TANACETUM *PARTHENIUM* (L.) SCHULZ. BIP. (FAM.: ERICACEAE) (TANACETUM, FEVERFEW)

by Lamberto Monti

Tanacetum parthenium

Picture: F. Mearelli

BOTANICS: A herbaceous plant with a sulcated stem, 30-80 cm tall, bearing branches in its upper part. The leaves are broad, briefly petiolated, yellow-green in colour and pinnated. The burs number 5-20 (rarely 30), grouped in a lax pannicle, are umbelliform, with white ligulate blooms with a tridental tip and numerous yellow tubular blooms. The fruit are conical, brown achenes. Forms obtained exclusively by cultivation, which are almost completely characterised by ligulate flowers, are also known.

DRUG: European Pharmacopoeia 5th Ed.: it consists of the dried aerial parts, whole or in fragments, containing not less than 0.20% of parthenolide (C15H2003; PM 248,3) calculated with respect to the dried drug.

CHEMICAL COMPOSITION: 0.5-0.9% of essential oil with the main components represented by trans-chrysanthemyl acetate and 1-S-(-)-camphor, as well as monoterpenes, sesquiterpenes and eugenol. 0.5-2.0% of sesquiterpenic lactones (germacranolide, eudesmanolide and guaianolides) mainly with α-methylenbutyrolactone group, the main constituent of which is parthenolide (0.2% according to European Pharmacopoeia), as well as 3-β-hydroxycostunolide, 1-β-hydroxy-arbusculin, canin, etc.. Flavonoids, especially derived from apigenine and luteoline, as well as lipophile flavones (methoxylated campherol- and quercetin-derivates).

PHARMACOLOGY: The activity of preparations of tanacetum seems to be connected with the interaction of the functional methylenbutyrolactone groups of its components with the thyolic groups of the organic molecules. Although no certainty of the prophylactic activity of tanacetum against headaches exists, some in vitro and in vivo tests carried out both with extracts and with pure parthenolide seem to suggest it. Both pure parthenolide and the acetone or ethanolic extracts of tanacetum have shown an inhibiting action on the synthesis of prostaglandins, thromboxane B2 and leukotriene B4 in the white blood cells and the formation of NO radicals. The intercellular interactions stimulated by the cytokines and by the interleukins are also modified with the suppression of inflammatory mediators such as TNF-α, interferone-γ and IKB kinase-β. In the peritoneal white blood cells of the rat, the derivatives of dimethylether of hydroxycampherol and santina have shown that they can block the expression of the different lipoxygenases. By blocking the phospholipase A2 at 1-2 mg/kg i.p., parthenolide has inhibited the bronchoconstriction induced by collagen in the cavy; the block of the synthesis of the prostanoids is deemed the cause of the inhibition of the experimental nephrocalcinosis observed in the rat. The compound was active (1-2 mg/kg i.p.) in the rat foot carrageenan-induced oedema. The hexocyclic methylene group that characterises its structure is believed to be responsible for the decreased sensibilization from contact induced by phorbol myristat in the mouse's ear. Extracts of tanacetum inhibit the secretion of serotonin of the blood platelets and prevent their aggregation induced by external stimuli. Parthenolide has been able to antagonise the effects of phenfluramine and dextroamphetamine, two indirect serotonergics, in the isolated stomach of the rat and a dichloromethanic extract of tanacetum has been able to antagonise 5-HT2A and 5-HT2B receptors with the release of serotonin at the concentration of 10 μM. Parthenolide, through the methylenbutyrolactone group, interferes in the mechanisms of contractility and dilatation of the blood vessels. This compound is cytotoxic for various lines of human tumorous cells, because it inhibits the insertion of thymidine in the DNA; at concentrations higher than 5 micromoles, it blocks the proliferation of the cells of the murine fibroblastic sarcoma and the human lymphoma. Oral pre-treatment of rats with extract of tanacetum (2.5-80 mg/kg) or with parthenolide (5-40 mg/kg) has reduced the incidence of the ethanol-induced gastric ulcer (reduction of the ulcerous index on average from 4.8 (controls) to 1.4 (extract) and to 0.5 (parthenolide). The essential oil of tanacetum is active against gram-negative bacteria, yeasts and fungi.

TOXYCOLOGY: The toxicological tests carried out on 6 patients treated with tanacetum for headaches have not shown any significant problems. A comparison of 30 women treated with tanacetum for headaches (12.5-250 mg/day) for 11 months and 30 women with headaches who did not use it did not show any significant differences in the average frequency of the chromosome aberrations and the exchanges of chromatids in the lymphocytes. The urine of the patients who had used tanacetum did not shown any increase in the average number of mutants in the Ames test compared to that of the patients who had not taken tanacetum.

CLINICAL STUDIES: The conclusion of a systematic review of 6 randomized clinical studies, double-blind and placebo-controlled, which had evaluated single preparations of tanacetum in the prevention of headaches was one of probably efficacy. In one clinical study, 8 patients suffering from headaches were treated daily with 2 x 25 mg of dried leaves of tanacetum, whilst 9 other patients received the placebo; the patients in both groups had previously used the drug unrefined for 3-4 years with considerable relief. The average frequency of the headache attacks in those treated was of 1.69/month for 6 months and 1.5/month in the final three months compared with 3.13 and 3.43 in the placebo group respectively. In the tanacetum group, a total of 39 episodes of nausea or vomiting were recorded, against 116 episodes reported by the patients in the placebo group. A randomized study on 57 patients suffering from headache was made up of a first phase of two months, during which all the patients received 100 mg of powder of tanacetum leaves and two further phases of 1 month, when the patients alternated treatment with tanacetum and with the placebo. A reduction in the intensity of pain, in the number of episodes of nausea and vomiting and sensitivity to the light and to noise was observed during the periods of treatment. Lastly, in a double-blind randomized study with a placebo, 50 patients suffering from headaches were treated every day for one month with the placebo. Subsequently, they alternated 0.5 mg/die of parthenolide or the placebo for 4 months. No prophylactic effect was observed that could be attributed to the treatment, but only a lesser tendency to take other medicines. Prophylactic effects against various forms of arthritis are also attributed to tanacetum, but a double-blind study of 6 weeks carried out on 40 patients suffering from rheumatoid arthritis treated with a dose of 70-86 mg/die of dried leaves or with the placebo did not show any benefit.
Profilassi dell'emicrania.

THERAPEUTIC INDICATIONS: Prophylaxis of headaches.

SIDE EFFECTS, CONTRAINDICATIONS, INTERACTIONS, SPECIAL PRECAUTIONS: Unwanted effects are rare and generally consist of inflammation of the mucous of the oral cavity, digestive problems and abdominal pain.

DOSAGGI*: Extremely variable; according to clinical studies, a daily dose of 50 mg of dried drug is suggested.

** ESCOP Monographs, 2nd Edition 2003.*