

**Annual Report
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Project Title:

Vegetative aroma: Sensory definition, chemical interpretation (and ultimately) causal explanation.

Principal Investigator(s):

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Cooperators :

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Summary:

During the 2001-2002 funding year we obtained wines and associated viticultural information from industry cooperators. A graduate student was hired and has been coordinating these efforts. Sensory studies have been initiated and are expected to be completed by the end of the funding year. A GC-O-MS instrument was purchased, has been installed at UCD, and preliminary method development and validation has begun. Descriptive analysis of wines made from a wide range of Cabernet Sauvignon viticultural trials has begun. The completed analysis will act as a screening tool, identifying potentially important viticultural parameters meriting further systematic study.

Objectives of Proposed Research:

- 1) Define the meaning of "vegetative aroma" in quantifiable sensory terms, i.e., bell pepper, green bean, etc.
- 2) Identify chemical components and their interactions which may affect the intensity of vegetative character.
- 3) Relate viticultural and enological parameters to the aroma profiles and to the intensity of vegetative character.

Summary of Major Research Accomplishments and Results:

Objective 1 Define the meaning of "vegetative aroma" in quantifiable sensory terms, i.e., bell pepper, green bean, etc.

Wines from industry cooperators have been obtained from a variety of vineyard blocks and vintages. For comparison we have also included some wines that do not have vegetative character. We are in the process of compiling the vineyard information (Brix, harvest date, yield, weather, canopy, pruning, irrigation, soil type, etc.) for these wines. Sensory descriptive studies of these commercial wines have been initiated and are expected to be completed during spring quarter. In a related project, Dr. Dave Block has made wines from a number of vineyard sites with well-characterized viticultural treatments. The chemical characterization of these wines has been completed (pH, TA, color, etc.) and sensory analysis has been initiated. Specific sensory descriptors for these wines have

been identified (blackberry, cherry, dried fruit, bell pepper, cooked vegetable, black/white pepper, olive, and cocoa) and a trained descriptive panel has begun to evaluate the intensities of these terms in the various wines. Wines with distinct vegetative character identified in this study will also be included in the descriptive analysis of the commercial wines.

Following completion of the descriptive panels (using both commercial and UCD wines), the viticultural data, chemical data (where available), and sensory data will be analyzed by Principal Component Analysis to begin to understand relationships between the sensory character and the vineyard parameters. Depending on the results obtained, further statistical analysis (Partial Least Squares, Procrustes analysis, etc.) will be completed as appropriate in order to better characterize these relationships.

We have also initiated studies with an “expert” panel. These “experts” are people in the food and wine industry who have extensive experience tasting wine. Panelists will be asked to group the wines by their own perceptions of vegetative character. Following this initial sorting, the concept of “vegyness” will be discussed with a panel moderator (Catherine Blagden, graduate student) and standards used to define vegetal and other related sensory terms. Following the discussion, the panelist will then regroup the wines. Comparisons of the groupings before and after the discussion will be used to better understand the use of the term “vegetative” by experienced tasters (e.g. quantitative vs qualitative differences in the use of the vegetative term).

All sensory panel work for these initial studies is expected to be completed by the end of the funding period.

Objective 2 Identify chemical components and their interactions which may affect the intensity of vegetative character.

A GC-O/MS has been purchased with funds from AVF (funded separately from this grant). We have begun to validate methods of analysis for aroma active compounds in wine as well as for quantitation of MIBP (2-methoxy-3-isobutylpyrazine). Further application and development of methods will be determined following completion of descriptive analysis in Objective 1.

Objective 3 Relate viticultural and enological parameters to the aroma profiles and to the intensity of vegetative character.

Dr. Nick Dokoozlian has visited Cabernet Sauvignon vineyards in the central valley and in the Napa area which are reported by the winemakers to produce wines with characteristic vegetal aromas. Observations of foliage, fruit exposure, and light measurements have been made and compared to nearby vineyards that do not produce vegetal wines. In some cases, fruit exposure (i.e., sun exposure) appears to be an important variable, however, in other cases the differences are not readily apparent using these initial measurements and observations. These initial findings have made it clear that the effects of vineyard variables are not clear cut and will require further study. In the upcoming year Dr. Dokoozlian will work with Dr. Block on his ongoing viticultural experiments to characterize those vineyards/vines that yield wines with vegetal characters as determined by the descriptive analyses. Evaluation of characteristics of these vines and the corresponding wines using methods such as decision tree analysis will help us to better elucidate variables that we will then further explore in more controlled viticultural trials.

Outside Presentations of Research:

None

Research Success Statements:

This research is still in preliminary stages. When completed this work will provide an improved understanding of vegetative aromas in Cabernet Sauvignon wines, including a qualitative and quantitative assessment of the sensory perception of vegetative aromas, identification of chemical components which may contribute to vegetative aromas, and a characterization of viticultural and/or enological parameters which can influence development of vegetative aromas in grapes and wines.

Funds Status:

Funds will be expended by the end of the fiscal year.