long shelf life.

Recently, the formulation of mortadella has changed to meet the evolving tastes of consumers and nutritional trends (Horita, Morgano, Celeghini, & Pollonio, 2011; Tius, Sebranek, Rust, & Carr, 1994; Zanardi, Novelli, Campaninni, Madarena, & Chizzolini, 2000). The use of certain cuts, such as those of the stomach and meat stripped from the head bones, has been dramatically reduced and, in some cases, discontinued entirely. Mortadella producers are becoming increasingly oriented towards products that are lower in fat and salt content.

Mortadella is an economically meaningful product with a large market. In Italy, the annual production of mortadella is as high as 750,000 tons, of which 27,000 tons are exported to the European Community (source: ASSICA, 2011). The dimensions of Mortadella vary significantly, ranging in weight from 1 kg to >50 kg. The most common type of mortadella has an average weight of 12 kg, with a diameter of approximately 24 cm.

The purpose of this survey was to describe the chemical, physical, and sensorial characteristics of the current Italian production of mortadella, in light of recent changes in product formulations. The composition of mortadella was characterized and correlated with sensory and physicochemical properties. This analysis allowed us to evaluate which properties had the greatest influence on quality perception.

2. Materials and methods

To obtain a representative sample, 39 samples of mortadella (of the most common dimension) were obtained from markets located in the north and central regions of Italy. The 13 most well-known brands were chosen, with 3 samples per brand. The goal of the sampling process was to choose typical mortadella products available in Italy. Therefore, mortadella samples were chosen with consideration of the stated composition and price. Discounted products were not considered. To test the widest variety of manufacturing conditions, samples from the same producer (3 samples) came from different lots. The 13 brands were considered to cover more than 80% of the Italian market of mortadella. Each sample underwent the tests described in Sections 2.1 to 2.6.

2.1. Proximate composition and physicochemical analyses

Minced samples were analyzed for moisture, ash, fat, total protein, and collagen (by hydroxyproline content) with the standard AOAC procedure (AOAC, 2000). The approximate composition of the lean mixture was determined after the fat cubes had been removed from the sample. The NaCl concentration was determined from the chloride ion content by the Volhard method (ISO, 1841, 1996). Levels of residual nitrates and nitrates in the products were determined by ion suppression chromatography (Pizza, Pedrielli, Bergamaschi, Barbieri, & Franceschini,