

# Fatty acid composition as biomarkers of Azeitão and Nisa PDO Portuguese cheeses

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## BACKGROUND & OBJECTIVES

The **Azeitão** and **Nisa** cheeses are Portuguese cheeses with protected designation of origin (PDO), made from raw ewe's milk and Cardoon flower (*Cynara Cardunculus* L.) as coagulant.



Both types of cheese are highly valued and can be easily recognized by their special characteristics.

The quality and unique properties of these traditional cheeses should be preserved and protected.

It is necessary to identify the unique characteristics of each type of cheese to use them as authenticity tools.

**The aim of this work is to investigate the potential of fatty acids (FA) as biomarkers for Nisa and Azeitão PDO cheese**



## METHODS

Cheeses were obtained from 4 batches per year from 2016 to 2022 (n=7) from all available certified traditional PDO cheesemakers.

Fatty acids methyl esters were prepared by a direct transesterification procedure using KOH in methanol followed by HCl in methanol.

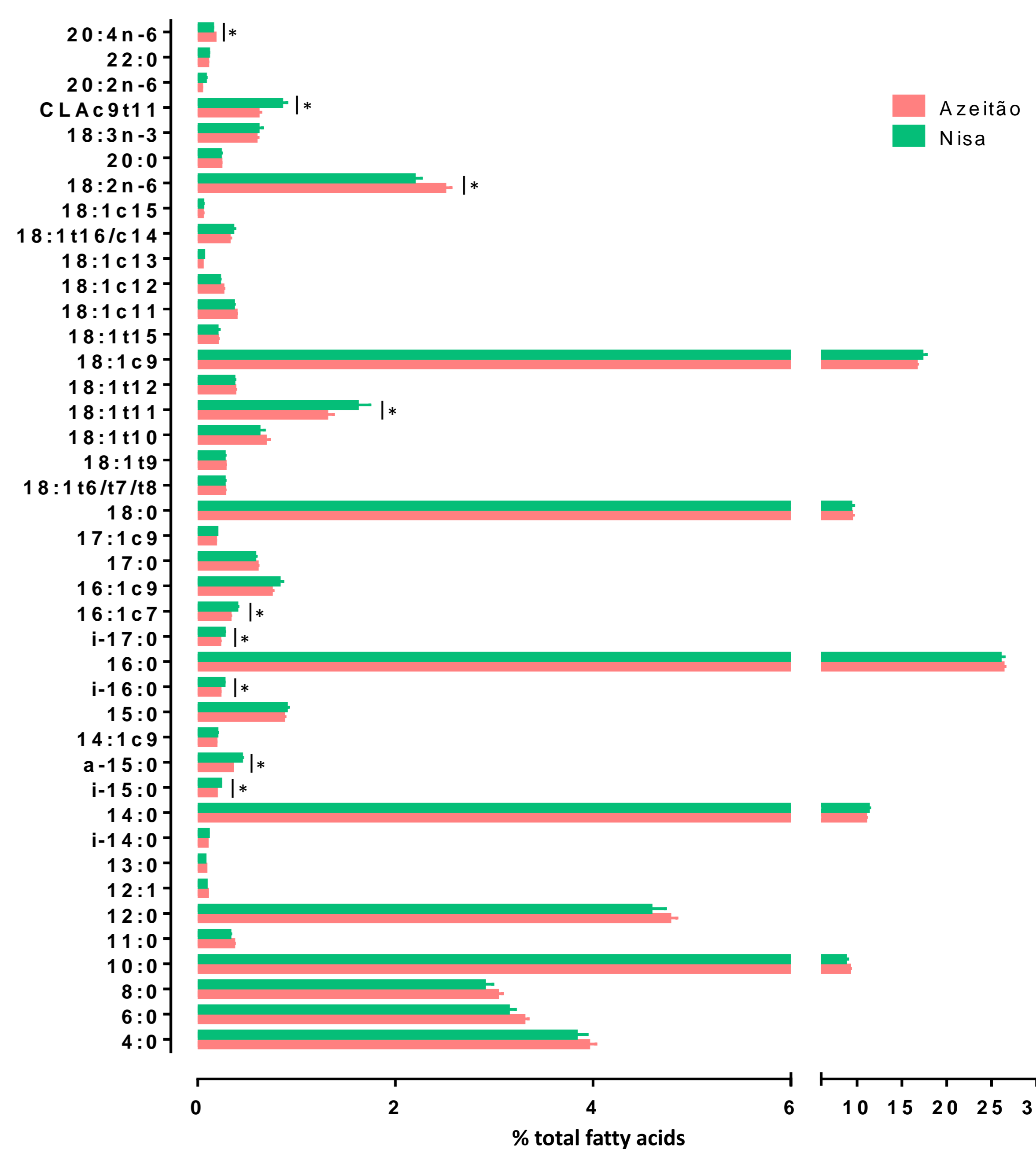
Fatty acid methyl esters were analyzed by gas chromatography with flame ionization detection.



