

BOTANICAL SOURCES USED IN FOOD AS FLAVOURINGS

MENTHA PIPERITA L. VAR PIPERITA



Foto di F. Mearelli

Mentha piperita

Massimo De Vincenzi\*,  
Francesca Maialetti\*,  
Marco Silano\*\*

\* Department of Metabolism and Pathological  
Biochemistry, Istituto Superiore di Sanità,  
Roma, Italy

\*\*Hospital "Bambin Gesù",  
Rome, Italy

Per l'introduzione alla rubrica,  
fare riferimento al fascicolo di maggio 2002

*The introduction to this section  
is in the edition of May 2002*

<b>SYS NAME:</b>	Mentha piperita L. var. piperita
<b>CE No:</b>	282
<b>STEINMETZ No:</b>	707
<b>FEMA:</b>	/
<b>ORDER:</b>	Tubiflorae
<b>FAMILY:</b>	Labiatae
<b>NAME:</b>	<b>E:</b> Peppermint <b>F:</b> Menthe poivre <b>D:</b> Pfefferminze <b>I:</b> menta piperita, menta inglese
<b>SYNONYMS:</b>	Mentha balsamica Willd., Mentha piperita Stokes.
<b>PARTS USED:</b>	Flowers tips, herb, leaves.
<b>IMPORTANT CONSTITUENTS:</b>	<b>essential oil:</b> menthol (33-48%), menthone (8.9-31.6%), <b>pulegone</b> (0.5-4.6%), limonene (2.7-6.8%), <b>menthofuran</b> , iso-menthol, iso-menthol acetate, neo-menthol, iso-menthone, menthyl-acetate, <b>1,8-cineole</b> (5.2-18.5%), piperitone, <b>terpinen-4-ol</b> (18%), piperitonone, carvone, carvacrol, p-cymol, p-menthane, linalool, octan-3-ol, a-pinene, b-pinene, pyridine, 2,6-methylpyridine, 2-propyl-5-phenylpyridine, 3-phenylpyridine, 5-ethyl-2-methylpyridine, sabinene, c-terpinene, terpinolene, p-methoxy-acetophenone, a-amorphene, anethole, benzyl alcohol, cadinene, caffeic acid, dihydroxycarvone, b-caryophyllene, cedrene, chlorogenic acid, coumarine, p-cymene, p-cresol, o-cresol, fenchene, geranial, guaiacol, heptan-2-one, heptan-3-ol, a-ionone, jasnone, dihydrolimonen-10-ol, luteolin, p-methoxy-acetophenone, anethole, 2-hidroxy-benzaldehyde, benzoic acid, bovolide, hydroxy-bovolide, butan-2-one (1-10,18). <b>Dried entire plant:</b> eriocitrin, eriodictyol, luteolin, cynaroside, naringenin, prunin, narirutin, apigenin, cosmosiin, a-pinene, b-pinene, sabinene, b-phellandrene, octan-3-ol, menthone, menthofuran, linalool, terpinen-4-ol, 1,8-cineol (11-12). <b>Dried leaf:</b> eriocitrin, narirutin, iso-rhoifolin, diosmin, rosmarinic acid, luteolin, sorbifolin, thymusin, apigenin, acacetin (13-15)
<b>ACTIVE PRINCIPLES:</b>	pulegone (III), menthofuran (III), 1,8-cineole (III) terpinen-4-ol (under evaluation)
<b>OTHER CONSTITUENTS OF TOXICOLOGICAL CONCERN:</b>	carvacrol

**PRODUCTS IN WHICH IT IS USED:** the dried flowering tops are used to prepare the beverage, peppermint tea, and the infusion. They are used also in small quantities in the formulation of liqueurs and bitters.

**LEVEL OF USE:** **Peppermint leaves:** jam, jelly 501.4 ppm. **Peppermint oil:** baked goods 300 ppm, frozen dairy 110 ppm, meat products 8 ppm, soft candy 1200 ppm, confection, frosting 650 ppm, gelatin, pudding 200 ppm, nonalcoholic beverages 99 ppm, alcoholic beverages 240 ppm, chewing gum 8300 ppm.

