

Melissae folium (DAB 10), Balm

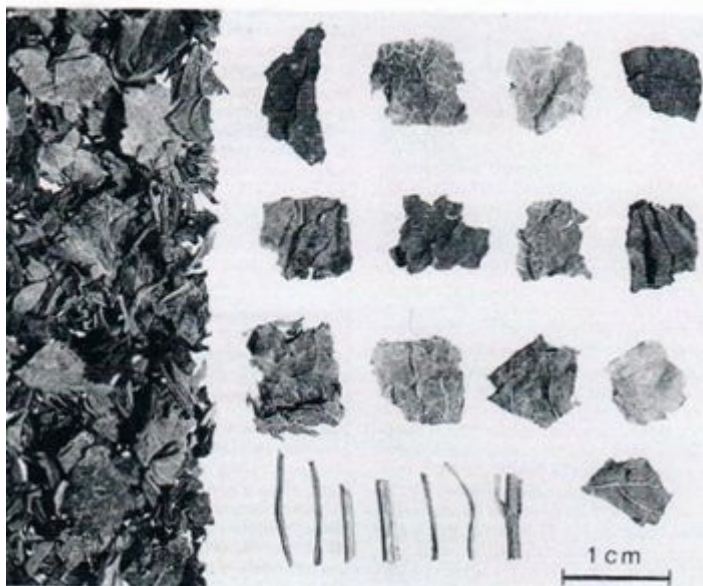


Fig. 1: Balm

Description: The more or less long-petiolate leaves are ca. 8 cm long and up to 3 cm wide, broadly ovate, and rounded or almost cordate at the base. The thin and somewhat crumpled lamina has a dark green upper surface which is slightly pubescent and a lighter green lower surface which is almost glabrous or only slightly pubescent along the veins and finely punctate (Fig. 3). The margin is irregularly crenate or serrate and the venation is thin and prominent on the lower surface.

Odour: Spicy and aromatic, reminiscent of lemon; often, only noticeable after rubbing the leaves; with material that has been stored for some time, the odour may be very faint.

Taste: Pleasantly spicy.

Fig. 2: *Melissa officinalis* L.

A herb, up to 70 cm in height, smelling strongly of lemon, with distinctly petiolate, broadly ovate, opposite and decussate leaves on 4-angled stems. Leaf venation very prominent on the lower surface and margin crenate and serrate. Pale-coloured ca. 1 cm long flowers, with a 2-lobed calyx, grouped in the axils of the leaves.



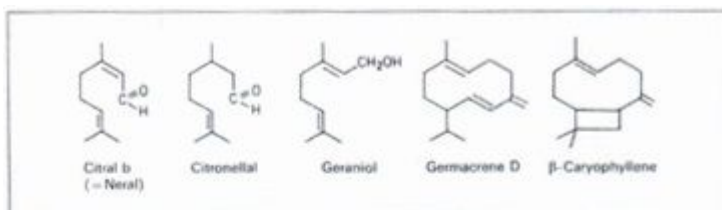
DAB 10: Melissenblätter
ÖAB: Folium Melissae
Ph. Helv. VII: Melissae folium
St. Zol. 1149.99.99

Plant source: *Melissa officinalis* L., balm (Lamiaceae).

Synonyms: Folia citronellae, Folia melissae citratae (Lat.), Melissa, Balm, Lemon or Sweet balm, Cure-all (Engl.), Melissenblätter, Zitronenkraut, Zitronenmelisse (Ger.), Feuilles de mélisse (Fr.).

Origin: Originally, native in the eastern Mediterranean region and in western Asia; cultivated in western (especially Spain), central (southern and eastern Germany), and eastern Europe. Imports of the drug come from Bulgaria and Romania. For a review of the literature, including the history of its cultivation and current research, see [1].

