

REFERENCES

Anthemis nobilis

CHAMOMILE

ROMAN CHAMOMILE

1. **Wiseman** The SAS Survival Handbook. 1986, William Collins & Co. Ltd. ISBN No. 0-00-272774-9. refers to *Chamaemelum nobile*. Use an infusion of the whole plant for fevers, headaches, migraines, and colds, or the expressed juice of the flowers for aches and strains. It has a calming influence, especially on nervously excited children.

2. **The Lawrence Review of Natural Products** we read the following:-

References from The Lawrence Review, March 1991

Scientific Names : *Matricaria chamomilla* L. and *Anthemis nobilis*. sometimes referred to as *Chamaemelum nobile* (L.) All. L. Family: Compositae (Asteraceae)

Common Names: *M. chamomilla* is known as German, Hungarian or genuine chamomile and *A. nobilis* is called English or Roman Chamomile (common chamomile)

BOTANY - *M. chamomilla* grows as an erect annual and *A. nobilis* is a slow-growing perennial. The fragrant flowering heads of both plants are collected and dried for use as teas and extracts.

HISTORY - Known since Roman times for their medicinal properties, the plants have been used as antispasmodics and sedatives in the folk treatment of digestive and rheumatic disorders. Teas have been used to treat parasitic worm infections and as a hair tint and conditioner. The volatile oil has been used to flavour cigarette tobacco.

CHEMISTRY - Both plants contain related chemical constituents. The anti-inflammatory and antispasmodic effects of *M. chamomilla* are due to compounds contained in the light-blue essential oil which constitutes about 0.5% of the flower head. Chamazulene, an artifact formed during heating while preparing teas and extracts, comprises about 5% of the essential oil. Up to 50% of the essential oil consists of alpha-bisabolol, an unsaturated monocyclic sesquiterpene alcohol, and its concentration can vary according to geographic origin and chemotype. Other minor components include apigenin and angelic acid.

PHARMACOLOGY - Bisabolol exerts numerous pharmacologic effects which may account for the many traditional uses of chamomile. The compound effectively reduces inflammation of carageenan-induced rat paw swelling and adjuvant-induced arthritis in rats, and inflammation induced by the cotton pellet granuloma test. Bisabolol is antipyretic in yeast-induced fever in rats. It significantly shortens the healing time of cutaneous burns in guinea pigs. The compound also inhibits the development of gastric ulcers in rats induced by indomethacin, stress and ethanol, and shorten the healing time of acetic acid-induced ulcers.

Chamomile infusions have been used traditionally as gastrointestinal antispasmodics. Alcohol extracts of *M. chamomilla* showed significant antispasmodic effects in vitro.

3. **Gordon, L.:** A Country Herbal. 1980 Webb and Bower (publishers) Ltd. ISBN No.0-906671-09-4.

Matricaria chamomilla or *Anthemis nobilis* the wild chamomile has an obvious desire for the companionship of man for it inhabits the fields and lanes and waste patches around our houses, on gravelly and stony soils. This aromatic daisy plant, with feathered leaves, is inclined to loll about on dusty verges, showing no great desire to stand upright. It was early recognized as a good friend in both house and garden. Parkinson wrote in 1629: It is a common hearbe, well knowne, and is planted of the rootes in alleyes and walkcs, and on bankes to sit on, for that the more it is trodden on and pressed downe, in dry weather, the closer it groweth, and the better it will thrive: the use thereof is very much both to warm and to comfort and to ease pailnes, being applied outwardly after 'many fashions.'

For the past 200 years the seats in the arbours - or the herbares, as they were called-and those hollowed out of the banks that enclosed the herb garden were frequently covered with chamomile; and lawns of it were planted before grass lawns were introduced into our gardens. It was also used for Paths, seeming to thrive underfoot, and repaying such treatment by its sweet scent. It is no doubt for this reason that the meaning of Chamomile' in the language of flowers is 'patience in adversity'.

It was also an old strewing herb. It was dedicated to St Anne, mother of the Virgin Mary.

Evelyn mentioned that 'October it will now be good to Beat, Roll and Mow carpet walks and camomile far now the ground is supple and it will even out all inequalities'. Shakespeare grew it in his garden' and it is said that Sir Francis Drake played his historic game of bowls on a lawn of clipped chamomile.

Bisabolol and the lipophilic compounds bisabolol oxides A and B, as well as the essential oil, have a papaverine-like antispasmodic effect. Bisabolol is about as potent as papaverine and twice as potent as the oxides. The cis-en-in-ether and the flavones apigenin, luteolin, patuletin and quercetin also have marked antispasmodic effects as do the coumarins umbelliferone and herniarine.

