SOFT 2022
Abstract Submission Form

Due by June 10, 2021

*****Do not exceed 600 words including tables and charts.*****

TITLE: ***Assessment of Commercially Available Devices for the Removal of Histamine from Red and White Wines.***

AUTHOR(S) AND AFFILIATION(S): Judith Rodriguez Salas*[1], *Francis X. Diamond[1], Barry K. Logan[1].*
[1]Center for Forensic Science Research and Education (CFSRE) at the Fredric Rieders Family Foundation, Willow Grove PA 19090

ABSTRACT: *Structure the abstract using the following headers.*
Current Word Count: 597 word

Background/Introduction: Wine has been produced for thousands of years and it is one of the most commonly consumed alcoholic beverages around the globe. Histamine is produced in wine during fermentation, as naturally occurring histidine from the grapes is decarboxylated to histamine. In spite of its popularity, there is a portion of the population who do not tolerate histamine well and may encounter unpleasant side effects such as itchy watery eyes, rhinorrhea, headaches and flushing. There are many commercially available products claiming to remove the histamine while preserving the quality of the beverage taste and aroma. Directions are generally to swirl the device in a glass of wine or pour the wine through a pour spout to remove the histamine.

Objectives: The objective of this project was to optimize and validate a previously published quantitative method for the analysis of histamine in red and white wines after treatment with devices that claimed to remove the histamine. Analysis was performed by liquid chromatograph tandem mass spectrometer (LC-MS/MS) with a Hydrophilic Interaction Chromatography (HILIC) column well suited to the analysis of highly polar analytes. A selection of wines was tested before and after using a variety of commercially available histamine removal products to evaluate their claims of being able to remove up to 90% of histamine in wine.

Methods: Sample preparation consisted of simple dilution of aliquots of store-bought wines. Samples were filtered by passing them through a 0.2 µm nylon filter using a 1 mL luer-lock syringe to apply pressure. Wine was filtered and a 100 µL was aliquoted and diluted in 1000 µL of mobile phase (MPA:MPB 60:40 with mobile phase A 0.1% formic acid in water and B 0.1% formic acid in acetonitrile). 50 µL of a deuterated internal standard, histamine-D4, was added to all the samples at a concentration of 1 ng/µL prepared in 0.1% HCl. A seven-point calibration curve from 5 - 2000 ng/mL was prepared using histamine-

free red grape juice (RGJ) and white grape juice (WGJ) as matrix surrogate. A fit-for-purpose validation for this application was designed using portions of the ANSI/American Standards Board (ASB) Standard 036, consisting of assessment of calibration model, bias and precision, limit of detection (LOD), limit of quantitation (LOQ), carryover, internal standard interference, ion suppression/enhancement and commonly encountered interferences in wine.
Analysis was conducted on an Agilent 1200 High Performance Liquid Chromatograph coupled to an Agilent 6430 Triple Quadrupole Mass Spectrometer (LC-MSMS). The mode selected for liquid chromatography was HILIC. The mass spectrometer was operated in positive ion electrospray using MRM. Quantitation was achieved using a Cogent Diamond Hydride 100A (4 µm 150 x 2.1mm) analytical column at a temperature of 40°C. A total of three red wines, and three white wines will be analyzed using different commercially available histamine removal devices placed in 200 mL of the wine for 3, 5 or 30 minutes.

Results: All validation requirements were met. The LOD and LOQ were determined to be 5 ng/mL.
The histamine content of the untreated red wines was between 3300 ng/mL and 4600 ng/mL. Preliminary results using one of the testing devices, that was placed in the wine for 5 or 30 minutes, has shown that at 5 minutes, there was a minimal reduction of histamine (<1%), and after 30 minutes between 8 and 10% of the histamine had been removed.

Conclusion/Discussion Histamine in wine is well-documented to have an adverse effect on individuals with histamine intolerance. The commercial products evaluated in this assessment only had a minimal impact on the removal of histamine and are unlikely to counteract the adverse effects in histamine sensitive individuals. Testing of other devices is ongoing.