Constituents: 0.02-0.3% essential oil, comprising more than 70 components - >60% monoterpenes and >35% sesquiterpenes; the oxygen-containing fraction is very large-



ly (ca. 90%) monoterpenoid, while the hydrocarbon fraction is mostly (ca. 90%) sesquiterpenoid. Among the principal monoterpenoid components are citronellal (ca. 30-40%) and citral a and b (geraniol and neral) in the ratio 3:4-5 (ca. 10-30%); small amounts of methyl citronellate, (+)-ocimene, citronellol, geraniol and nerol, etc. are also present. The predominant sesquiterpenes include ca. 10% each of β -caryophyllene and germacrene D, along with some germacrene-1(10)E,5E-dien-4-ol [13, 14]. Monoterpene glycosides, and other glycosides with a volatile aglycone, e.g. eugenyl glycoside, are also present in balm leaves [15]. The composition of the essential oil depends on various factors, including origin and climate, and whether it is obtained from leaf material of the first or second cut also plays a decisive role [4, cf. 13, 14]. When cultivated under special conditions and in a particular climate, e.g. as in Spain, the essential-oil content of some materials (chemical

types?) may rise to 0.8% [5]. The drug contains ca. 4% rosmarinic acid (so-called labiate tannin), glycosidically bound chlorogenic and caffeic acids, triterpenes, and flavonoids [2, 3].

Indications: Preparations of balm have sedative, spasmolytic, and antibacterial actions. They are therefore employed for gastrointestinal disorders of nervous origin, in psychosomatic cardiac disorders, against migraine, and as a "nervine" [7, 8]. In mice, aqueous alcoholic extracts of the drug have been shown to have sedative and peripheral analgesic activity; they also induce and potentiate sleep after administering subhypnotic and hypnotic doses of pentobarbital [16]. Possibly, the polyphenolics present are responsible for the long known [6] choleric action of balm leaf [7, 8]. Whether this is also the case for the demonstrated virostatic action [9], more especially of the herpes viruses [10], or whether this is due to the whole

complex of substances is still under discussion. Very probably, the effect results from reaction between the polyphenolics and the viral and cell-membrane proteins, the phenolic substances occupying viral receptors and thereby preventing adsorption of the virus on to the cell wall. The diminution of the thyrotrophin level in animals brought about by balm extracts is worth noting [11]. In folk medicine, preparations of balm are also recommended against colds (as a diaphoretic, "calming", or "strengthening remedy), in functional disorders of the circulation ("nervous palpitations of the heart", "migraines", "hysteria", and "melancholia").

Making the tea: Boiling water is poured over 1.5-2 g of the finely chopped drug, covered, and allowed to stand for 5-10 min. before being passed through a tea strainer. 1 Teaspoon = ca. 1.0 g.

Herbal preparations: The drug is also available in tea bags (1.0-1.5 g); care has to be taken to ensure that it is of pharmacopoeia quality. In instant teas, the drug extract is usually combined with other drug extracts.

Phytomedicines: A series of preparations grouped as plant hypnotics and sedatives contain, among other things, aqueous or more often alcoholic extracts of balm leaf. However, because of the cost, the proportion of genuine balm is usually very small. Alcoholic distillates, such as Melissa or Carmelite water, are prepared not only from balm leaf, but also make use of other drugs.

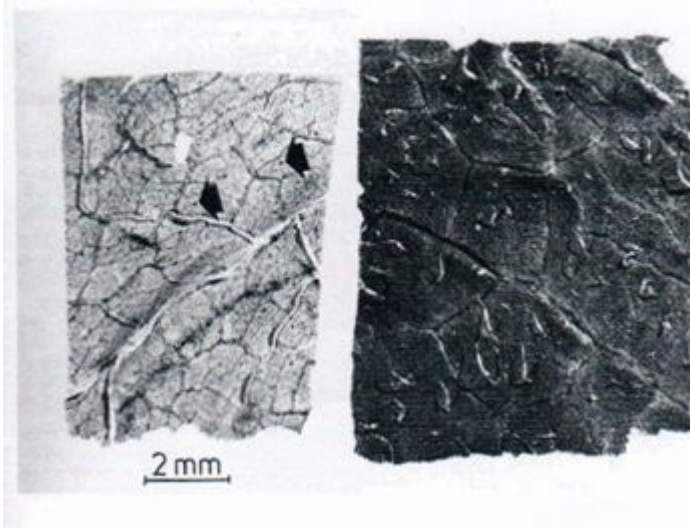


Fig. 3: *Melissa officinalis*: Paler lower surface of the leaf, showing the glandular punctation (arrows), and darker upper surface with whitish bristles.

