

Analysis of Chemical Flavourings in Chewing Gum

Technical Information

Session 1

- Impregnated filter papers with a selection of fragrant chemicals e.g. eucalyptus, orange oil, spearmint oil, citronella, tea tree and vanilla
- Chewing gum with R and S carvone spiked (so that 'problem' is detected)

Session 2

- 1 x chewing gum sticks – spiked with 50 mgcm⁻³ carvone
- Weighing boat
- Spatula
- Camphor
- Volumetric flasks of 1,5,10 and 50 ml - (students should use 5 or 10 ml)
- 2 x 1 ml plastic pipettes
- White tile
- Scalpel
- Heating Mantle
- Soxhlet
- Soxhlet Thimble
- Condenser
- 2 x 250 ml round bottomed flask
- 2 x rubber tubing
- 100 ml and 50 ml measuring cylinder
- 5 or 10 ml Hexane depending on chosen flask for internal standard
- 150 ml Methanol
- Clamp stand
- 2 x clamp and bosses
- Cork Ring
- Glass funnel
- Cotton Wool
- Filter paper
- Rotary Evaporators set at 40°C
- Molecule Kits
- Magnetic stirrer
- Antibumping granules

Session 3

- 2 x clamp stand
- 2x clamp and bosses
- Weighing boats
- 4 x 7 ml vial

- 5% ethyl acetate/hexane in a beaker
- 2 x Pasteur pipette containing cotton wool and silica
- Nitrogen blowdown apparatus
- 50 mg ml⁻¹ of carvone and camphor solution
- 3 x plastic pipettes
- Spatula
- Hexane for dilutions

Preparation for GC analysis

- Micro pipettes of 10 µl and 100 µl
- Vials
- 1 ml graduated pipette
- Pipette filler
- Hexane

Session 4

- Gas chromatography instrument both FID and MS
- Syringe
- Solvent to rinse syringe

Program Setting for Mix of menthol, citral, limonene and vanillin

Flavouring	Elution Order	Retention Time at 95 – 175 (10°C per min)
Menthol	2nd	4.5
Citral (sometimes 2 isomers)	3rd	5.2 and 5.6
Limonene	1st	3.1
Vanillin	4th	7.1

Chosen Setting

Start Temperature	105°C
Finish Temperature	175°C
Program	105 – 145 (10°C per min) 145 – 175 (20°C per min)

Program Setting for mix of carvone and camphor

Flavouring	Elution Order	Retention Time at 75 – 175 (10°C per min)
Carvone	2nd	9
Camphor	1st	7.7

Chosen Setting

Start Temperature	105°C
Finish Temperature	175°C
Program	105 – 145 (10°C per min) 145 – 175 (20°C per min)

Flavouring	Retention Time
Limonene	2.8
Camphor	3.7
Menthol	3.9
Citral	4.5
Carvone	4.7
Vanillin	4.9

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