Oregon Wine Advisory Board
Research Progress Report

1994 - 1995

A Survey of Oregon Pinot noir Grape and Wine Phenolic Composition

Steven F. Price, Marilin Valladao, and Barney T. Watson
Departments of Horticulture and Food Science and Technology

Thirty five vineyard blocks of Pinot noir were sampled at harvest by taking a two hundred cluster sample in 1993. Commercial wines from these blocks were analyzed by HPLC at two and nine months of age. Cluster weights ranged from 72 to 148 g, berry weights from 0.55 to 0.90 g, and Brix from 20.8* to 24.7% Acidulated ethanol skin extracts of a 200 to 500 berry sub-set were analyzed by HPLC for phenolic composition. Anthocyanin concentrations varied by 2 fold between the lowest and highest sample, total phenolics by 3 fold, quercetin glycosides by 5 fold, and polymeric compounds by 15 fold. Vineyards with the highest anthocyanin and quercetin concentrations were generally younger vineyards in their first to third year of production.

Catechin in new wines ranged from 20 to 190 mg 1;' and did not change greatly during aging; polymeric compounds at 280 nm doubled during this same period. Catechin and polymeric compounds are extracted from grape seeds in Pinot noir, however, this trial did not measure grape seed phenolic composition. Quercefin glucoside was rapidly hydrolyzed in wine and was not detectable in any sample by 9 months. The quercetin glucuronide appeared to be more stable, declining slowly in most wines between 2 and 9 months. Quercetin aglycone concentrations increased during aging and ranged from 1.4 to 43.6 mg L` at 9 months. Much of the variability in wine total quercetin could be explained by variation in grape quercetin. Caffeic acid was present in several wines accompanied by lower levels of caftaric acid suggesting that hydrolysis of the ester is occurring under some commercial fermentation regimes.

Average wine monomeric anthocyanin concentration decreased about 30% (range 0 to 61%) between 2 and 9 months while polymeric anthocyanins tripled. The percent of total 520 nm absorbance contributed by polymeric compounds ranged from 2 to 25% and appeared to be related to both gape composition and winery practice.

Analysis of gape and wine phenolics appears to have significant utility. This trial clearly demonstrated that there are large differences in the phenolic profile of grapes in a single season. Analysis of grapes and wines from the same site in multible years has shown a an equal or greater effect of vintage. Recent research on wine processing variables at OSU has shown that specific processing practices also alter wine phenolic profiles. Knowledge of gape phenolic composition prior to processing might be used to determine the most appropriate fermentation practices for that site and vintage, and an understanding of which factors affect phenolic composition in the field could lead to management of wine phenolics in the vineyard.