Visit by flavourist expert – Leslie Norris: for research collaboration and training in flavour additive technology



FINAL REPORT to

GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

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Principal Investigator: **Dr Sue Bastian**

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1. **Abstract:**

This project sought to enable Ms Leslie Norris, an internationally renowned flavourist from California-based company FlavorSense America, to visit and participate in the GWRDC-funded PhD project of Yaelle Saltman, at the University of Adelaide. Leslie visited between the 20th and 30th of November 2012, during which time the following project objectives were achieved:

- Ms Norris trained Yaelle Saltman in optimising the addition of flavourings to base wines during bench top trials undertaken to create prototype wines for focus group tastings.
- Ms Norris, a qualified moderator, helped design and moderated one of four consumer focus group tastings conducted to ascertain the acceptability and perceived quality of prototype wines.
- Ms Norris gave a presentation titled *Problem-Solving Using Flavor Chemistry. An Interactive Discussion of Industrial Problems and Their Solutions* to research staff and students from the School of Agriculture, Food and Wine and co-located partners.
- Ms Norris also presented a *'Think Tank": future applications of sensory/flavour research* workshop at the Jacobs Creek Visitor Centre in the Barossa Valley, which was attended by several industry partners, the GWRDC and researchers from the University of Adelaide's Wine Science and Business group.

2. **Executive Summary:**

Due to the unique nature of this project, and the general lack of experienced professionals in this field in Australia, our research team sought to collaborate with a specialist in the flavouring field, i.e. Ms Leslie Norris. To the best of our knowledge, this is the first project to investigate the addition of flavourings to wine for the purpose of improving quality; it was therefore very important to introduce specialised flavourist expertise to the project. Ms Leslie Norris has extensive experience working with flavourings, experience in novel product development and a background in wine production, having completed a 7 year 'flavour scientist' apprenticeship with McCormick and Co., and then working at E. & J. Gallo winery as the Director of flavour and sensory studies, prior to launching FlavorSense America.

This grant supported the costs associated with Ms Leslie Norris's two week visit to the University of Adelaide. During her stay, Leslie taught GWRDC-funded PhD student Yaelle Saltman the fundamentals of flavourings and helped to optimise the addition of flavourings to several base wines. Flavour mixtures are difficult to apply and require delicate handling due to underlying suppression reactions. Leslie's prior knowledge and involvement in this field considerably reduced the time required to develop the prototype wines for Yaelle's project. This enabled a series of focus groups to be undertaken during Leslie's visit: two focus groups featuring flavoured white wines and two focus groups featuring flavoured red wines. Leslie assisted in the organisation and execution of the focus groups and acted as a moderator for one session.

In summary, Leslie's visit allowed her to directly share knowledge and expertise in flavouring wines with the UA based research team; specifically, sourcing and combining different flavours and their successful addition to wine.

3. **Background:**

Food additives are substances which can be added to foods and beverages to enhance or preserve aroma, flavour, taste, texture and/or appearance. Current legislation does not permit the use of food additives in wine production, which therefore presents a clear knowledge gap and several interesting research questions regarding the capacity of food additives to enhance wine aroma and flavour, and therefore quality, as well as consumer acceptability of additives, including flavourings, in wine.

Wine comprises hundreds of volatile and non-volatile compounds which determine both sensory properties and quality. The interactions between wine constituents, in particular aroma/flavour volatiles are extremely complex and the addition of flavourings to wine may result in additive, synergistic or suppressive effects. As such, guidance and input from an expert flavourist, with specific knowledge of wine, was sought to provide knowledge and expertise in the use of flavourings in wines.

4. **Project Aims and Performance Targets:**

The project's direct objectives comprised:

- for Ms Norris to train Yaelle Saltman in optimising the flavourings to be added to base wines (i.e. during bench-top tastings to develop 'prototype' wines);
- for Ms Norris to attend consumer focus group tastings which will be used to ascertain the acceptability and perceived quality of 'prototype' wines;
- for Ms Norris to present a seminar on the use of flavour additives in food and beverages to the entire School of Agriculture, Food and Wine, so as to facilitate opportunities for further networking with academic and researchers in the School.
- for Ms Norris to meet with the industry partners who have donated wines to the project, to provide them with insight into the practices of novel products in the American wine industry and share some of her knowledge on the importance of flavour addition in food products for improving quality.

5. **Method:**

- **Training:** for the duration of her visit, Ms Norris worked with Yaelle in the sensory laboratory training Yaelle in the techniques involved in flavouring wines. Ms Norris explained the roles of different flavours and possible matchings of flavourings with base wines according to each wine's individual characteristics. For example, the addition of certain flavourings to a specific wine might result in the enhancement of key aroma attributes, whereas adding a different set of flavour compounds might also result in modification of mouthfeel characteristics. In addition Leslie explained how flavourings should be stored, their shelf life, usage in different food products and potential benefits for the wine industry.

