



Diacetyl Analysis Solutions

GC-MS Analysis of Vicinal Diketones (VDK's) in Beer, Wine & Spirits



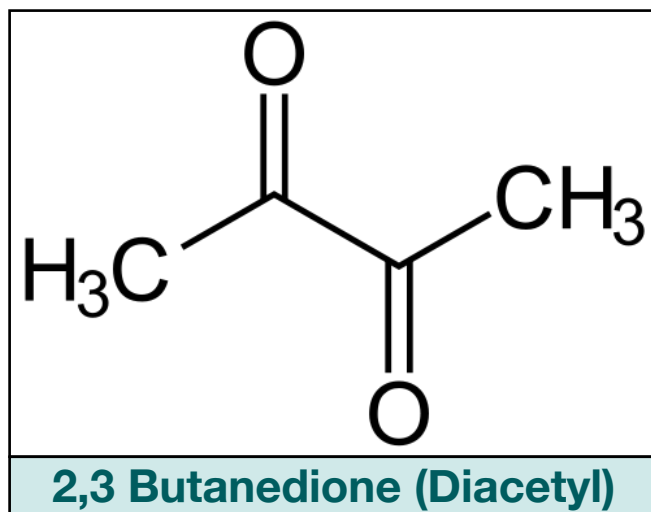
The Problem

Vicinal diketones (VDK) are naturally produced compounds in the fermentation process. The monitoring of VDK levels is of great importance as the concentration of these compounds can greatly alter the flavour of a beverage. VDK's produce a butter like flavour in the beverage so are undesirable in lighter beers that want a clean crisp taste, but are actually wanted at higher levels in wines to give a smoother taste and feel. The most commonly monitored VDKs are 2,3-butanedione also known as Diacetyl and 2,3-pentanedione also known as Acetyl Propionyl. VDK's are typically found in the 0-100ppb range in beers, and can be anywhere from 100 to 5000ppb in wine.

Analysis

Ellutia can offer a Headspace Gas Chromatography (HS-GC) system to perform the analysis of VDK's down to the desired levels. The system comprises of an Ellutia 200 series GC fitted with an Electron Capture Detector (ECD) a headspace autosampler such as the Ellutia EL2100H.

Before any analysis can take place the sample must first be degassed, the simplest way to achieve this is repeatedly pass the sample between two beakers until the sample stops foaming. This is to help prevent pressure forming when the sample is heated in the headspace vial and from the CO₂ eluting during the chromatography. Once degassed 2ml of the sample is then placed into 20ml headspace vial which is then purged with nitrogen. This is to help prevent oxygen in the air interfering with the chromatography. The samples can then be run using the conditions below.



Headspace Conditions

Incubation Temp	60°C
Incubation Time	15:00
Agitation Speed	750rpm
Agitation on Time	10 seconds
Agitation off Time	1 second
Syringe Temp	80 °C
Sample Volume	1ml

