

Abstract

Monitoring and determination of glutathione content and thiol precursors in grape and wine is an important aspect of viticulture and winemaking, but appropriate analytical methods have to be developed for the purpose. For the quality, flavor and stability of certain white wines, for example Sauvignon Blanc, the most important contribution is from thiols, released from the thiol precursors, as well as glutathione. Glutathione is an important antioxidant that preserves the flavor components of wine and extends the quality and longevity of white wines.

My research work consisted of two parts, the development of method for the determination of glutathione and the development of method for the determination of thiol precursors in grape and wine. To analyse the glutathione content, I've developed a new sample preparation for grape and wine, followed by the analysis with pre-column derivatization and high-performance liquid chromatography with fluorescence detection (HPLC-FLD). For the inactivation of the polyphenol oxidase enzymes and to prevent the loss of glutathione, I've used ice-cold deoxygenated methanol. According to the validation data, the method is appropriate for the determination of glutathione content in grape juice and wine.

In the second part, we have developed a method for the determination of thiol precursors using ultra high-performance liquid chromatography with tandem mass spectrometry (UHPLC-MS/MS), deuterated internal standards and the preparation of grape samples with solid phase extraction (SPE) and cation exchange sorbent. Since the analytical and deuterated internal standards of thiol precursors are not commercially available, an important part of the development represented their synthesis. According to the validation data, the method is appropriate for the determination of thiol precursors in grape. We used the method to analyse the thiol precursors in different Sauvignon Blanc grapes.