Chamazulene exerts anti-inflammatory and anti-allergic activity in animal models. The hydrophilic components of chamomile, principally the flavonoids, also contribute to the anti-inflammatory process. The most active flavonoids are apigenin and luteolin, with potencies similar to that of indomethacin.

Because of the low water solubility of the essential oil, teas prepared from chamomile flowers contain only about 10% to 15% of the oil present in the plant. Despite the relatively low concentration of lipophilic components in water infusions, chamomile teas are generally used over long periods of time, during which a cumulative therapeutic effect may result.

TOXICOLOGY - The toxicity of bisabolol is low following oral administration in animals. The acute LD₅₀ is approximately 15 ml/kg in rats and mice. In a 4-week subacute toxicity study, the administration of bisabolol (1 to 2 ml/kg body weight) to rats caused no significant toxicity. No teratogenicity or developmental abnormalities were noted in rats and rabbits

after chronic administration of 1 ml/kg bisabolol.

The use of the tea is not without potential adverse effects. The tea prepared from the pollen-laden flower heads has resulted in contact dermatitis, anaphylaxis and other severe hypersensitivity reactions in persons allergic to ragweed, aster, chrysanthemums and other members of the family Compositae. Although some experts suggest that persons with allergies to ragweed pollens should refrain from ingesting chamomile, good evidence for this cross-sensitivity remains to be established.

The dried flowering head are emetic when ingested in large quantities.

SUMMARY - The chamomiles are used widely. They exert significant antispasmodic activity in the gastrointestinal tract and the potential for delaying concomitant drug absorption from the gut should be considered. There is significant evidence from animal models that some components of chamomile exert significant anti-inflammatory activity, but the extent to which this is observed in man has not been established. The toxicity and teratogenicity appear low, but hypersensitivity problems have been reported.

4. **Hutchens**, A.R.: Indian Herbalogy of North America. 1973 First paperback edition. Shambhala. ISBN No. 0-87773-639-1.

Hutchens, Alma: A Handbook of Native American Herbs - the pocket guide to 125 medicinal plants and their uses. Shambhala. 1992. ISBN No. 0-87773-699-5.

Matricaria chamomilla, which is Roman Chamomile (the author is wrong, it is German Chamomile – ACD), Garden Chamomile, Ground Apple, Pinheads. The favoured Chamomile comes from southern Europe and is officially known as *Anthemis nobilis*, possessing medicinal qualities superior to the American.

This yellow or whitish small daisy-like perennial, with its strong fibrous root, pale green thread-shaped leaflets, has a very bitter taste, with the strong aromatic smell of the apple. It is interesting to note that the name "chamomile" is derived from the Greek, meaning "ground apple".

The flowers and herb are used.

It is stomachic, antispasmodic. Tonic, stimulant (volatile oil), carminative, diaphoretic, nervine, emmenagogue, sedative.

It is used for infantile colds, convulsions, stomach pains, colic, earache, restlessness, measles, etc. When given warm, Chamomile will favour perspiration and soften the skin. The cold infusion acts as a tonic, and is more suitable for stomach difficulties, and as a drink during convalescence from febrile disease, dyspepsia, all causes of weak or irritable stomach, intermittent and typhoid fever.

Syrup made of the juice of chamomile, using the white flowers (fresh or dried) with the best white wine, is a tonic for jaundice and dropsy.

Old fashioned but worth remembering for hysterical and nervous affections in women and will promote the menstrual flow, relieve dysmenorrhic spasms, and promote the menses when due to exposure to colds, uterine spasms or nervous tension, bilious headache, and aids digestion. A specific for uterus pains of mother at nursing time.

Externally: The flower of chamomile beaten and made into oil, will comfort side pain of liver and spleen; at the same time drink the tea of the fresh or dried herb. The flowers combined with crushed poppy head make a good poultice for allaying pains when other means have failed. As a lotion, it is also excellent for external application in toothache, earache, neuralgia, etc.

A poultice of chamomile will often prevent gangrene and remove it when present. For sprains and bruises, the herb bruised and moistened with vinegar is excellent in the pulverised form. It may be made up with Soapwort (*Saponaria*) into shampoo, especially for keeping the hair light and alive.

