



“The effects of ethanol and glycerol on the body and other sensory characteristics of Riesling wines”

By: R. Gawel, S. Van Sluyter, and E. Waters

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This is a tricky one because the authors not only try to reach some agreement on what we mean when we talk about a wine’s “body” (what attribute is really missing when a wine is not full-bodied?), but they also take on the challenging task of differentiating between “body” and “viscosity”.

- The goal of the paper is to assess how ethanol and glycerol affect the body, sweetness, aroma, and flavor of white wines. To do that, the authors manipulate wines to end up with 3 realistic concentrations of glycerol (5.2, 7.2 and 10.2 g/l) and 3 realistic concentrations of ethanol (11.6, 12.6 and 13.6 % v/v), for a total of 9 wine combinations. Then, they have a panel of trained judges taste the resultant wines, using descriptive analysis, to find out how the added glycerol and ethanol -by themselves or interacting with each other - change their perception of each wine.
- The authors devote the entire Materials & Methods to describing the sensory panel training and their final tasting. 1) **Descriptive analysis.** Briefly, the 12 training sessions concentrated on arriving at a broad definition of wine body and a definition of the attributes contributing to body, as well as on selecting and refining an appropriate scale. During the formal tasting, 9 combinations (3 ethanol x 3 glycerol) of each of 3 Australian Rieslings (A, B, C) were tasted in triplicate (81 samples tasted by each of the 10 judges). In each session, all 9 treatments for each wine were randomly presented. Seven attributes were evaluated: aroma, body and acidity were evaluated first, using a 9 point-scale with word anchors applied to the odd-numbered categories. Then, the wines were re-tasted and viscosity, hotness, flavor, and sweetness were evaluated on a different sheet using the same scale.



- 2) **Directional difference test.** To enable a more direct assessment of the effect of increased alcohol and glycerol, in addition to the above descriptive analysis, the panel also performed pair-wise comparisons between the base wine and the base wine+(ethanol or glycerol). In this instance, each judge was presented with 6 randomized pairs, along with two questions: *Which wine in the pair is fullest in body?* and *How confident are you of your answer?*. The answer to the last question could range from 1 (“not at all confident”) to 5 (“with a very high degree of confidence”). A definition of fullness/body was intentionally not provided.
- **Effect of alcohol.** Increased alcohol levels resulted in increased perceived hotness in all wines, and in higher perceived body and higher perceived viscosity in two of the three wines. Interestingly, alcohol addition did not increase sweetness (as previously reported), neither did it have a consistent effect on acidity, aroma, or flavor.

- **Effect of glycerol.** The effect of glycerol was less consistent, and highly wine-dependent. Higher glycerol increased perceived body in only two of the wines (and one of them, wine A, only at the highest glycerol level). A similar pattern was true for perceived viscosity, even though this time the wine (wine B) was perceived as different only when glycerol was added at its maximum level. Glycerol did not have a clear effect on hotness, even though when alcohol was low, added glycerol caused the low-alcohol wine to be perceived as even less alcoholic. Similar to alcohol, glycerol did not affect sweetness, aroma or flavor.

- **Judge's interpretation of "body".** The authors attempted to understand how each judge interpreted "body" by looking at the relationships between the intensities of the different attributes they judged. For 5 of the 10 judges, viscosity and flavor had a strong relationship with body. In general, acidity was inversely associated with body (even though for 2 of the judges it was the other way around, that is, they found more acidic wines to have more "body").

- If you are into sensory evaluation, you may want to read the full 2-page discussion of the authors, in which they cover items like:

- _ potential definitions for fullness, viscosity, density
- _ is "body" a concrete or an abstract attribute, singular or multidimensional in nature?
- _ does "body" include "flavor"?
- _ is sweetness influenced by our rating of "flavor" and of "viscosity"?
- _ may unexpected flavors contribute to a "lack of body" and expected flavors to more "body/fullness"?

In summary, adding *alcohol* had the effect of increasing hotness in the three Riesling wines tested, and it increased body and viscosity in two of the three wines. Adding *glycerol* had less consistent effects, increasing perceived body and viscosity in only one of the three wines. Neither alcohol nor glycerol had any consistent effect on sweetness, acidity, aroma or flavor. For most tasters, flavor and viscosity contribute to their interpretation of "body".

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