

EFFECT OF DIFFERENT COOKING METHODS ON FATTY ACID PROFILE OF PORK MEAT CUTS

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I. INTRODUCTION

The continuous innovations and changes of the breeds as well as in the rearing practices, feed composition, and slaughtering methods largely contribute to changes in the concentration of several nutrients [1]. To avoid incorrect information and to monitor changes, it is of importance to update the nutrient compositional data of meat. Cooking of meat is essential to deliver a palatable and safe product. However, heat treatment and the addition of new ingredients can lead modifications in the nutritional value of the meat. Lipids are important structural and functional components of food: they have an essential effect on the meat quality even when their concentration is low. The effect of cooking and heating on the meat fatty acid composition depends on the functional properties of each meat cuts and on its marbling level, so the cooked meat may or may not be characterized by higher content of unsaturated fatty acids (Lee, 2012). The objective of the present study was to determine the influence of recipe formulation and cooking methods on the fatty acid profile of Italian pork cuts.

II. MATERIALS AND METHODS

Meat samples: eight breeding rearing farms provided the pork cuts selected. The retailed cuts were: fillet, loin and steak. *Recipes:* The Italian recipes utilised in this study were selected among the most typical for each cut: Roasted fillet: 520 g meat rolled with bacon (25 g) and cooked with 30 ml extra-virgin olive oil, salt (2g), rosemary (3 g). Loin cooked in milk: 1000g meat, salt (3g), cooked for 10' with butter (40 g), add milk (338 ml) and cooked for further 60'. Steak: Roasted fillet: 1000 g meat cooked in pan for 8' without addition of any ingredient. The recipes for each cut were prepared in triplicate in a test kitchen and stainless-steel tools were used. After cooking the meat-based recipes were homogenised and sampled for subsequent analyses, each being carried out in triplicate. Lipids: Intramuscular fat was extracted by means of a modification of the method of Folch, [3]. Fatty acids: fatty acids were esterified as described by Metcalfe [4] and quantified by gas chromatography (HP5890 II series, equipped with FID). Standard reference material: Beef/Pig Fat Blend (BCR 163) and fatty acid methyl esters Mix C4-C24 were analysed as a control of the accuracy of the analyses.

III. RESULTS AND DISCUSSION

The percentages of SFA, MUFA and PUFA of the three raw pork meat cuts analysed is reported in Figure 1. The total intramuscular fat content was 1.9%, 4.6 and 8.2 g/100g in fillet, loin and steak, respectively. Compared with the data reported in the Italian Food Composition Table [5], which describes the composition of Italian pork meat of about ten years ago, a marked decrease in total fat content along with time was observable. Among SFA palmitic acid (C16:0) was the most represented in all the 3 cuts analysed. Among MUFA oleic acid (C18:1) showed the highest amount, loin was the cut with the highest concentration of it (45%). The most abundant PUFA were linoleic acid (C18:2), this acid was in fillet in doubled amount compared with the other two cuts analysed. As shown in Figure 1 steak, the cut with the highest content of intramuscular fat, had the highest level of SFA (38%) and, as well, of MUFA (49.7%). By contrast fillet, the leaner cut, was found to be the cut richest in PUFA (26.2%) (Fig. 1). Cooking has led to appreciable changes in fatty acid profile due to both heating and the presence of ingredients (Fig.2).

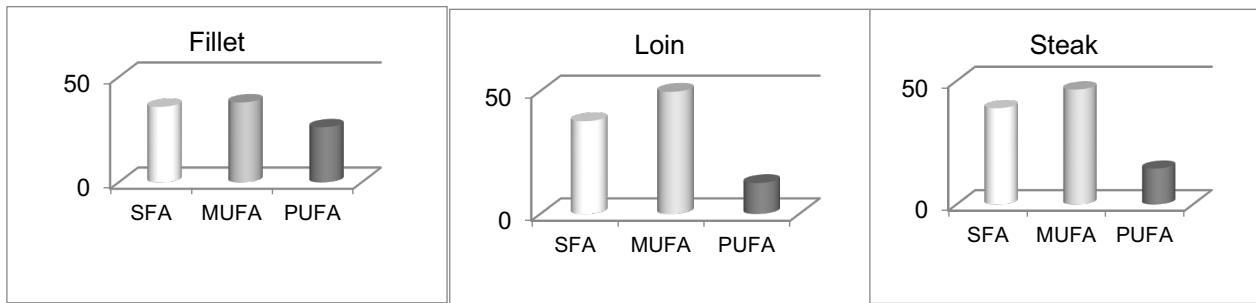


Figure 1. Percentages of SFA, MUFA and PUFA in raw pork meat cuts.

In the Roasted fillet the recipe included extra-virgin olive oil which led to a marked increase in oleic acid (C18:1) (68%). Therefore, after cooking, the ratio among SFA, MUFA and PUFA, compared with raw meat, shifted toward an increase of MUFA (+63%) and an appreciable decrease in both SFA and PUFA (Fig.2). The recipes of the loin cut included ingredients of animal origin like milk and butter, this induced an increase in SFA content and a parallel decrease in MUFA content (Fig. 2). Steak cooked in pan without added ingredients did not show substantial differences in the fatty acid profile with respect to the raw sample and caused only a minor modification in the balance among SFA, MUFA and PUFA.

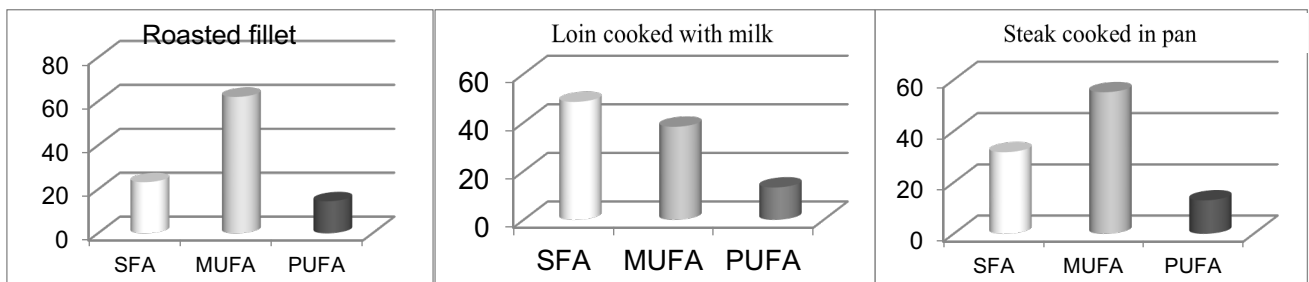


Figure 2. Percentages of SFA, MUFA and PUFA in the recipes based on pork meat.

IV. CONCLUSION

The present study provides a picture of the change in fatty acid composition of meat pork cuts upon cooking. Our findings show substantial differences among the fatty acid classes between raw meat and the respective cooked meat cuts (recipes), differences induced mainly by the ingredients that characterized each recipe. The knowledge of the changes occurring in foods after cooking, by means as they are usually consumed, is of great importance because it allows a correct calculation of the actual nutrient intake at consumer level. Calculated data in fact can differ significantly from analytical data, losses in nutrients content during food preparation and cooking procedures can affect the calculation of the theoretical nutrient intake.

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