

Analysis of Wine Vinegars by TXRF

*Martina Schmeling and Barbara Folga
Loyola University Chicago, Chicago, IL 60660, USA*

Vinegar has been used since ancient times for seasoning, preservation of food and as a therapeutic. Its production process followed closely to the wine production and has been mentioned in Egypt already in 8000BC. Until recently vinegar was considered as a side product of wine production, but that has been changed as the quality of vinegar improved. The production of vinegar is a two-step fermentation process starting with the conversion of sugars into alcohol by yeast and followed by the oxidation of alcohol to acetic acid by aerobic bacteria. Two methods are employed for this: the traditional process, which utilizes the oxidation at the interface of liquid and air in wooden barrels and wood chips and the submerge method in which bacteria are added to stainless steel drums and agitated vigorously to speed up the oxidation. The traditional process is slow, but yields a much higher quality product.

Vinegar can be made not only from wine, but also from fruits such as apples, and rice. In contrast to wine and fruit vinegar, which either use wine or fruits as the starting material, balsamic vinegar is made from cooked must. Two types of balsamic vinegar are recognized as original: Balsamic Vinegar of Modena and Traditional Balsamic Vinegar of Modena and Reggio Emilia. Both require cooked must of grapes originating from the Emilia Romagna region. Traditional Balsamic Vinegar follows a tightly regulated procedure, is highly priced and is considered as a condiment. It takes at least 12 years of aging to obtain traditional balsamic vinegar. Balsamic Vinegar of Modena is a vinegar and has more loose guidelines for production. The production is much faster and it can be sold after only 60 days of aging.

Little is known of how the trace element content varies between the different wine vinegars and whether it can be used as a means to pinpoint the origin of a product. Hence the aim of our study is to develop a sample preparation and analysis method to determine trace element content in wine vinegar by utilizing TXRF as analytical method. For this we will examine different types and origins of wine vinegar including regular wine vinegar and balsamic vinegar. It is expected that the balsamic type will demand a more complex sample preparation procedure due to its much higher sugar content than wine vinegar and will also contain higher concentrations and more trace elements as a result of the extended aging process in wooden barrels.