

PHENOLIC COMPOUNDS AND CHROMATOGRAPHIC FINGERPRINT ANALYSIS OF CACHAÇA EXTRACTS OF OAK AND BRAZILIAN WOOD SPECIES

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Introduction. The maturation of distilled spirits in wooden barrels is a well known procedure used to strengthen the spirit sensory attributes. Among the potential extractive compounds from wood, benzoic and cinnamic aldehydes (1) are of particular interest due to their well recognized direct contribution to the spirit flavor. Brazil has a quite rich flora thus, it is desirable to examine the possibilities of using Brazilian wood species (2, 3) for oak replacement on the wooden barrels manufacturing. Therefore it would be interesting to have an accessible methodology to certify the aged beverage origin regarding the wood utilized in the cask cooperage. Aiming to contribute on this subject is reported here the analysis of low molecular weight free phenolic compounds and polyphenols in cachaça extracts of 15 Brazilian wood species, and 11 extracts of American and European oaks. An HPLC-UV chromatographic fingerprint was build-up using chemometric methods (PCA, PLS) based on elution profiles of the extracts.

Methods. Twenty six cachaça's extracts of six different Brazilian wood species and oak, all commonly used by cooperage industries were analyzed through HPLC-DAD-Fluorescence and HPLC-ESI-MSⁿ for the presence of 16 phenolic compounds (ellagic acid, gallic acid, vanillin, syringaldehyde, synapaldehyde, coniferaldehyde, vanillic acid, syringic acid, scopoletin, coumarin, quercetin, trans-resveratrol, (+)-catechin, (-)-epicatechin, eugenol, myricetin)

Results and discussion. The major free phenolic components identified and quantified in cachaça extracts of Brazilian woods were coumarin, ellagic acid, and (+)-catechin, while in the oak extracts (+)-catechin, vanillic acid, and syringaldehyde accounts for the main phenolic contribution. The main differences between Brazilian woods and oak extracts remain in the coumarin, (+)-catechin, syringaldehyde and coniferaldehyde contents. The chemometric analysis of the quantitative profile of the phenolics compounds clearly provides a differentiation between the Brazilian woods and oak extracts. The chromatographic fingerprint method revealed significant differences among the Brazilian woods extracts themselves and oak, and clearly define five extracts groups: A- Oak, B- Jatobá, C- Cabreúva, and D- Amendoim and E-Canela., see Figure 1.

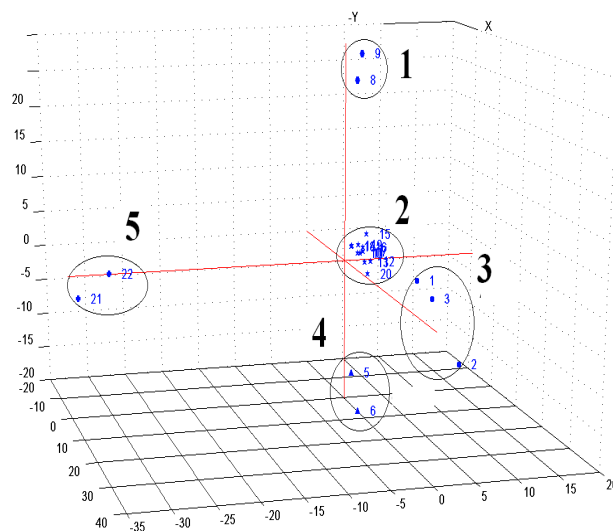


Figure 1- Score plot for chromatograms of woods extracts 1- canela-sassafrás, 2- oak, 3- amendoim, 4- cabreúva-parda, 5- jatobá

Conclusion. A comparison between Brazilian woods and oaks cachaças extracts based on their phenolic content is presented. Chemometric methods (PCA, PLS) applied to the phenolic elution profiles (HPLC-UV) of the different cachaças wood extracts proved to be suitable for their differentiation.

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Reference.

- 1-Canas, S.; Leandro M. C.; Spranger M. I.; Belchior A. P. (1999) Low Molecular Weight Organic Compounds of Chestnut Wood (*Castanea sativa* L.) and Corresponding Aged Brandies. *J. Agric. and Food Chem.*, 47, 5023-5030
- 2-Bettin, S. M.; Isique, W. D.; Franco, D. W.; Andersen, M. L.; Knudsen, S.; Skibsted, L. H.; (2002). Quantitative analysis and effect on radical formation and radical scavenging. *Eur. Food Res Technol.*, 215,169-175.
- 3- Souza, P. P.; Siebald, H. G. L.; Augusti, D. V.; Neto, W. B.; Amorim, V. M.; Catharino, R. R.; Eberlin, M. N.; Augusti, R.; (2007); Electrospray Ionization Mass Spectrometry Fingerprinting of Brazilian Artisan Cachaça Aged in Different Wood Casks. *J. Agric. Food Chem.*, 55, 2094-210.