Data were analysed in SAS9.4 and MetaboAnalyst5.0 for statistical and multivariate analysis, respectively.

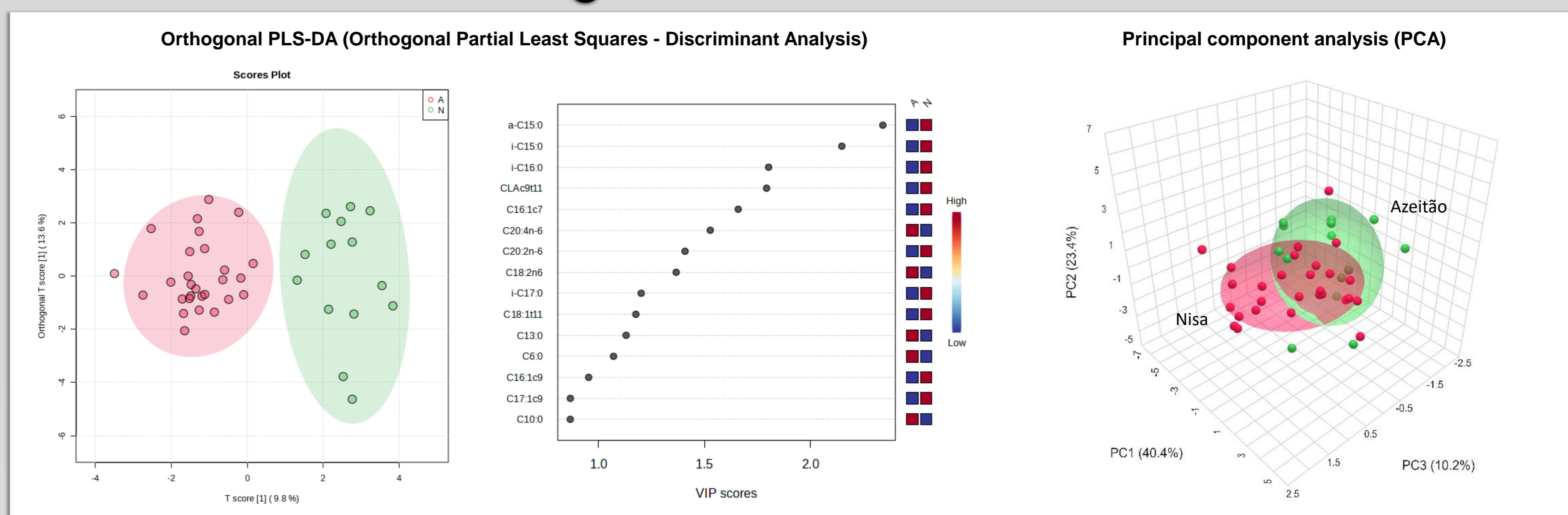
## RESULTS & DISCUSSION

The 16:0, 18:1c9, 14:0 and 18:0 were the main FA detected in both cheeses, together accounting for 62.9% of the total FA.



Only 9 FA varied ( $P < 0.05$ ) between origins, of which only 18:2n-6 and 20:4n-6 were higher in Azeitão than in Nisa cheese. There were no differences between production years.

When potential biomarkers for cheese were examined using multivariate analysis, several FA were identified as predictors for distinguishing between Nisa and Azeitão PDO cheeses.



**This work demonstrates the potential of FA, particularly minor branched-chain fatty acids, to differentiate the geographical origin of traditional Protected Designation of Origin (PDO) cheeses.**