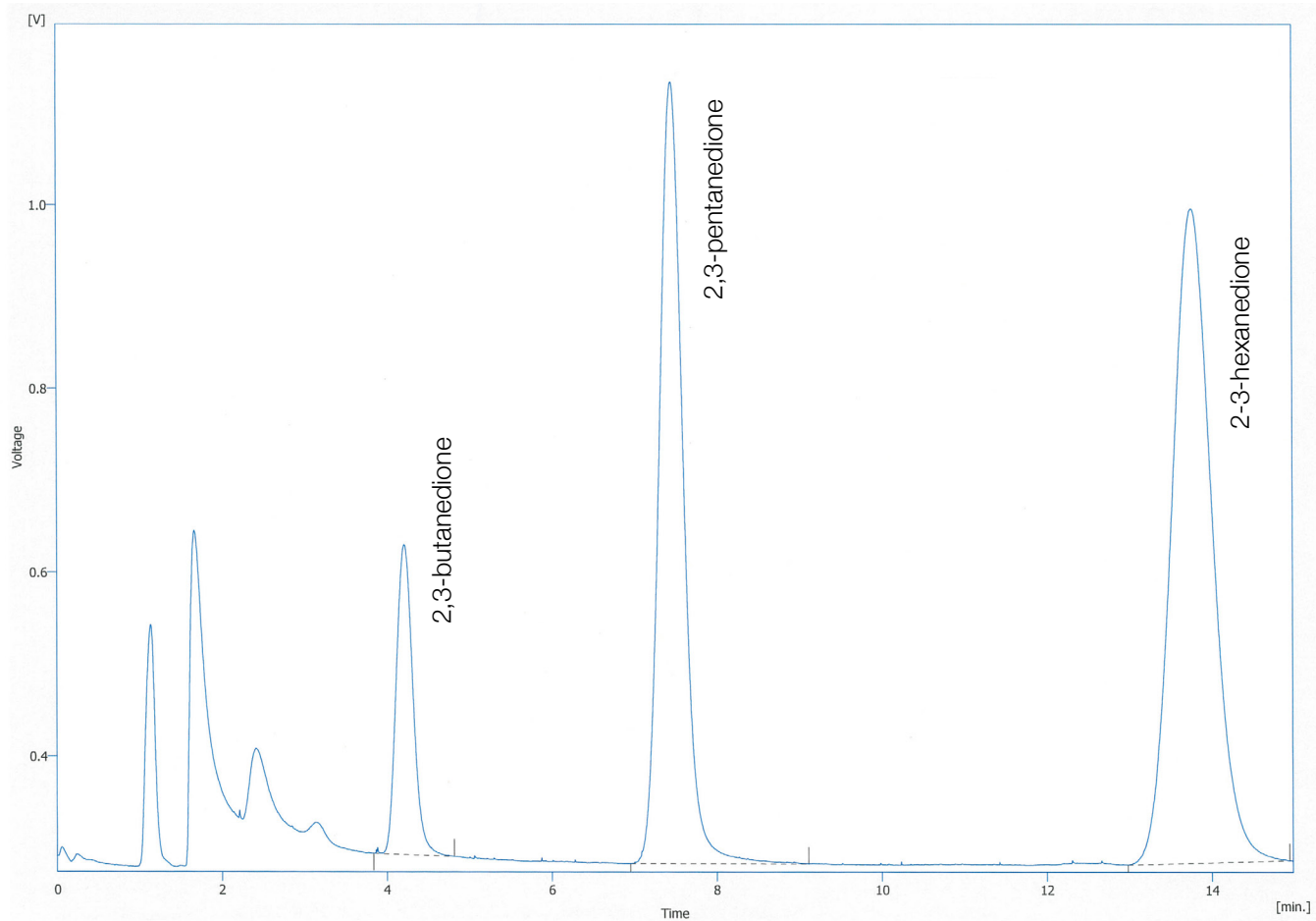
GC Conditions

Injector Mode	Split
Injector Temp	160°C
Split Flow	6ml/min
Column Details	1.5m Glass Pack Column, 2mm I.D 80/20 Carbopack BAW 5% Carbowax 20M
Column Pressure	12 psi
Column Oven	Isothermal 135°C
Detector Temperature	200°C
Detector Current	10

