

RESEARCHERS FIND LINK BETWEEN SUN AND WINE COMPONENT

By Carol Savonen

Oregon State University (OSU) scientists have discovered that the amount of sun concentrated on grapes influences the amount of quercetin, an important phenolic compound that contributes to red wine quality. Wine grape phenolic compounds affect bitterness, astringency, flavor and color in red wines.

This finding is of particular interest because quercetin is one of the compounds in wine identified with having positive health effects.

Quercetin is a type of flavonol, a group of phenolic compounds that give red wine some of its characteristics, explained Steve Price, who studies viticulture at OSU. Quercetin is found mostly in grape skins. It protects grapes from ultraviolet light, much like melanin shields human skin from sunburn in the tanning process.

Red wines are crushed and fermented with their skins, explained Barney Watson, a wine chemist in OSU's department of food science and technology. Quercetin is found in much higher amounts in red wines such as Pinot noir, Cabernet Sauvignon and Merlot, than in white wines which are fermented without their skins.

Price and Watson studied Pinot noir grapes produced by many Oregon vineyards. They collected clusters of grapes with various degrees of sun exposure, those grown in the open sun, partial sun and shaded areas. They analyzed each category of grapes for phenolic compounds including the amount of quercetin.

In replicated batches, they crushed and fermented each category of sun-exposed grapes, including the skins. Again, they analyzed the chemical properties of each mixture, including the amount of quercetin. Then they analyzed wine made from each treatment to see how much quercetin and other phenolic compounds extracted from the skin carried through to the finished wine.

Pinot noir grapes exposed to a high level of sunlight contained up to 20 times as much quercetin as those grown in the shade. Wine made from the highly sun-exposed grapes contained up to eight times as much quercetin as wines made from grapes grown in the shade.

"This is a really dramatic response," said Price. "It's not easy to get an eight-fold change in the production of a compound in wine. I can't think of any other component in grapes and wine where you could go out

in the vineyard and cause a 100 percent difference. And here you can cause an 800 percent difference. We were lucky to stumble on something in grapes that carried through into the wine. This doesn't always happen."

If health claims about quercetin are accurate, the Price and Watson findings may be significant for wine grape growers as well as wine makers.

"In the past, the effects of light exposure on grapes was not well understood, particularly with respect to phenolic compounds," said Watson.

"No one has shown increases in quercetin on the vineyard side before this," added Price. "It would seem that if you want high quercetin wine, you can do it in the vineyard. Growers can influence the amount of sun exposure their grapes get by varying their trellises, by leaf removal and by pruning. The more sun a cluster gets, the more quercetin."

Scientists suspect that flavonols, including quercetin, may have beneficial effects on blood borne cholesterol, hardening of the arteries and blood clotting in humans. These positive effects are sometimes termed "The French Paradox," based on the fact that some French people, who drink more red wine than some other cultures, show below-average rates of heart disease, even though they have diets high in saturated fats.

Scientific research has not yet pinpointed any specific mechanism to explain this paradox, but red wine is suspect. The fact that the French are known to eat less red meat and more fresh fruits and vegetables also may be the factor, said

Price.

"Eventually, quercetin content in wine may become commercially significant," Price said. "But now, we really don't know from a wine quality standpoint what this all means. We don't understand the chemistry yet."

For that reason, Watson and Price now plan to look at wine processing and the chemical interactions of high quercetin levels in wine.

Other OSU food scientists, Mina McDaniel and master's degree student Renee Vaia, also plan to investigate how different amounts of quercetin affects the taste, palate sensation and astringency of wine.

"We do know that there is currently a lot of interest in quercetin," said Price. "After 60 Minutes ran a segment about The French Paradox, red wine sales were 60 percent higher than the previous year."

Quercetin is also found in most other fruits and in onions, garlic and green leafy vegetables.



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