*Extract from the German Commission
E monograph
(BAN: no. 228, dated 05.12.1984)*

Uses

Nervous disturbance of sleep. Functional gastrointestinal disorders.

Contraindications

None known.

Side effects

None known.

Interactions

None known.

Dosage

Unless otherwise prescribed: as an infusion, 1.5–4.5 g drug to a cup, several times a day as required.

Mode of administration

Chopped or powdered drug, liquid or dry extracts, for infusions and other galenic preparations. Comminuted drug and its preparations for internal use.

Note

Combinations with other sedative and/or carminative drugs may be advantageous.

Effects

Sedative, carminative.

containing essential oils, e.g. coriander, cardamom, nutmeg, cloves, cinnamon, angelica root, ginger, galangal root, elecampane root. In the DAB 6 formulation of Carmelite water (*Spiritus Melissa compositus*) the balm oil is replaced by citronella oil. Balm bath oils usually do not contain genuine balm oil but rather "Indian Melissa oil" (= citronella oil DAB 6), a relatively cheap essential oil obtained from citronella and lemon grass (*Cymbopogon* species; Poaceae). To some extent, lemon oil, or lemon oil which has been distilled over balm herb (*Melissae Citratum oleum*), is used as a substitute for expensive balm oil.

Regulatory status (UK): General Sales List—Schedule 1, Table A.

Authentication: Macro- (see: Description) and microscopically. Particular noteworthy are the conical or tooth-like trichomes (Fig. 4); there are other, similar trichomes which are more slender and sometimes two-celled. The three- to five-celled covering trichomes with a warty or striated cuticle (Fig. 5) are a prominent feature. The essential oil accumulates in typical 8-celled laminaeous peltate glandular trichomes which are mostly situated in depressions on the lower leaf surface. In addition, there are various types of capitate trichomes with one- or two-celled heads and one- to three-celled

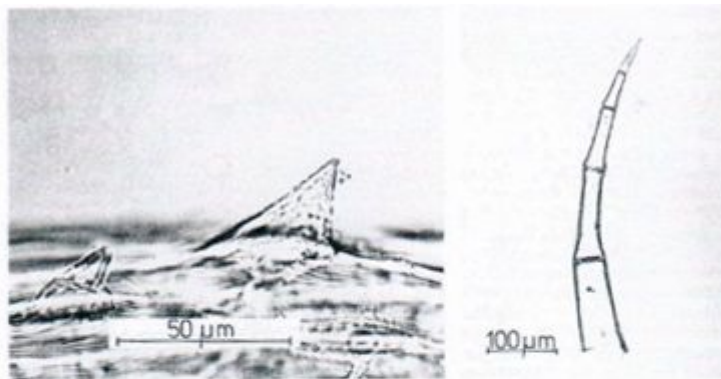


Fig. 4: Tooth-like conical trichome on the nervation of the leaf

Fig. 5: Multicellular covering trichome

stalks. The diacytic stomata, found only on the lower leaf surface, are raised like a dome above the surface.

The DAB 10 test of identity is as follows:

Test solution: 0.30 g freshly powdered drug shaken for 2–3 min. with 5 ml dichloromethane, then filtered over ca. 2 g anhydrous sodium sulphate, followed by rinsing with a further 2 ml solvent; combined filtrates carefully taken to dryness and the residue dissolved in 0.2 ml ethyl acetate.

Reference solution: 5 µl citral and 4.0 mg guaiazulene dissolved in 10 ml toluene.

Loadings: 20 µl test solution and 10 µl reference solution, as 2-cm bands on silica gel G.

Solvent system: ethyl acetate + hexane (10+90), 2 × 10 cm run.

Detection: before spraying, in daylight and in UV 365 nm light; after spraying with anisaldehyde reagent and heating to 100–105 °C for 5–10 min., in daylight.

Evaluation: before spraying. Test solution: just above the starting line, two greyish green zones fluorescing intense red in UV 365 nm light (chlorophyll); a little below the solvent front a yellow zone.

After spraying. Reference solution: about the middle, the faint greyish violet citral zone; in the upper third, the orange-brown guaiazulene zone. Test solution: about the middle, the faint greyish violet citral zone with slightly above it the pinkish red caryophyllene epoxide zone (possibly ab-

sent); in the upper third, slightly below the level of the reference guaiazulene zone, the faint greyish violet citronellal zone; near the solvent front and slightly above the level of the reference guaiazulene zone, the violet main zone (caryophyllene and other hydrocarbons); in the lower half of the chromatogram, other, mostly faint, greyish violet or reddish zones (including citronellol, geraniol).

