

Reducing Methoxypyrazine in Cabernet Franc and Cabernet Sauvignon Wine in the Cellar. A Progress Report

Jon Treloar, G. Stanley Howell and Gerard Logan
Program of Viticulture and Enology
Department of Horticulture
Michigan State University

Introduction.

Red *vinifera* varieties originating in the Bordeaux region of France are often described as “herbaceous” or “green” when grown in cool growing regions such as the Monterey district of California, the South Island of New Zealand or the Great Lakes Region of North America. Michigan is included in this latter geographic region and two red varieties that we would like to expand in our culture because of viticultural adaptation are being less considered because of the characteristic “bell-pepper” aroma and flavor perceived in most of the wines produced from either Cabernet Sauvignon or Cabernet Franc.

The chemical basis for this aroma is a group of compounds called methoxypyrazines. The most active of these is 2-methoxy-3-isobutylpyrazine (IBMP). This compound produces the traditional aroma of bell-pepper and the human threshold for the compound is very low (0.002) parts/billion. While other similar pyrazine compounds are also contributors to the aroma, IBMP is by far the most dominant.

Because the compound is active and perceived at such low concentrations, it seems unlikely that a single cellar or vineyard approach will provide a practical answer. We have received funding through the Eastern Viticultural Consortium for parallel efforts employing vineyard and cultural methods to reduce the impact of the compound in the fruit arriving at the cellar. We include four different vineyard variables in the field study and a similar number in the cellar.

Research Objectives.

The primary objective is to reduce the level of IBMP to a level below human threshold as the perceived “green-ness” is interpreted as “unripe” regardless of the crop’s physiological maturity.

Since we anticipate that an array of cellar practices may influence the quantity and expression of IBMP, we will employ a variety of approaches that have either shown some promise in preliminary efforts in our research cellar (taste perception differences in response to yeast strain), suggestion from other scientists (differences in response to strain of malolactic bacteria, Henick-Kling, Geneva, NY), suggestions from industry persons (differences in enzyme extraction and influence of binding by oak derivatives). An attached Table contains the listing of the materials employed in this first year effort with the 2004 vintage.

2004 Effort to Date.

This effort was funded in April, 2004 and therefore there are no data to report. The effort began at harvest, 2004. Fruit of both Cabernet Sauvignon and C. Franc were harvested and vinified with the materials noted in the Table. Wine lots were made in triplicate. The methods developed by Wampfler and recently published in the American Journal of Enology and Viticulture will be employed.

Conclusions.

None to date, but unless we can solve this concern, we will be very limited in our ability to consistently produce competitive wines from these two very important red wine varieties.

Specific Materials Employed in the 2004 Cellar Trials to Reduce the Impact of Methoxypyrazine in Wines Produced from Cabernet Sauvignon and Cabernet Franc.

Different Yeast Strains: (C. Sauvignon)

ICV-GRE
D-21
MI-24
ICV-D80
P. Red
NT-50
ICV-254D
BM-45
Cepage c.s.
Fermicru VR5
W15
CSM
Natural/Wild

Enzymes: (C. Franc)

Control – No
Enzyme
Rapidase
Ex-Color
Rapidase
ADEX G

Malo-Lactic Bacteria: (C. Franc)

Lallemand alpha
Lallemand Beta
Lallemand 31
Lallemand VP-41
Lallemand Provino
Lallemand Elios
Christian Hansen Oenos

French Oak Addition (C. Franc)

Control – No Oak
1.0 gram/liter
2.5 gram/liter
4.0 gram/liter
