PHENOLIC COMPOSITION OF MERLOT RED WINE MATURED IN OAK BARRELS VS OAK CHIPS DURING THREE MONTHS

Espitia-López J, Verde-Calvo J R,, Escalona-Buendía. H B., Luna-Contla H M. Unversidad Autónoma Metropolitana-Iztapalapa, Departamento de Biotecnología. joss_efa@hotmail.com.

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Introduction. Oak barrels have been commonly used for wine aging due to the positive effects they induce, such as better color stability, spontaneous clarification and flavor enriching-softening (1). Recently, several technologies have been introduced as alternatives to the conventional barrel maturation; one of them consists on adding wood chips into the wine placed in an inert container. This method has enabled more surface contact as the wood is inside the wine and the whole surface is used, instead of the 40% of surface contact in the conventional method of wine resting in barrels (2).
The aim of this research was to study the extraction of phenolic compounds related to wood maturation of merlot red wine comparing barrel resting vs chips contact during the first three months.

Methods. Phenolic composition was determined by the modified method previously (3). HPCL-UV-Visible was used with a RP-18 column (LiChrospher), flux of 0.8 mL/min and injection volume of 10 µL. Detector was set at 280 nm and determinations were carried out at 25°C. Eluents were A) Water/Acetic Ac. 98:2 (v/v) and B) methanol. Gradient started at A 90% constant during 4 minutes, then B increased to 60 % from 4 to 40 minutes, and from 40 to 50 minutes B decreased at 10%. Total time for running was 55 minutes**.** Polyphenols were monitored during the first three months for both conditions, sampling every month in triplicate.

Results. Table 1 shows the average concentrations for selected phenolic compounds in each treatment. Compounds marked with * showed significant difference after a T-Student test for means comparison. Figure 1 shows concentrations after three months maturation.

Table 1. Phenolic concentration as mg/L of selected polyphenols during three months of maturation.

	Barrel			Chips		
Standards	**1 month**	**2 months**	**3 months**	**1 month**	**2 months**	**3 months**
Gallic Acid	0.32	0.33*	0.30*	0.33	0.37*	0.32*
Catechin	1.08	1.07*	1.03*	1.17	1.55*	1.16*
p-Hydroxybenzoic Acid	0.04*	0.05*	0.05*	0.07*	0.10*	0.06*
Caffeic Acid	0.42	0.42	0.43	0.46	0.35	0.44
Epicatechin	1.29	1.33	1.68	1.94	2.01	1.88
Syringic Acid	0.33*	0.31*	0.31*	0.21*	0.26*	0.23*
Vanillin	0.05*	0.05*	0.08	0.15*	0.16*	0.08
Ferulic Acid	0.52	0.51	0.49	0.55	0.59	0.52
Resveratrol	0.42	0.40	0.40	0.46	0.45	0.42
p-Coumaric Acid	0.20	0.26	0.28	0.29	0.36	0.40
Eugenol	0.00073	0.00058	0.00071	0.00068	0.00063	0.00071

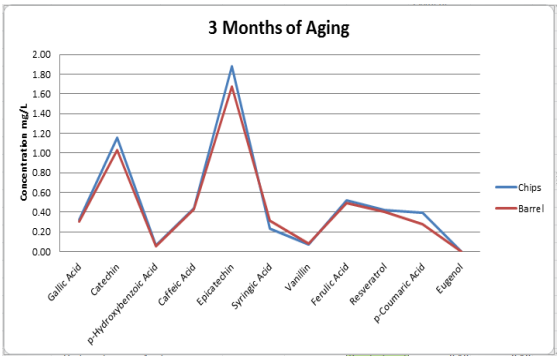

Fig.1. Polyphenol concentrations after three months of maturation of merlot red wine in barrels vs. chips.

Results (Table 1) showed that vanillin concentration is significantly higher in wine matured in wood chips after 1 and 2 months, while gallic acid was higher after 2 and 3 months (Figure 1). *p*-hidroxibenzoic and syringic acids had higher concentrations along the three months.
Conclusions. These results suggest that, as expected, there has been a higher extraction of wood components in chips maturation because of a higher surface of wood contact in comparison with the conventional barrel maturation.

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