EFFECT OF CARBOXYMETHYL CELLULOSE ON TARTRATE SALT, PROTEIN AND COLOR STABILITY OF RED WINE

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Introduction
Since the 80ies, the long-lasting effect of carboxymethyl-cellulose (CMC) for tartrate stabilization of white wines is known. However, in red wine-making the efficiency is discussed controversially. Here, CMC is often considered to be ineffective, and frequently haze formation occurs, caused by the interaction of proteins and polyphenols. In addition, wine color can be affected. In order to explain these effects, we studied in detail the impact of CMC on haze formation and color stability in red wine. The haze-forming material was analyzed by sodium dodecyl-sulfate polyacrylamide electrophoresis and the protein composition by high-performance liquid chromatography-mass spectrometry. Color alteration was documented by Vis-spectroscopy. The nature of several proteins which have been identified susceptible for precipitation allows conclusions about the influence of the microbiota and the immune defense of the grapes.

Results and discussion
The haze formation coincided with a high-color density and protein instability of the wine. The insoluble fraction contained pathogenesis-related or late vintage wine proteins. Carboxymethyl cellulose is of value for tartrate salt stabilization in red wine. Occasionally, it promotes development of protein haze and color loss. At a first glance, this behavior appears to limit the oenological suitability of CMC, but it might also be considered as a new tool to remove unstable wine proteins.

Impact of CMC on turbidity, color loss and crystal stability
In the test, red wines could be stabilized by applying CMC at very high saturation temperatures and conductivity differences [1]. The dosage was dependent on the crystal instability of the investigated wine. Crystal stability was not always achieved immediately after the CMC application. High saturation temperatures along with low conductivity differences were observed (cf. tab. 1; [1]). Three out of ten investigated wines show significant haze formation after applying CMC. Untreated wines with high turbidity values show intensified haze formation when CMC was applied. CMC treatment of wines which were protein instable leads to increased turbidity.

Reference