Homoeopathically; Acidity, anger, asthma (from anger), blepharospasm, catarrh, effects of coffee, colic, convulsions, cough, cramp, croup, cough, dentition, diarrhoea, dysmenorrhoea, dyspepsia, earache, eyes (blepharitis, ophthalmia), eructations, erysipelas, excitement, excoriation, fainting fits, fevers, flatulence colic, gout, gum rash, headache, hernia, hysterical joint, influenza, jaundice, lientaria, labour (disorders of, after-pains), mastitis, menstruation (disordered), miliary eruption, milk fever, miscarriage, mumps, neuralgia, parotitis, perichondritis, peritonitis, pregnancy (disorder of), red-gum, rheumatism, salivation (nocturnal), sciatica, screaming, sensitiveness, spasms, speech (affections of), toothache, ulcers, uterus (disease of), waking (screaming on), whooping cough.

Russian experience: In Russia chamomile has the name Romashka. The demand is so great that supplements are imported from Europe. They estimate that 500-1,000 lbs of dried plant can be obtained from 1 acre.

Uses: No family can stay without this simple aromatic home medicine. It is used as a tea from the cradle to the grave for colds, stomach trouble, anaemia, gargle, sedative, nervine, calming, colitis, eczema and antiseptic for all inflammations.

India and Pakistan: The rhythmic Babunah or Babuni-ke-phul is India's local name. Indian Chamomile grows wild and they consider the herb second best to the European imported flower.

Uses: India's knowledge gives added variety and credit to the popular miniature daisy-like flower. As a carminative, stimulant, emmenagogue, diaphoretic, attenuation, discutient. Special interest is given to Babunah (Chamomile) for uterine reflex disturbance of women. Also for dyspepsia, flatulent colic, fever, menstruation disorder, hysteria, and conditional debility. Popular as a children's remedy for nervine and sedative, tonic, stomach disorders, earache, neuralgia pain, convulsions and dentition. A weak infusion is a tonic and febrifuge. Strong warm infusion as an emetic and for periodic headaches.

Externally: The oil is especially helpful applied to rheumatic joint pain.

5. Research Reports. Tony Balacs. The International Journal of Aromatherapy. Summer 1993, Vol.5, No.2.

In 1992 a British paper, two workers at Cambridge and Bangor have reported distinct psychological effects after the inhalation of a chamomile oil (type unspecified), as compared with a control.

They decided to present subjects with suggestions for images which provoked either a positive or a negative response. For instance, they were asked to imagine a cosy fireside (pleasant) or congealed grease (unpleasant) each on two occasions; in the presence of chamomile oil vapour and with an inert placebo (crushed green peppers). Some subjects received the placebo first, others the chamomile.

Measurements were taken of subjects delay in imagining each scene, of mood and of the vividness of the imagery they produced. Finally, subjects were asked to judge the relative occurrence of positive and negative phases which had been presented.

Chamomile oil significantly increased the time it took for subjects to visualise both positive and negative phrases, in keeping with its sedative effects, but did not change the vividness of the imagery.

In particular, chamomile shifted negative mood rating towards the positive and had the general effect of increasing the proportion of positive images the subjects thought they had been asked to visualise.

The authors suggest that chamomile's sedative effect may be responsible both for blunting negative effect (mood) and for increasing latency (the time taken to produce a mental image). Alternatively, the primary effect may have been on latency, as it has been shown that negative moods decay more rapidly and the delay produced by chamomile would give them time to decay.

6. **Tyler, V.E., Brady L.R., Robbers, J.E.:** Pharmacognosy. 9th edition. Lea & Febiger. 1988. ISBN No. 0-8121-1071-4.

The dried flower heads of *Matricaria chamomilla* Linné (Fam. Compositae) constitute the drug known as German Chamomile or Matricaria.

A related plant *Anthemis nobilis* Linné, known as Roman Chamomile, contains similar constituents and is similarly employed. Chamomile is extensively cultivated in Europe, where it is widely utilised in folk medicine for its carminative, spasmolytic, and anti-inflammatory effects. The most common form of the drug is a tea, but various extracts and volatile-oil-containing preparations are also available. In fact, chamomile is so highly regarded and so extensively used, that it might be labelled the 'ginseng' of Europe. Recently chamomile has become one of the most popular herbal teas in the United States.

One group of persons should be especially cautious in utilising chamomile. The tea, prepared from pollen-rich flower heads, has caused contact dermatitis, anaphylaxis, and other severe hypersensitivity reactions in individuals allergic to ragweeds, asters, chrysanthemums, and

similar plants. In fact, persons allergic to any member of the Family Compositae should avoid this as well as other teas prepared from composite flower heads.

