

## CHEMICAL CHARACTERISTICS OF DESALTED AND NON-DESALTED ISTRIAN DRY-CURED HAMS

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### Introduction

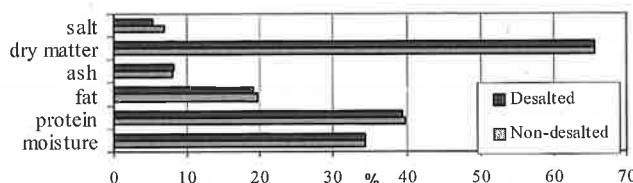
The traditional production of dry-cured ham in the coastal areas of Croatia (Istria and Dalmatia) is likely to be as old as found in other Mediterranean countries. By definition, Istrian ham is a lasting cured meat product, processed in the Istrian manner with or without the aitch bones, salted with sea salt and natural herbs, and cured in the air without smoke. Considering that the desalting process contributes to a more uniform distribution of salt in the dry-cured ham and impacts the course of lipolysis and proteolysis, the objective of this work was to determine the effect of salt concentration on the most important chemical parameters of Istrian dry-cured ham (Andres *et al.*, 2005; Martin *et al.*, 1998).

### Materials and Methods

21 Swedish Landrace breed hogs underwent an extended fattening process to a final body mass of 190-200 kg. Hogs were slaughtered, cut up, cooled and the raw hams trimmed. Legs were processed in the traditional Istrian manner, medially and laterally without rind and the subcutaneous adipose tissue, with the aitch bones. The continued technological process was conducted in Istria according to traditional Istrian technology. *Dry salting* of hams was conducted using a mixture of coarse and fine sea salt, with an addition of herbs. *Pressing* was carried out by burdening the hams with a mass of 200 kg/m<sup>2</sup>. Half the hams were *desalted* by soakage in pure, cold water. After desalting, hams were subjected to *drying* and *ripening* processes. The process of production of Istrian dry cured ham lasted for 14 months. To carry out the chemical analysis a section was made by a longitudinal cross-section of the muscle on the caudal side of the leg, from the *tuber ishiadicum* to the *tuber calcanei*, and the following muscles were cross-sectioned: *m. semimembranosus*, *m. semitendinosus*, *m. gracilis*, *m. biceps femoris*. Chemical analysis included determination of moisture content and dry matter, total protein content, intramuscular fat content, ash content, mineral content, amino acid content and fatty acid content.

### Results and Discussion

The technological process of desalting did not significantly influence the chemical composition of the dry-cured hams, with the exception of salt content (Figure 1). Statistical analysis of the macro and microelement content showed a significant difference for the mean content of the macroelement calcium (desalted: 0.26 g/kg; non-desalted: 0.23 g/kg). The most represented free amino acids in the experimental dry-cured hams are shown in Figure 2, expressed in g/100 g of sample. These amino acids were also found in Iberian and Serrano hams (Ruiz *et al.*, 1999; Toldrá, 1998). In the majority of cases, the non-desalted hams had a greater content of individual amino acids than the desalted hams, however the differences in the arithmetic means were not statistically significant, with the exception of methionine, which had a content statistically significant higher than in non-desalted hams (P=0.013). Several studies have shown a positive effect of salt on lipolysis (Motilva and Toldrá, 1993), while other papers have not shown this correlation (Coutron-Gambotti and Gandemer, 1999). Statistical analysis of the presence of free fatty acids in muscle tissue of dry-cured ham in this study showed that desalting had a statistically significant impact on the content of certain fatty acids in the intramuscular fat of dry-cured ham (Figure 3).



**Figure 1:** Chemical composition of desalted and non-desalted Istrian dry-cured hams (a statistically significant difference was found for the salt content (non-desalted : 6.83%; desalted: 5.33%; p<0.001)).

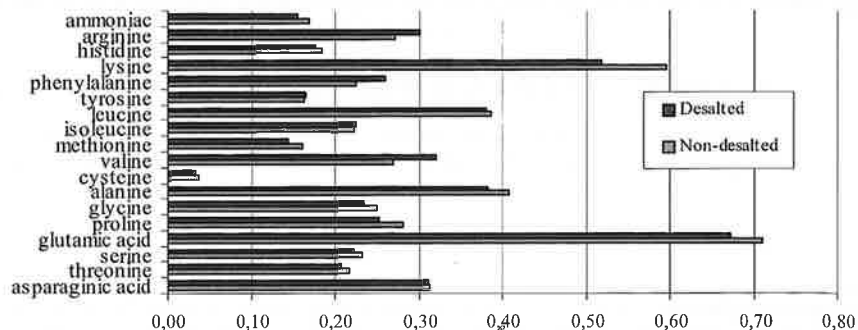


Figure 2: Amino acid composition of desalted and non-desalted Istrian dry-cured hams (g/100 g sample) with a statistically significant difference for the methionine content (P=0.013).

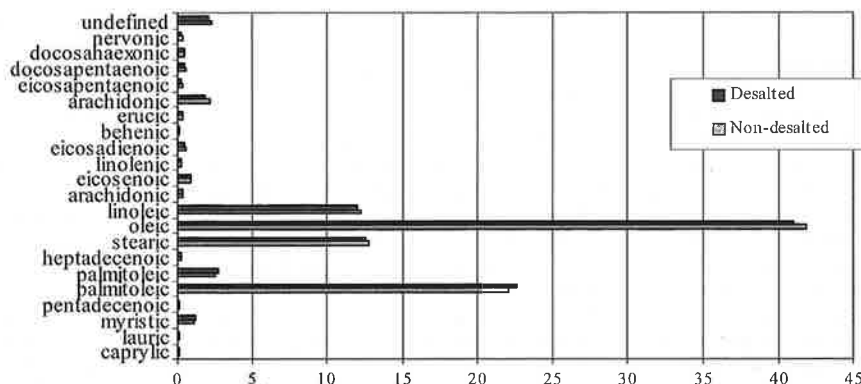


Figure 3: Free fatty acids in Istrian dry-cured ham muscle tissue (%).

A statistically significant difference ( $P < 0.05$ ) was found for the content of eicosapentaenoic acid (C20:5 $\omega$ -3), which had a higher content in desalted dry-cured ham ( $P = 0.019$ ), while a statistically highly significant difference ( $P < 0.01$ ) was found for the content of heptadecanoic (C17:0) and docosapentaenoic (C22:5 $\omega$ -3) acids; the content of heptadecanoic was higher in desalted ( $P = 0.003$ ) and docosapentaenoic acids in non-desalted dry-cured ham ( $P = 0.002$ ).

### Conclusion

It is assumed that varying salt concentrations in dry-cured ham tissues during processing impacts the course of biochemical processes in the dry-cured ham, leading to a statistically significant difference in the chemical composition in non-desalted and desalted hams.

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