Mate folium

Paraguay tea, Maté leaf

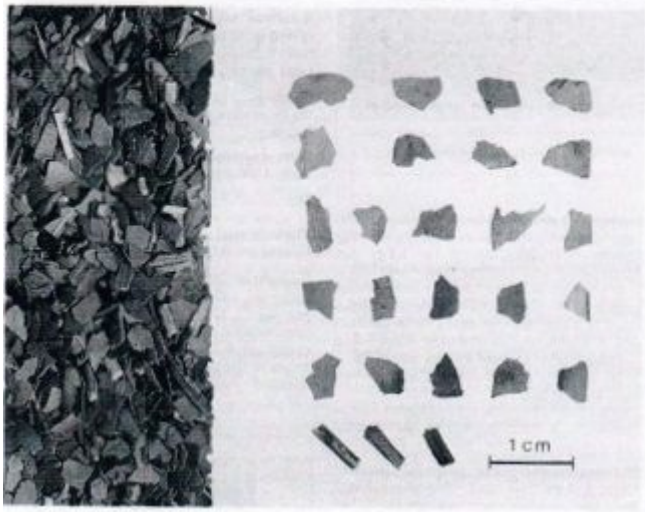


Fig. 1: Maté leaf

Description: The material consists of irregular, broken, glabrous, and stiff pieces of leaf, which are light green to brownish green (the green untreated drug is usual in South America, while the brown roasted leaves are available in Europe). The venation is clearly visible only on the lower surface; it is pinnate with a prominent midrib and arcuate lateral veins. Occasionally, on the lower surface, there are dark-coloured corky nodules. The sinuate, serrate leaf margin is not usually recognizable as such in the chopped drug. Occasional fragments of the stout, angular brown petioles are present.

The leaves, harvested from May to September, are briefly heated to inactivate the enzymes, thereby becoming dark in colour, then dried at 60°C, and finally powdered to different degrees depending on the market [2].

Odour: Faintly aromatic.

Taste: Astringent and somewhat smoky.

Fig. 2: *Ilex paraguariensis* A.St.Hil.

A small, evergreen tree or bush with alternate, ca. 15 cm long, leathery leaves having a sinuate, serrate margin and very small stipules. Monoecious, 4-partite, axillary white flowers; red spherical drupes ca. 7 mm in diameter.

Fig. B. 6: Folia Mate

Plant source: *Ilex paraguariensis* A.St.Hil., maté (Aquifoliaceae).

Synonyms: Ilex, Jesuit's Brazil or St. Bartholomew's tea, Yerba maté, Herva (Engl.), Mate (Ger.), Thé de Paraguay (Fr.).

Origin: An evergreen tree, maintained to some extent as a bush, growing in Brazil between latitudes 30° and 20° south and there also cultivated. The drug is exported (in 1958, more than 300 tonnes to Germany) from Brazil and partly also from Argentina and Paraguay [2].

Constituents: Varying amounts of caffeine (0.3–1.7%), part of which is combined with "tannins", and a little theobromine; 4–16% tannin-like substances which are mainly derivatives of phenol-carboxylic acids: condensation products of caffeic acid, 5-*O*-caffeoylquinic acid, and at least 10% chlorogenic acid (including isochlorogenic and neochlorogenic acids) [1]. An ursolic-acid derivative matesaponin 1 [3], a little essen-

tial oil, and (only in the fresh leaves?) a "resin fraction".

Indications: Based on its caffeine content, as a centrally acting stimulant (tonic, etc.) and as a diuretic. Since maté tea is greatly appreciated throughout much of South America as a "national drink", the people ascribe many other effects to it. It is thus not surprising that in Europe as well maté is praised as "the green gold of the Indios", as a "natural remedy and magic drink" and especially as "the ideal slimming remedy which facilitates losing weight in a natural way and stills the distressing feelings of hunger and thirst".

