

Coffee Volatile Profiles Using Dynamic Headspace

Application Note

Food and Flavor

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Organoleptic (perceived by a sense organ) properties of food products effect our perception of taste and smell, as well as how palatable a product will be to the consumer. It is apparent that these properties in many food and food products depend upon volatile organic compounds present in the product and evolved during preparation.

Dynamic headspace is a technique in which volatiles are purged from a sample, usually using helium or nitrogen as a carrier. The volatiles are purged either at ambient temperature or sometimes elevated temperatures. The volatiles are collected onto a trap which typically consists of polymeric material like Tenax or a multibed trap consisting of specially treated carbons. The samples are then thermally desorbed onto a focusing trap which in turn is thermally desorbed on to a GC or GC/MS.

Two samples of coffee, consisting of a ground and a perked liquid sample, were individually placed into an 800 ml dynamic headspace vessel. The vessel was sealed and a flow of helium was started. An exterior helium vent port containing a Tenax sampling tube collected volatiles from the ground coffee sample (25 ml volume) and the perked sample (25 ml). Each sample was purged for 30 minutes. The collection tubes were then thermally desorbed using the Dynatherm 9300 and a GC/MS. Clearly, the profiles of dry ground coffee compared to the volatiles of a "perked" sample are different. The large number of aldehyde compounds in the perked sample may be the enticer that stimulates the senses and makes one have to have another cup of "Java".

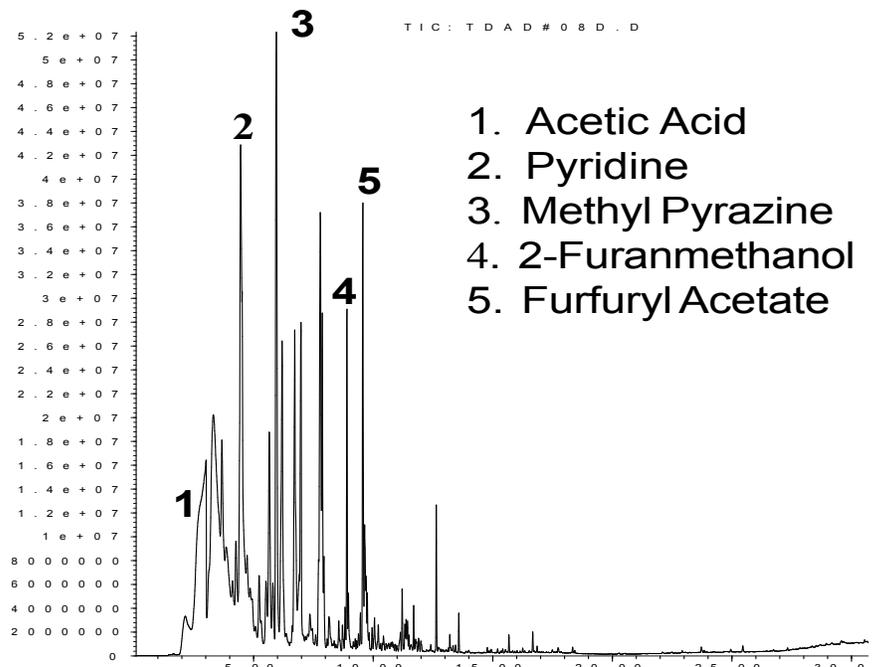


Figure 1. Volatiles of Ground Coffee

CDS 800mL DHS Vessel

Purge Flow: Helium, 50mL/min
Purge Time: 30 minutes

CDS Autosampler Dynatherm 9300

Valve Oven: 300°C
Transfer Line: 325°C
Tube Heat: 275°C 7 minutes
Trap Heat: 300°C 7 minutes

GC/MS

Column: HP-5MS
(30m x 0.25mm x .25µm)
Carrier: Helium, 50:1 split
Injector: 300°C
Program: 40°C/2min, 15°C/min to 300°C,

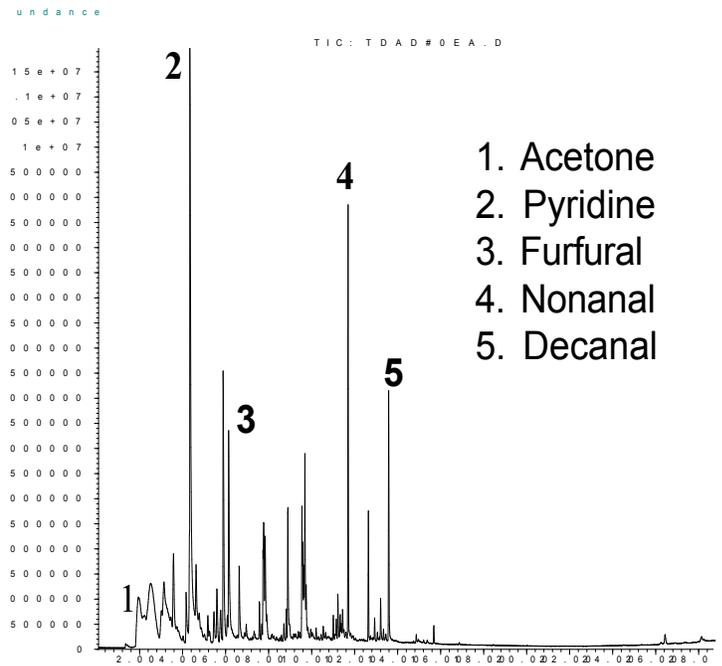


Figure 2. Volatiles of "Perked" Coffee