An excellent paper by Schultze et al. [14], which describes extraction of the TLC zones and their subsequent GC/MS examination, indicates that evaluation of the chromatogram (after spraying) requires modification. The following is a suitably modified text [with comments]:

Test solution: about the middle, two close but distinct zones (the upper one citral,

*Wording of the package insert, from the
German Standard Licence*

6.1 Uses

Nervous disorders of sleep and of the gastrointestinal tract; to stimulate the appetite.

Dosage and Mode of administration

Hot water (ca. 150 ml) is poured over 1–3 teaspoonsfuls of Balm leaf and after 10 min. passed through a tea strainer.

Unless otherwise prescribed, a cup of the freshly prepared tea is drunk several times a day.

6.3 Note

Store protected from light and moisture.

the lower one geranial) [If no reference is used, and bearing in mind the variation in colour due to the spray reagent, there could be confusion with a greenish grey zone having a somewhat higher Rf; there can be a little as 1-2% geranial/neral in the oil, but even so it should be detectable.], with slightly above it the pinkish red caryophyllene epoxide zone (possibly overlapped by two greenish zones and therefore not visible) [Caryophyllene epoxide always appears to be present.]; in the upper third, below the Rf of the reference guaiazulene zone, a greyish violet zone; near the top of the middle third, the distinct greyish violet citronellal zone [In fact, the proportion of citronellal can vary from undetectable to the dominant terpene present.]; near the solvent front and slightly above the Rf of the reference guaiazulene zone, the violet to greyish blue main zone (caryophyllene and other hydrocarbons) [Other apolar lipophilic constituents may affect the colour produced.]; in the lower half of the chromatogram, other, mostly faint, greyish violet or reddish zones [There is no citronellol/geraniol band detectable in the extract, but one at a slightly lower Rf].

A TLC separation of the leaf extract into 13 bands, better than that using the DAB 10 (9) procedure, is obtained on double development using the solvent systems: (a) hexane + ethyl acetate (90 + 10), 10 cm run, and (b) hexane + ethyl acetate (95 + 5), 14 cm run; for the detection of the fainter bands, the phosphomolybdic acid spray is rather more sensitive than the anisaldehyde reagent.

It is evident, on comparing the chromatograms of the steam-distilled oil and the extract from the leaves, that the latter contains a series of interfering constituents. Identification of *Melissae folium* would be

better carried out by TLC of the volatile oil [14], though it has to be said that the DAB 10 does not require the oil content to be determined.

Quantitative standards: DAB 10: *Foreign matter*, not more than 3%. *Loss on drying*, not more than 12.0%. *Ash*, not more than 12.0%.

ÖAB: *Volatile oil*, not less than 0.05%. *Foreign matter*, not more than 3%. *Ash*, not more than 12.0%. *Acid-insoluble ash*, not more than 1.0%.

Ph. Helv. VII: *Foreign matter*, not more than 3%; stem fragments, not more than 7%; leaves of *Stachys* and *Ballota* species (see: Adulteration), absent. *Sulphated ash*, not more than 17%.

BHP 1983: *Total ash*, not more than 14%. *Acid-insoluble ash*, not more than 2%.

Adulteration: Happens occasionally. Leaves of *Nepeta cataria* L. var. *citriodora* (BECKER) BALIS, cat-mint, are softly pubescent on the upper surface and velvety on the lower greyish green surface; they smell more strongly of lemon than do the leaves of balm. The covering trichomes are like those of balm; the glandular trichomes mostly have bicellular heads, though some with a one-celled stalk and four-celled head also occur. The tooth-like conical trichomes characteristic of balm are absent. Leaves of *Stachys* and *Ballota* species have needles of calcium oxalate in the mesophyll and the epidermal cells have a striated cuticle.

Storage: Protected from light and moisture in well-closed (but not plastic) containers. Under normal conditions of storage (room temperature, absence of light), the essential-oil content of the chopped drug can decrease

to 30% of the initial amount within 11 months [12].

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