**PREPARATION:** essential oil, infusion (2%), fluid extract and tincture.

**MAIN TOXICOLOGICAL DATA:** **Peppermint oil:** mutagenicity studies neg.(16); 28-day gavage study, NOEL 10 mg/kg b.w.(17). In others subacute studies in which dogs were treated with oral doses of up to 125 mg/kg and rats of up to 500 mg/kg daily for five weeks, peppermint oil was well tolerated both topically and systemically (19). **Pulegone and menthofuran:** group TDI 0-100 mg/kg. **1,8-cineole:** provisional TDI 0.2 mg/kg; **Terpinen-4-ol:** kidney irritation by commercially available *Juniper* oil depend on the content of terpinen-4-ol (20). In another study two slightly different *Juniper* oil batches were tested in male Sprague-Dawley rats. Animals were dosed orally for 28 days with 100-333 and 1000 mg/kg bw/d (1<sup>st</sup> batch) and 100-300 and 900 mg/kg bw/d (2<sup>nd</sup> batch). Additionally, terpinene-4-ol, a known component of *Juniper* oil (10 mg%), was tested with the same experimental design at 400 mg/kg. Neither of the tested substances induced changes in function or morphology of the kidney at the tested doses (21).

**DATA NEEDED:** neurotoxicity and long term on pulegone; mutagenicity and 90 days feeding studies on menthofuran.

**MAIN REFERENCES:** 1. J. Liq. Chromatogr. 6,1175,1983; 2. J. Sci. Food Agr. 31,1143,1980; 3. J. Pharm. Sci. 53, 1407, 1964; 4. Phar. Acta Helv. 43, 411,1968; 5. Planta Med. 23,101,1973; 6. Agr. Biol. Chem. 47, 2307, 1983; 7. Agr. Biol. Chem. 44,1535,1980; 8. J. Agr. Food Chem., 47, 4100, 1999; 9. J. Herbs Spice Med. Plants, 4, 81, 1996; 10. Bull. Natl. Res. Cento, 19, 135, 1994; 11. Aromatopia, 13, 42, 1995; 12. J. Essent. Oil Res., 5, 13, 1993; 13. J. Agr. Food Chem., 42, 679, 1994, 43, 410, 1995; 14. Biochem. Syst. Ecol., 22, 95, 1994; 15. Phytochemistry, 31, 2299, 1992; 16. Mut. Res. 138,17,1984; 17. Toxicol. Lett. 19, 211,1983; 18. Amm. Pharm. Fr., 50, 146, 1992; 19. Med. Sci. Res., 17, 499, 1989; 20. Pharmaz. Zeit. Wissensch, 138, 85, 1993; 21. Arzneimittel Forschng, 47, 855, 1997.

**CLASSIFICATION AND LIMITS:** Flowering tips, Herb, Leaves **Category 5** (with limit on pulegone, menthofuran,1,8-cineole)  
**Category 5:** plants, animals and other organisms, and parts of these or products thereof, and preparations derived therefrom, for which additional toxicological and/or chemical information is required.  
These could temporarily be acceptable provided that any limits set for the "active principles" or the "other chemical components" are not exceeded.

**NATIONAL/INT. EVALUATIONS:** **Peppermint leaves:** CFR 182.10, 582.10, 155.130, 155.200, 155.120, 155.170, 145.131; FEMA No. 2847.  
**Peppermint oil:** CFR 182.20, 582.20 ; FEMA No. 2848.  
**Peppermint plant:** CFR 182.10, 582.10

**DATA BASES USED:** NAPRALERT (1988-2001), CHEMABS (1967-2001), BIOSIS (1973-2001), FSTA (1969-2001), TOXLINE (1969-2001), MEDLINE (1966-2001), PASCAL (1973-2001).

*Key words: Mentha piperita L. var. piperita,  
Peppermint chemical composition, toxicity data*