
# BIO-SUSTENTABILIDADE E BIO-SEGURANÇA ALIMENTAR, INOVAÇÃO E QUALIDADE ALIMENTAR

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## Autores

Ofélia Anjos, Soraia I. Pedro, Carlos Antunes

## Edição

Ofélia Anjos, Soraia I. Pedro, Natália Martins Roque, Carlos Antunes

## Outros colaboradores:

Fátima Peres

Cecília Gouveia

Cláudia Adriana Fernandes Vitória

## Ilustrações

Luísa Ferreira Nunes

## Editor

Sociedade Portuguesa de Química

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# FT-Raman methodology applied to study the effect of seasoning time of Fino *Sherry Casks*® in Brandy de Jerez elaboration.

Guerrero-Chanivet, María[1,2]; Anjos, Ofélia[3,4,5]; García-Moreno, M. Valme[1]; Valcárcel-Muñoz, Manuel J.[2]; Guillén-Sánchez, Dominico, A.[1].

[1]*Department of Analytical Chemistry, Faculty of Science, IVAGRO, Campus of Puerto Real, University of Cádiz,11510 Puerto Real, Cádiz, Spain; maria.guerreroch@uca.es (M.G.C.); valme.garcia@uca.es (M.V.G.M.); dominico.guillen@uca.es (D.A.G.S.).*
[2]*Bodegas Fundador S.L.U., C/San Ildefonso, n 3, 11403 Jerez de la Frontera, Cádiz, Spain; mjc.valcarcel@gmail.com (M.J.V.M.).*
[3]*Instituto Politécnico de Castelo Branco, Quinta da Senhora de Mércules, 6001-909 Castelo Branco, Portugal; ofelia@ipcb.pt (O.A.)*
[4]*Centro de Estudos Florestais, Instituto Superior de Agronomía, Universidade de Lisboa, Tapada da Ajuda, 1349-017 Lisboa, Portugal.*
[5]*Centro de Biotecnología de Plantas da Beira Interior, 6001-909 Castelo Branco, Portugal.*

Brandy de Jerez is a grape-derived spirit produced in the Southern Spanish area known as Marco de Jerez. The Technical File of the Geographical Indication under this name indicates that it must have a minimum alcoholic strength of 36% vol. (usually between 36–45% vol.); it has to be obtained from wine spirits and distillates and it must be aged in oak barrels with capacity of less than 1000 L, previously seasoned with Sherry wine and following a traditional dynamic ageing system used in the Sherry area known as *Criaderas and Solera*.

Brandy de Jerez has a number of specific organoleptic characteristics that distinguish it from other spirits. These characteristics are given to the brandy by the barrels where it is aged. This is because the barrels used to make Brandy de Jerez must have previously contained some type of Sherry wine, i.e., Fino, Amontillado, Oloroso, or Pedro Ximénez. This conditioning process is called *seasoning* and must be carried out following the specifications of the Technical File that regulates their production, is then referred to as *Sherry Cask*®. The Sherry wine must remain in the barrel for at least 12 months, in order to obtain the designation of *Sherry Cask*®. However, there are no studies that corroborate that 12 months is the optimal seasoning time or related to differences observed for and longer or shorter seasoning time. Fino Sherry wine is one of the Sherry wines used for *Sherry Cask*® seasoning. It is a dry wine, obtained by biological ageing under the action of flor yeast. Fino Sherry wine is characterised by having a pale color, dryness, slight acidity and sharp aromas with hints of almonds[1].

During ageing, the organoleptic profile of the Brandies de Jerez improves and develops not only because of the wood, but also because of the Sherry wine that the casks have previously contained. Nowadays, spectroscopy techniques are increasingly used in the analysis of food and beverages because they are fast, not expensive, non-invasive, without sample treatment and environmentally friendly. Although there are no studies on the analysis of Brandy de Jerez with FT-Raman spectroscopy, moreover this technique has recently been used to monitor other brandies[2]. In this work FT-Raman spectroscopy was applied to Brandies de Jerez aged in barrels that had been seasoned with Fino Sherry wine for different ageing times. The obtained spectra are similar to those proposed for other brandies[2] and show greater differences according to the ageing time (**Figure 1**). The region from 1610 $cm^{-1}$ to 785 $cm^{-1}$ seems to be the most influential part in distinguishing of the Fino Brandy de Jerez samples.

The peaks appearing in the region shown in **Figure 1** are due to the $–CH_2$, $–CH_3$ bending (also influenced by the ethanol content in the samples); H-C-H bending modes; C-O stretching vibration (associated with the presence of ethanol and methanol) and $CH_3$ rocking vibrations and C-C stretching. These bands could be influenced by the presence of organic acids present in Brandy de Jerez due to the *Sherry Cask*®. Brandy de Jerez is the only brandy that contains wine-derived organic acids in its composition, and the concentration of these acids could be different depending on the type of *Sherry Cask*® in which it is aged, so the amount of these types of compounds could be a distinguishing feature between the samples[3].

A chemometric study confirms that the Brandies de Jerez studied in this work are different according to the seasoning time that the barrels have previously received. FT-Raman is a potential technique to distinguish between the seasoning time of the barrels in the elaboration of Brandy de Jerez, which affects in its quality and sensory profile. It could be a very interesting technique for quality control, since that does not take much time to obtain good results and that could be used by companies to control their products.

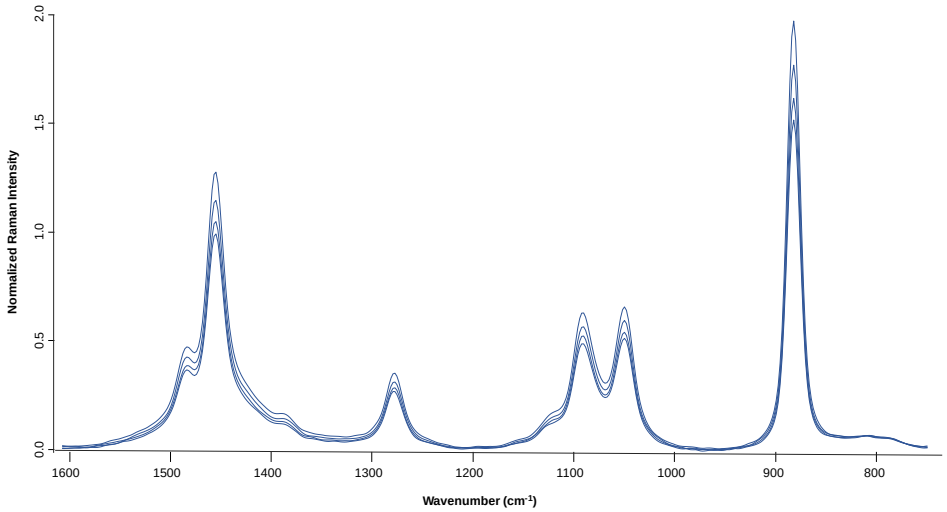


**Figure 1**. FT-Raman spectra of a representative Brandy de Jerez sample.

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