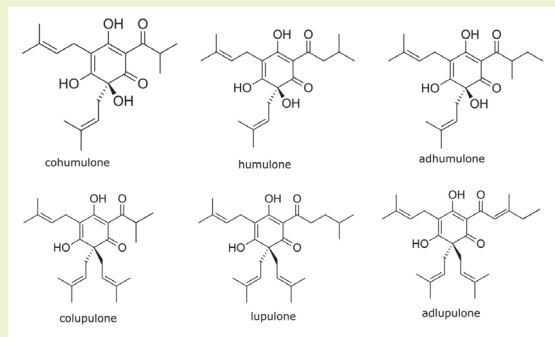
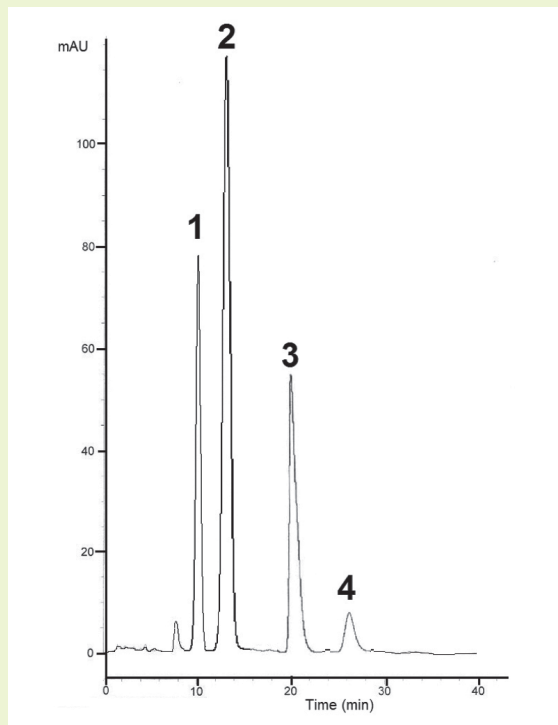


Analysis of Alpha and Beta-Acids in Hops

Robust, precise method for beer samples



Note: Hops contain substances that are described as alpha and beta-acids, which are used to impart bitter flavor and aroma to beer. The bitterness of beer depends mainly on the concentration of alpha acids in the hops, so it is important to be able to determine their composition. In addition bittering acids found in beer have positive effects on diabetes, forms of cancer, inflammation and weight loss.

Method Conditions

Column: Cogent Bidentate C18™, 4µm, 100Å

Catalog No.: 40018-75P

Dimensions: 4.6 x 75 mm

Mobile Phase: 80% A: DI H₂O / 0.1% formic acid
20% B: Methanol

Injection vol.: 5µL

Flow rate: 0.5 mL/min

Detection: UV 326 nm

Sample: International Calibration Extract 3 (ICE-3), containing 44.65% alpha acids (cohumulone - 13.88%, humulone/adhumulone - 30.76%) and 24.26% beta acids (colupulone - 13.44%, lupulone/adlupulone 10.84%), was obtained from the American Society of Brewing Chemists. The sample was prepared by dissolving 0.1482g of ICE-3 standard in 50.00 mL of the mobile phase. The solution was then filtered with a 0.45µm nylon syringe filter (MicroSolv Tech Corp.). Samples for calibration curves were prepared and diluted 1:20. Final concentrations were 0.005–0.05 mg/mL.

- Peaks:** 1. Cohumulone
2. Humulone/adhumulone
3. Colupulone
4. Lupulone/adlupulone

t₀: 1.5 min

Discussion

The effectiveness of the presented method is evident from the fact that data obtained were in a good agreement with the literature values. This method also has the added bonus of precision (%RSD = 0.1 and below), which is typical for Cogent Type-C Silica™ columns.

The constructed calibration curves for alpha and beta acids in beer showed good linearity ($R^2 = 0.9999$).