- **Consumer focus groups:** for the focus groups, Ms Norris spent an extensive period of time working with Yaelle to optimise the prototype wines to be evaluated by wine consumers during the focus group sessions. Ms Norris also designed the structure, guidelines and ballots used during the focus groups and finally, being a qualified moderator in the US, she also conducted one of the four focus groups and assisted with the preparation of the other focus groups, which were moderated by Dr Sue Bastian and Yaelle Saltman. The results obtained from the focus groups will inform subsequent experiments, to include descriptive analysis and consumer acceptability trials.

- **Presentation/workshop**: Ms Norris gave a presentation titled *Problem-Solving Using Flavor Chemistry* to the School of Agriculture, Food and Wine and co-located partners from AWRI, SARDI and FoodSA.

  Finally, Ms Norris held a 'Think tank' workshop at the Jacobs Creek Visitors Centre in the Barossa Valley. The workshop was attended by industry partners from Treasury Wine Estate (Wolf Blass) and Pernod Ricard (Jacobs Creek), i.e. the companies who donated wines to Yaelle's project, as well as representatives from the GWRDC, and sensory/flavour chemistry researchers from the University of Adelaide and UniSA. The think tank was designed to stimulate discussion regarding innovation in the food and beverage industries, and the importance of consumer acceptability. The ideas, exercises and general discussion on innovation were then related back to Yaelle's PhD project via a short presentation given by Yaelle.

6. **Results/Discussion:**

Yaelle Saltman's PhD project involves an investigation into the use of flavour additives to improve wine quality and therefore represents a novel avenue of research. As far as our knowledge goes there is no published work in this field and so to ensure the success of the project, the research team sought to collaborate with an experienced flavour scientist, with wine experience. Ms Norris agreed to spend time on this project without being payed for her consultation because she strongly believes that flavours could play an important role in improving wine quality by providing additional tools for winemakers to mange wine composition. According to Leslie, the flavour industry has over 2000 flavours that could be used to improve wine quality, based on her experience in the food industry.

Training: to date there is no published work on the addition of flavours to natural wines and so, prior to Leslie's arrival, Yaelle spent many weeks in the sensory lab trying to optimise the addition of flavourings to her base wines. This visit allowed Leslie to provide invaluable hands-on training to Yaelle, to improve her ability to use flavourings to modify wine composition, to optimise their quality. Leslie explained and demonstrated different outcomes of flavour additions, e.g. the interactions that can occur following the combination of two or more flavours in a base wine. This

knowledge transfer allows Yaelle to more confidently progress her project and will considerably reduce the time required to develop new products.

Consumer focus groups:

Four prototype wines were developed by adding one or more flavours to base wines (two Chardonnay and two Shiraz). The role of these flavourings was: to enhance aroma intensity; to reduce unfavourable aroma attributes present in the base wines (e.g. green notes); or to improve mouthfeel. The prototype wines were subsequently evaluated by wine consumers in a series of focus groups. The data collected from the focus groups is still being analysed, but preliminary findings indicated that in a blind tasting, consumers preferred the flavoured wines over the base wines. In general, most consumers found the flavoured wines to be more complex, to have a pleasant mouthfeel, uplifting nose, and to be less bitter. When asked if they would consider purchasing/drinking wines with added natural flavours the majority of consumers, (in particular consumers younger than 35) indicated they would drink/buy such wines provided "they tasted better". Consumers were informed of the difference between a "natural" wine and a wine product and the moderator made sure that consumers responded to questions in relation to "natural" wines rather than wine products which are often targeted to a very specific population rather than the general wine drinking population. Data generated during the focus groups will inform the next stages of Yaelle's research, which are intended to involve descriptive sensory analysis of flavoured wines.

Presentations: In addition to the benefits for the Yaelle's PhD project, the School of Agriculture, Food and Wine have also benefited from Leslie's visit. Research staff were able to meet with Leslie to discuss opportunities for developing collaborative relationships. During her visit, Leslie presented a seminar to the School on the use of flavourings in food and beverage production, and she set aside time to meet with staff and students sharing similar research interests.

7. **Outcome/Conclusion:**

Yaelle Saltman directly benefitted from the ability to work intensively with Leslie for two weeks; this experience enabled her to gain new knowledge and skills in flavour development and to foster ideas and practices for her project. The experience

gained adding flavourings to wines, together with the data generated from the focus groups, will allow her to optimise the prototype wines in preparation for descriptive sensory analysis and consumer acceptability trials. Yaelle also hopes to present her research findings and the knowledge gained from Leslie to prepare a workshop for the upcoming Australian Wine Industry Technical Conference, to enable her to disseminate her work to a broader industry audience.

8. **Recommendations:**

Collaboration with Ms Norris, a professional flavourist based in America, has provided insight into flavour innovations used in the food industry and research and development underway overseas. Ms Norris had a very positive impact on the direction and progress of Yaelle Saltman's PhD project. As such, we highly recommend continuation of this collaboration, as well as interactions with other flavour industry professionals outside the wine industry (e.g. within the food and/or beverage industries), so that new knowledge based on the procedures, innovations, ideas and experiences from other industries and wine-producing countries can be utilised in our pursuit of the development of new products to benefit the Australian wine industry.