# Bio Fermented Alcohol Detection Utilizing Isocratic Cation Exchange HPLC with Hamilton's HC-75 Column

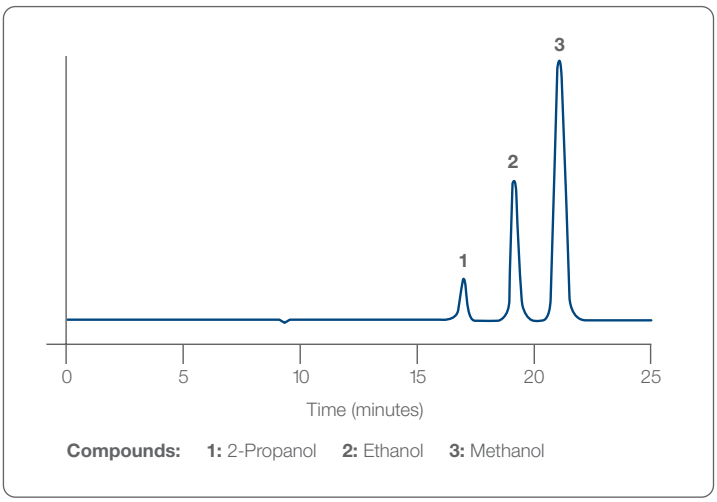
Concern over detrimental greenhouse gases produced from the combustion of fossil fuels has been growing for the past few decades. Identification of new and more diverse methods of energy use has been investigated around the world. One such avenue is combustible alcohols produced from biomasses like sugar beet or sugar cane. To reduce dependence on fossil fuels, a concerted effort has been made to develop processes where biomass can be fermented biologically by bacteria or yeast to produce combustible alcohols. Combustible alcohols are desired over other technologies due to the convenience of switching from petrol based fuels. Ethanol is already added to most gasolines to increase octane efficiency. With anywhere from 5–25% ethanol being added to petrol products in most of the world and up to 100% ethanol fuel in Brazil.[1] Additionally, the combustion of these alcohols tend to be more efficient and lead to less carbon monoxide side products.[2] Production of ethanol from biological sources produce side products, specifically propanol and methanol amongst other ketones, fatty acids, and esters. Due to azeotropic formation of ethanol with water it is difficult to distill pure 200 proof ethanol products. However, HPLC analysis provides a good platform for ethanol determination after biomass fermentation.[3] To aid the detection of ethanol purity, Hamilton has developed a method utilizing the HC-75 ($H^+$ Form) HPLC column, which provides good separation of the desired analytes. With ~8% crosslinking of the PS-DVB backbone the resulting porous gel stationary phase matrix allows for enhanced interactions between stationary phase and analyte. Detection was accomplished with refractive index, but other methods of detection can be applied (i.e. UV, or mass spectrometry).

## Column Information

| | |
|---|---|
| **Packing Material** | HC-75 ($H^+$ Form), 9 µm |
| **P/N** | 79544 |

## Chromatographic Conditions

| | |
|---|---|
| **Gradient** | Isocratic |
| **Temperature** | 80°C |
| **Injection Volume** | 10 µL |
| **Detection** | Refractive Index |
| **Dimensions** | 305 x 7.8 mm |
| **Eluent A** | 0.55 mM Succinic Acid |
| **Flow Rate** | 0.6 mL/min |





1) *E. Gnansounou, A. Dauriat, Ethanol fuel from biomass: A review. J. Sci. & Indust. Res. (64) 2005, 809–21.*

2) *S. Onuki, J. A. Koziel, W. S. Jenks, L. Cai, D. Grewell, J.H. van Leeuwen, Taking ethanol quality beyond fuel grade: A review. J. inst. Brew. (122) 2016, 588–98.*

3) *S.Y. Lee, R. Sankaran, K.W. Chew, et al. Waste to bioenergy: a review on the recent conversion technologies. BMC Energy. 1:4, 2019.*



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