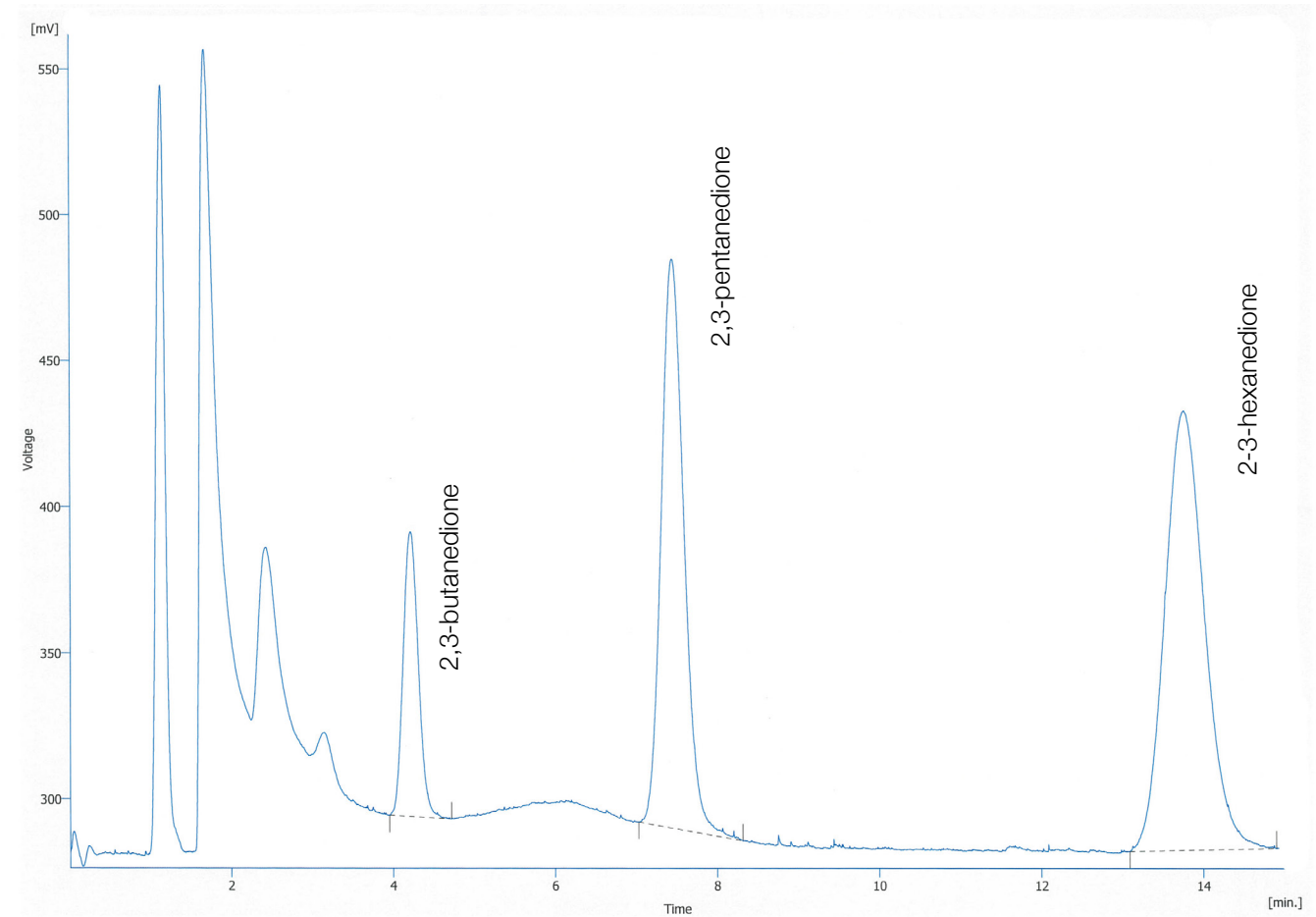


Results

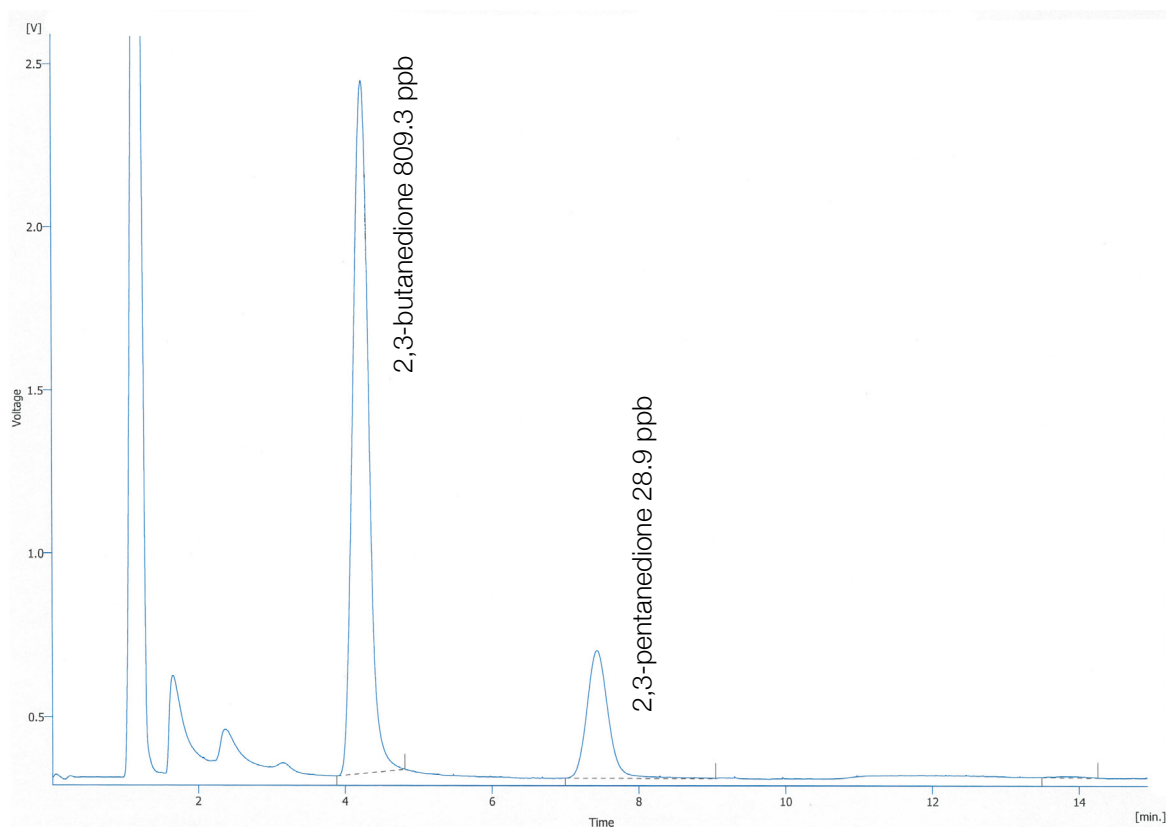
Standard VDK mix at 100 ppb



Standard VDK mix at 25 ppb



Red Wine Sample



British Pale Ale Sample

