

Wine quality: conversion of grape components to wine aromas

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This presentation is a revision of our knowledge and understanding about the chemicals basic of wine aroma. One of the key points of the present knowledge is the surprising aroma-buffering effect played by ethanol and the major volatiles formed by fermentation. Such a system has the ability to suppress the effect of many odourants added to it, particularly of those with fruity characteristics. The ability of the different odour chemicals to break such a buffer, and hence transmit to the wine a different aroma nuance, is used as a classification criterion of wine odourants. To our knowledge, there are only sixteen aroma chemicals that at the concentration at which they can be naturally found in some wines, have the ability to break the buffer without the support of additional odourants. Those aroma chemicals in some wines can play a genuine role as aroma impact compounds. A second way to break the buffer is by means of the concerted action of a group of molecules sharing chemical and odour properties, and at least ten families of this type are described. The third way to break the buffer is by the concerted action of many chemicals sharing some similarity in any of their generic aroma descriptors. Of course, the buffer can be broken, but in a negative way, by many chemicals playing the role of off-flavours whose nature and role are briefly discussed. Bad aroma compounds are those that induce the suppression of a positive aroma nuance, which can take place at concentration below the recognition threshold.

The way in which the buffer is broken in a given wine: by means of more or less impact compounds or families, or by means of large numbers of subtle compounds, determines the complexity and aroma characteristics of the wine. Simple wines most usually have a single impact compound determining the aroma properties. Some more complex wines can have several of them. Still more complexity is found in some wines in which there are not impact compounds but in which the different sensory notes are the concerted action of different groups of molecules. Some of the most relevant associations between wine aroma chemicals to form important aroma nuances of some wines, such as floral notes of some whites or different fruity notes of red wines have been presented.

The aroma of wine is not static, rather it can be considered as a “living system” in which aroma precursors act as “pumps”, delivering a continuous flow of odor chemicals until its exhaustion. The grape plays an outstanding role in such living system by conditioning yeasts by-products, direct delivering of odor chemicals and delivering the pool of precursors.