# MENTHOL

# MODULE 1

# SUBSTANCE INFORMATION SHEET

# L-MENTHOL

| | |
|---|---|
| CAS number | 2216-51-5 and 89-78-1 |
| Natural Origin | Is a naturally occurring monocyclic terpene found in peppermint and other oils, or prepared synthetically. |
| Chemical Formula | C10-H20-O |
| Synonyms | Racemate, “D/L-Menthol pure”. 3-p-Menthanol, (-)-Menthol; Menthol, (1R, 3R, 4S)-(-)-; Hexahydrothymol, Menthol, cis-1,3,trans-1,4-; Menthomenthol; 5-Methyl-2-(1-methylethyl)cyclohexanol; p-Menthan-3-ol; Cyclohexanol, 5-methyl-2-(1-methylethyl)-, (1-alpha,2-beta,5-alpha)-; Cyclohexanol, 2-isopropyl-5-methyl-; Peppermint camphor |
| E number | N/A |
| FEMA GRAS number | 2665 |

## General Information

### Council of Europe (CoE)

| Number | Comment |
|---|---|
| 63 | Category A - Approved |

### US Food & Drug Administration (FDA)

| Number | Comment |
|---|---|
| 21CFR172.515; 21CFR182.20 | Synthetic flavoring substances and adjuvants; Essential oils, oleoresins (solvent-free), and natural extractives (including distillates |

### Joint FAO/WHO Expert Committee on Food Additives (JECFA)

| Number | ADI | Comment |
|---|---|---|
| 427 | 0-4.0 mg/kg/day | Also valid for CAS No. 2216-51-5, (l)-Menthol |

### European Food Safety Authority (EFSA)

| Number | Comment |
|---|---|
| 02.015 | N/A |

## Flavors & Extracts Manufacturers Association (FEMA)

| Number | Comment |
|---|---|
| 2665 | Generally Recognized as Safe as a flavor ingredient - GRAS 3 |

## Uses and Exposure

Both peppermint and spearmint have extensive use in foods as fresh and dried preparations of the leaves, for both flavoring and decorative purposes. The oils are the basis of many flavors and are predominant in many candies, chewing gums and liqueurs. Menthol is used as flavouring agent in toothpastes and mouthwashes, in pharmaceuticals (e.g. cough drops, inhalers used for relief of nasal congestion, headache or neuralgia), liqueurs, confectionary, perfumery; as principal flavouring agent in cigarettes; flavouring agent in room fresheners; and in cosmetic products such as aftershaves and shaving creams.

## Estimated Intake from Food and Drink

| Daily Intake |
|---|
| Considering the possible means and routes of exposure to menthol there is a range from a possible 492 mg/day (8.2 mg/kg) to 4.99 mg/day (49.9 mg/day if the FDA assumption that 10% of the population entertains all exposure) (0.083-0.831 mg/kg). Undoubtably, the actual exposure is somewhere between the two.[1,2,3] |

## Summary of the Toxicological Investigations on the Use of the Substance in Tobacco Products

### Smoke Chemistry

| Internal Studies | Level Tested ppm | Comment |
|---|---|---|
| Philip Morris | 2, 5, 18,000 | The effect of the addition of ingredient mixes containing menthol at concentrations up to 18,000 ppm on the inherent toxicity of the cigarette smoke was investigated. |

### Neutral Red Uptake Assay (NRU)

| Internal Studies | Level Tested ppm | Comment |
|---|---|---|
| Philip Morris | 2, 5, 18,000 | The effect of the addition of ingredient mixes containing menthol at concentrations up to 18,000 ppm on the cytotoxicity, as measured by the Neutral Red Uptake assay, was investigated. |

### AMES Assay

| Internal Studies | Level Tested ppm | Comment |
|---|---|---|
| Philip Morris | 2, 5, 18,000 | The effect of the addition of ingredient mixes containing menthol at concentrations up to 18,000 ppm on the mutagenic response, as measured by the Salmonella reverse mutation assay, was investigated. |

### Mouse Lymphoma Assay (MLA)

| Internal Studies | Level Tested ppm | Comment |
|---|---|---|
| N/A | N/A | N/A |

### *In vivo* Micronucleus

| Internal Studies | Level Tested ppm | Comment |
|---|---|---|
| N/A | N/A | N/A |

## Inhalation studies

| Internal Studies | Level Tested ppm | Comment |
|---|---|---|
| Philip Morris | 2, 5, 18,000 | The effect of the addition of ingredient mixes containing menthol at concentrations up to 18,000 ppm on the toxicity of cigarette smoke, as suggested in a 90-day inhalation study, was investigated. |

## References

1. FDA CFR - Code of Federal Regulations Title 21, key words > 172.515 and 182.20, website http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm

2. The EFSA Journal (2006) 331, 1-77 http://www.efsa.europa.eu/de/scdocs/doc/331.pdf

3. WHO (1998) Evaluation of certain food additives. Fifty-first meeting of the Joint FAO/WHO Expert Committee on Food Additives. Geneva, 9-18 June 1998. WHO Technical Report Series, no. 891 WHO Technical Report Series, No. 891, 2000.