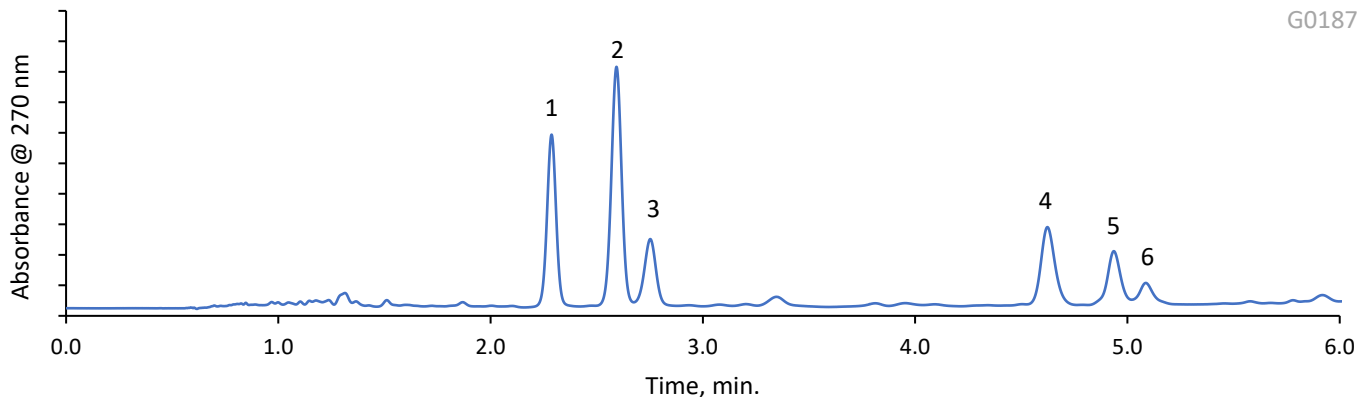


Separation of Hop Acids on HALO® 5 µm Biphenyl



TEST CONDITIONS:

Columns: HALO 90 Å Biphenyl, 5 µm, 4.6 x 150 mm

Part Number: 95814-711

Mobile Phase A: Water, 0.1% Formic acid

Mobile Phase B: Acetonitrile, 0.1% Formic acid

Gradient:

Time	% B
0.0	60
3.0	60
6.0	80

Flow Rate: 2.0 mL/min

Initial Pressure: 236 bar

Temperature: 30°C

Detection: 270 nm, PDA

Injection Volume: 5 µL

Sample Solvent: Acetonitrile

Data Rate: 100 Hz

Response Time: 0.025 sec.

Flow Cell: 1 µL

LC System: Shimadzu Nexera X2

PEAK IDENTITIES:

Alpha Acids

1. Cohumulone

2. Humulone

3. Adhumulone

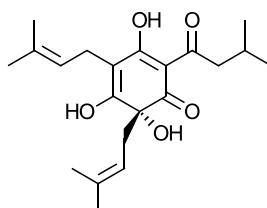
Beta Acids

4. Colupulone

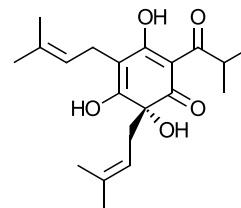
5. Lupulone

6. Adlupulone

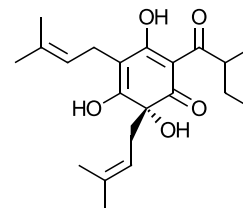
STRUCTURES:



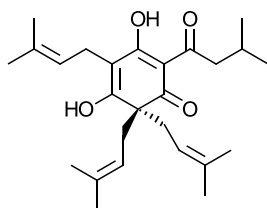
Cohumulone



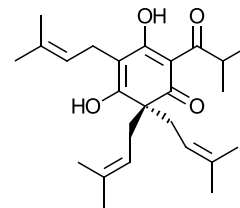
Humulone



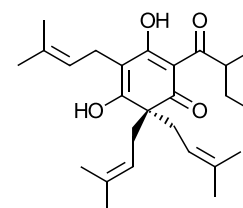
Adhumulone



Colupulone



Lupulone



Adlupulone

Hops are primarily made up of essential oils and alpha and beta acids. They have many benefits in the beer brewing process, including their antiseptic nature and bitterness flavor they give to the beer. Alpha and beta acids from the International Calibration Standard Extract (ICE-3) are separated on a HALO® Biphenyl column.