

Impact of the application of vegetable proteins and yeast extract in the chemical and aromatic profile of red wine

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Fining wines are used to ensure the physicochemical stability and prevent the formation of hazes and deposits. Several fining agents (gelatin, isinglass, bentonite, etc.) are used by winemakers. These products are animal proteins or of mineral origin. However, some strict vegetarians do not accept any beverage treated with products of animal origin. Consumers requirements have given origin to new alternatives to these products, such as proteins of plant origin and yeast extracts.

This work aimed to evaluate the effect of four fining agents, two vegetable proteins [pea protein and patatin, a protein extract from potatoes (*Solanum tuberosum*)], one yeast extract and one gelatin, on phenolic composition, volatile composition and sensory profile. The fining agents were used at the minimum (D1) and maximum dosages (D2) suggested by the respective technical sheet. Unfining wine was used as a control (D0). The red wine 2015, was produced in the Escola Superior Agrária de Santarém winery, in Tejo region. The wine is a blend of Tinta Roriz, Syrah and Alicante Bouschet.

Total phenolic Index (IPT), total anthocyanins (Ant) and total tannins (Tan), colour intensity (CI) and hue were determined according the International Organization of Vine and Wine (OIV). The turbidity was also evaluated. The analysis of the volatile compounds was done by GC-MS and the sensorial analysis was performed by five expert panellists, members of the 'Comissão Vitivinícola Regional of Tejo (CVRTejo)'. The attributes of the wine, corresponding to the visual (limpidity and colour), nose (typicity, intensity and quality) and taste senses (typicity, intensity, persistence and quality, as well as the harmony (overall judgment).

According the results obtained, the vegetable proteins and the yeast extract used did not influence the wine phenolic composition: IPT (60,04±2,735), Ant (443,96±22,32 mg/L), Tan (3034,33±189,89 mg/L), CI (10,54±0,47), Hue (0,711±0,017). However, the tannin content decreased in fining wines (untreated wine 3178,47±36,24 mg/L; D1: 2980,59±238,73 mg/L; D2 2943,96±154,27 mg/L).

The turbidity decreased significantly in fining wines (untreated wine 2,53±0,00; D1 1,68±0,61; D2 1,12±0,47); the gelatin was the less efficient in the decrease of turbidity (2,10±0,46).

The results indicate that the fining agents did not significantly remove isobutyl alcohol, isoamyl alcohols, acetoin, ethyl lactate, diethyl succinate, 2,3-butanediol-*meso* and 2,3-butanediol-*levo*, 1-hexanol, γ -butyrolactone, octanoic acid, 2-metil-propanoic acid, diethyl succinate, 2-phenylethanol and ethyl vanilate. As with regards to the hexanoic acid, the ethyl 3-hydroxybutyrate and the ethyl 3-methylbutyl succinate, these decreased when the treatment was carried out with patatin, pea protein or yeast extract.

These results are in agreement with those obtained in the sensory analysis, in which the tasters did not detect significant differences between the wines treated with different fining agents.

Keywords: Fining, Vegetable proteins, Yeast extract, Gelatin, Wine