Making the tea: Hot water, just off the boil, is poured over ca. 1 teaspoon of maté and after 5–10 min. passed through a tea strainer. As with ordinary black tea, the stimulating effect of the briefly brewed tea is stronger and has a more pleasant taste, being less astringent, than tea which has been allowed to draw for a longer time: caffeine dissolves more rapidly than the tannins!
1 Teaspoon = ca. 2 g.
In South America, maté is prepared in the following way: In a roughly fist-size gourd (*cuia* or *cuia*), the same quantity of hot water, which is no longer boiling, is poured over the maté leaves. The drink is sucked up through a silver "straw" which has a sieve-like bottom end (*bombilla* or *bombui*), more water being added several times to the *cuia*. When *chimarrão* (a mixture of the powdered leaves and branches) is used, the characteristic taste is much stronger [2].

Extract from the German Commission E monograph (BAnz no. 85, dated 05. 05. 1988)

Uses
Mental and physical fatigue.

Contraindications
None known.

Side effects
None known.

Interactions with other remedies
None known.

Dosage
Unless otherwise prescribed: average daily dose, 3 g drug; preparations correspondingly.

Mode of administration
Chopped drug for infusions. Drug powder for other galenical preparations for internal use.

Effects
Analeptic, diuretic, positively inotropic, positively chronotropic, glycogenolytic, lipolytic.

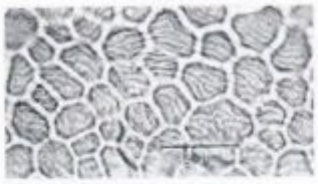


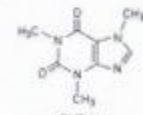
Fig. 3: Epidermis with sinuate cuticular striations

Herbal preparations: Maté is available on its own from several firms, and also in tea bags (mostly containing up to ca. 1.8 g), e.g. Mate-Gold® and roasted Mate-Gold®. It is a component of several herbal mixtures for preparing refreshing and stimulating drinks, some of which are also available in tea bags and in food shops, as well as in Blasen- und Nierentee (bladder and kidney tea) NRF.
Maté extracts are present in instant teas such as Nicroxin®-Tee.
Dried maté is a component of Lanes Lustys Herbalene, a multi-ingredient herbal laxative.

Phytomedicines: Some prepared Bladder, Kidney, Laxative, and "Blood-purifying" Teas also contain maté, e.g. Protitis®-Tee, Ramend®-Tee, Species urologicae nach Dr. May, Vital-Kopfschmerztee (headache tea). Maté extracts are also present in Phytoren®-Tropfen (drops).

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

Authentication: Macro- (see: Description) and microscopically. See also [4]. The leaf epidermis is covered with a thick striated cuticle (Fig. 3). There are fairly numerous calcium oxalate cluster crystals and occasional prisms in the spongy mesophyll.
On microsublimation, the caffeine can be detected as characteristic needles. The identification can also be carried out by TLC.



Caffeine

Test solution: 2 g powdered drug refl with 10 ml of an ethanol + chlorofor water (40 + 20 + 10) mixture for 5 min. after cooling, filtered into a 20 ml volun flask, followed by rinsing the flask an filter and making up to the mark.

Reference solutions: A, 50 mg caffeine solved in 10 ml of the foregoing solvent ture; B, 50 mg theobromine dissolved i same mixture.

Loadings: 5 µl each of the test solution the two reference solutions A and B, as bands.

Solvent system: ethyl acetate + methan water (100 + 16.5 + 13.5), 6 cm run.

Detection: chromatogram dried in a cu of warm air. Observed in UV 254 nm l Then sprayed with iodine solution, foll by ethanol + 25% hydrochloric acid (1

Evaluation: in UV 254 nm light. Refer solutions: caffeine quenching zone in th per third; slightly below it, the we theobromine quenching zone. Test solu comparable zones, and further quenc zones in the centre and lower third (Fig Sprayed: Test and Reference solutions

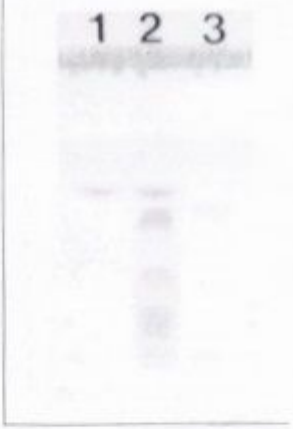


Fig. 4: TLC on 4 × 8 cm foil
1: Caffeine
2: Maté
3: Theobromine
For details, see the text