

Analysis of Ethanol and Isopropanol in Alcohol-based hand sanitizers by direct injection GC/FID



The GC columns used in this study are among the most popular columns used for analysis of alcohols. Both, the Agilent J&W DB-624 and DB-WAX Ultra Inert, meet column requirements for USP <611>^{1,2} and ASTM D3695 methods. In the first set of chromatograms, we see the composition of an IPA-based hand sanitizer prepared following new guidelines set up by the USFDA. For the first chromatogram, we used a DB-624 UI connected to a 1-m retention gap. This setup can help with neat injections of aqueous solution by focusing the water peak prior to reaching the analytical column. Both columns shows good separation and adequate symmetry for IPA at high concentrations. The complimentary selectivity between both phases is also noticeable, and the column choice will depend on user preference or the method of choice.

The chromatograms in Figure 2 are Ethanol-based hand sanitizers obtained using the same set of columns. Distilleries have begun to make Ethanol based hand sanitizers³. These products, in addition to Ethanol, contain fusel oils that are by products occurring naturally during the fermentation process. Fusel oils will often be present and may present themselves as unpleasant odors in the hand sanitizer. The presence of these alcohols are apparent with both, the DB-624 UI and DB-WAX UI chromatograms. DB-624 UI has the selectivity to fully resolve fusel oils if their analysis is required.

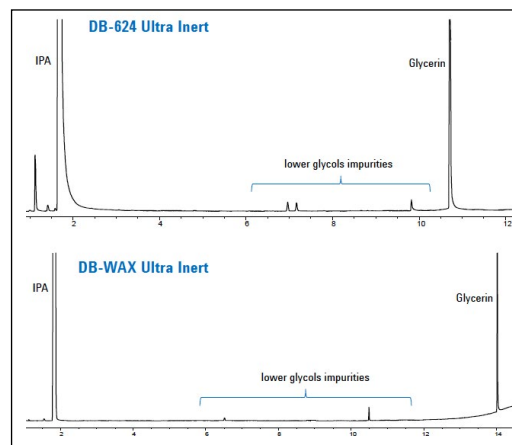


Figure 1. GC/FID chromatograms of an IPA-based hand sanitizer using a DB-624 UI, 30 m x 0.32 mm ID x 1.8 µm df (top) and DB-WAX UI, 30 m x 0.25 mm ID x 0.25 µm df (bottom)

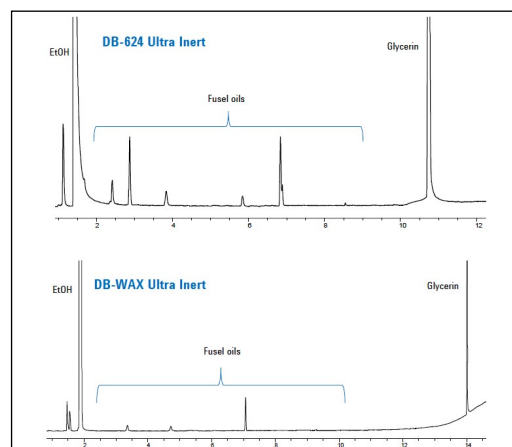
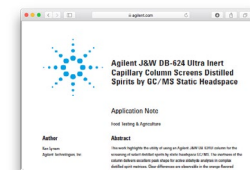
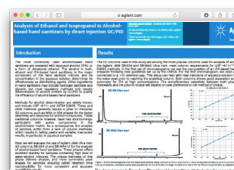


Figure 2. GC/FID chromatograms of an Ethanol hand sanitizer obtained from a distillery. The chromatograms were obtained using a DB-624 UI, 30 m x 0.32 mm ID x 1.8 µm df (top) and DB-WAX UI, 30 m x 0.25 mm ID x 0.25 µm df (bottom).

ANALYSIS OF ALCOHOL-BASED HAND SANITIZER ORDERING GUIDE	
PART NO	DESCRIPTION
INLET SUPPLIES	
5190-2295	Agilent Ultra Inert, flow pressure drop w/glass wool
5190-6144	Agilent Ultra Inert split/splitless inlet gold seals
5183-4759	Agilent Non-stick advanced green septa
G4513-80206	Agilent 5 µL syringe
NUTS AND FERRULES	
G3440-81011	Agilent Self tightening column nut, inlet detector
5062-3514	Agilent Graphite/Vespel ferrule, 0.5 mm, 10/pk
VIAL AND CAPS	
5182-0543	Agilent Clear with write-on spot
5182-0552	Agilent Silver aluminum crimp cap
RETENTION GAP AND SPLITTER SUPPLIES (FOR GC/FID/FID)	
160-2325-1	Agilent Deactivated fused silica, 1 m x 0.32 mm
G2855-20530	Agilent Internal nut, CFT capillary fitting
G3188-27501	Agilent Flexible metal ferrule, UltiMetal plus, 0.4 mm ID
G3188-27502	Agilent Flexible metal ferrule, UltiMetal plus, 0.32 mm ID
GC COLUMNS	
123-1334UI	Agilent J&W DB-624 Ultra Inert, 30 m x 0.32 mm, 1.8 µm
122-7032UI	Agilent J&W DB-WAX Ultra Inert, 30 m x 0.25 mm, 0.25 µm
FID SUPPLIES	
5200-0176	Agilent FID Jet, universal fit, 0.011" ID

1. Isopropyl Alcohol, Monograph US Pharmacopeia, 2020
2. USP <611> Alcohol Determination, Monograph US Pharmacopeia, 2020
3. Temporary policy for preparation of certain alcohol-based hand sanitizers products during the public health emergency, FDA



[www.chromtech.com/
customcontent/handsanitizer.pdf](http://www.chromtech.com/customcontent/handsanitizer.pdf)

Visit this link for Analysis of Alcohol-Based Hand Sanitizers

[www.chromtech.com/
customcontent/CT-5991-0659EN.pdf](http://www.chromtech.com/customcontent/CT-5991-0659EN.pdf)

Visit this link for Acetaldehyde application on the same DB-624UI Column