Phenolic profile of *Morus alba* L. (mulberry) barrel staves

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Introduction

The ageing process is one of the most important practices in the production of some alcoholic beverages, which results in improved sensory characteristics. Oak is by far the most common wood used in that process. However, in order to minimize losses in volume of beverages during aging process in wood barrels, cheaper non-oak wood alternative to barrel products like shavings or staves can be used. In the choice of good alternative aging wood, the phenolic fraction was considered to be one of the most important parameters for evaluating quality. The aim of this research was to investigate phenolic profile of industrially dried mulberry staves originating from Serbia.

Materials and methods

- The phenolic profile of the seasoned mulberry stave sawdust originating from Serbia (Figure 1) was characterized by HPLC-DAD-MS.
- Also, fluorescence spectroscopy was used to characterize both wood sample and its extract.
- A series of emission spectra for different excitation wavelengths in a wavelength range was performed, in order to determine the number and emission profiles of components, by using advanced statistical methods.

Figure 1. Mulberry stave sawdust

Results and discussion

- In mulberry wood extract were identified 30 out of 44 investigated compounds.
- Mulberry was abundant in flavan-3-ols, flavanonols, phenolic acids, stilbenoids, flavonols and coumarins (Figure 2).
- Mulberry did not contain investigated isoflavones.
- The spectral shapes are simpler for mulberry wood extract (Figure 3a) than for mulberry wood (Figure 3b), which may be addressed to the lower number of fluorophores (absence of lignin) present in the extract comparing with wood.
- Mulberry wood has blue shifted maximum at 420 nm, which may be addressed to a relatively low content of lignin in this wood species than in some other species. The extract showed a maximum at 440 nm, characteristic for the major polyphenols of oxyresveratrol and coumarin type.

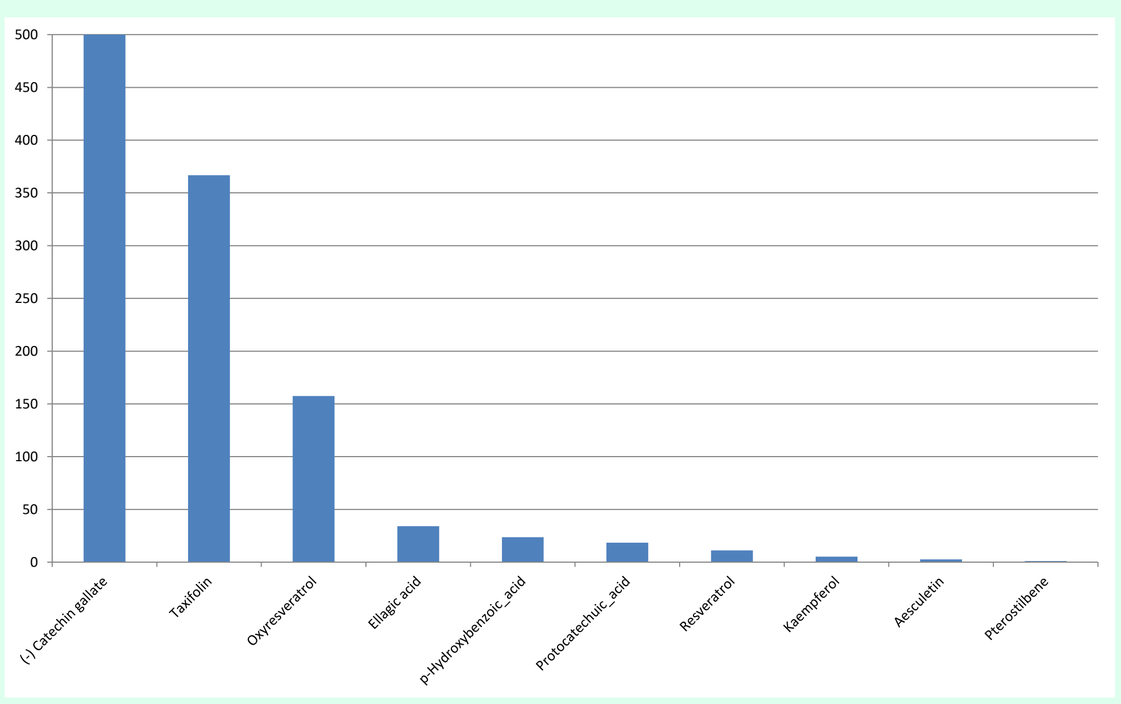
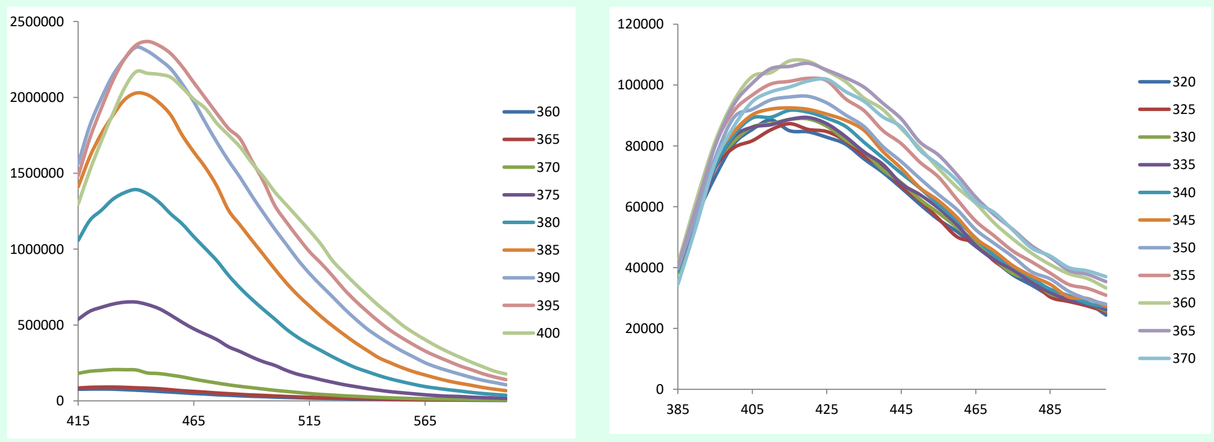


Figure 2. The most abundant polyphenols in mulberry wood extract (c>1ppm)



(a) (b)

Figure 3. Fluorescence emission spectra of mulberry wood extract (a) and mulberry wood (b), measured for a series of excitation wavelengths, indicated by different color lines on the graphs.