Characterization of Airborne Diacetyl Concentrations Associated with Consuming Different Types of Wine


Abstract: Diacetyl occurs naturally in a variety of beverages, including tea, coffee, beer, wine, milk and citrus juices. Since 2002, airborne exposures to diacetyl have been suspected as being the cause of lung damage in some food and flavoring manufacturing workers. Despite the presence of diacetyl in numerous consumer goods, there is a paucity of literature describing airborne diacetyl concentrations associated with the consumption or use of diacetyl-containing products. An exposure simulation study was conducted to characterize potential inhalation exposures to diacetyl as a result of wine consumption. Air samples were collected on the lapels of subjects during the consumption of four different types of wine (i.e., varietals). Additional samples were collected approximately two inches from the liquid surface (referred to herein as the headspace) while the glass was swirled. These samples were intended to characterize orthonasal olfaction, which occurs before putting food into the mouth. Samples were analyzed for the presence and concentration of diacetyl using the OSHA 1012 method. Diacetyl was detected in the headspace samples of two of the wines evaluated, a Cabernet and a Porto, at concentrations of 17 ppb and 7 ppb, respectively. Diacetyl was not detected in the headspace of the other two varietals (Chardonnay and Shiraz) and was not detected in any of the personal samples (limits of detection ranged from 1.5 ppb to 1.6 ppb). The detected diacetyl concentrations exceeded the National Institute for Occupational и Health’s (NIOSH) proposed Recommended Exposure Limit for diacetyl of 5 ppb and approached the proposed Short-Term Exposure Limit of 25 ppb. These findings indicate that the proposed NIOSH diacetyl standards are similar to, and may be lower than, the airborne diacetyl levels associated with many common food products.