As might be expected, such a renowned plant has been the subject of a large number of botanical, agronomic, chemical, and pharmacologic studies. In essence, the latter have revealed definite anti-inflammatory properties in chamomile, owing primarily to constituents of (or formed in) the volatile oil, especially chamazulene and (-)- α -bisabolol. Flavonoids and coumarin derivative are, without doubt, responsible for many of the spasmolytic effects. Various other effects of the drug are probably caused by these and other undetermined constituents.

Unfortunately, an infusion (tea) contains only about 10 to 15% of the volatile oil present in the plant material, and the ingredients of the volatile oil provide most of the anti-inflammatory activity. Whole plant extracts or preparations containing quantities of the volatile oil are certainly much more effective. In spite of the relatively low concentration of lipid-soluble active ingredients in the tea, one authority believes that, when the tea is used over a long period of time, a cumulative beneficial effect may result. This belief is attested to by the centuries-old use of chamomile as a home remedy and healthful beverage in Europe and by its increased popularity among the laity in the United States.

7. **Martindale:** The Extra Pharmacopoeia. 22nd edition. 1941. The Pharmaceutical Press. No ISBN No.

The dried double or semi-double flowerheads of cultivated varieties of *Anthemis nobilis*. Tonic, aromatic and stomachic; emetic in large doses. The infusion ("chamomile tea", 1 in 20, dose 1 to 4 ounces) is a domestic remedy for indigestion, and a tincture (2 of fresh flowers in alcohol 90% 3 and water 1, dose 3 to 10 minims), has been given for summer diarrhoea of children. A decoction with poppy heads is used as a fomentation.

8. **Bradley, P.R.:** British Herbal Compendium Volume 1. 1992. BHMA. ISBN No. 0-903032-09-0.

Chamomile flower.

Roman Chamomile Flower consists of the dried flower heads of the cultivated double variety of *Chamaemelum nobile* (L) Allioni [*Anthemis nobilis* L.], Compositae.

Constituents

* Volatile oil 0.4-1% consisting mainly of aliphatic esters, the principal components being n-butyl angelate (ca. 36%) and isoamyl angelate.

The oil also contains terpenes and the fresh, steam-distilled oil usually has a blue colour due to the presence of chamazulene.

* Sesquiterpene lactones, up to 0.6%, of the germacranolide type, mainly nobilin together with 3-epinobilin, 1,10-epoxy-nobilin and 3-dehydronobilin. 1- β -hydroperoxyisonobilin and a further hydroperoxide with a guaianolide structure have also been isolated.. All these

components have an angelate ester side-chain.

* Hydroperoxides: in addition to the sesquiterpene lactone hydroperoxides mentioned above, trans-pinocarveylhydroperoxide (a monoterpene) and four hydroperoxides of aliphatic esters have been isolated.

* Flavonoids, including the flavones apigenin and luteolin, apigenin-7-glucoside (cosmosioside), luteolin-7-glucoside, apigenin-6-O-apiosylglucoside and a 2,3-dihydroxycinnamic acid ester of cosmosioside (anthemoside)

* Phenols, especially phenolic carboxylic acids such as caffeic acid, ferulic acid and their esters including chlorogenic acid. Also about 1% of polyphenolic catechin tannins which cause browning of the dried flowers on storage.

* Coumarins, in small amounts, including scopoletin and its 7-glucoside (scopoloside).

* Thiophene derivatives, in trace amounts (15mg/g), characteristic of Compositae plants.

Therapeutics

Actions

Aromatic bitter, spasmolytic, mild sedative.

Topically: anti-inflammatory, mild analgesic.

Pharmacology

Roman Chamomile flower has certain uses similar to those of Matricaria flower (German Chamomile), although some of its constituents are markedly different and it is much less investigated pharmacologically and clinically.

Anti-inflammatory and sedative effects of volatile oil have been demonstrated in rats.

Flavones such as apigenin have been shown to possess spasmolytic and topical anti-inflammatory activity.

In pharmacological tests on rats the anti-inflammatory activity of sesquiterpene lactones with an α -methylene- γ -lactone ring (as present in nobilin and related compounds) has been demonstrated. The sesquiterpene lactones also account for the bitter taste.

Side effects

Rare contact allergy. Large doses are emetic.

Indications

Internally: dyspepsia, nausea, vomiting of pregnancy, irritable bowel.

Externally: inflammation of the skin and oral mucosa, minor wounds and abrasion.

Contraindication

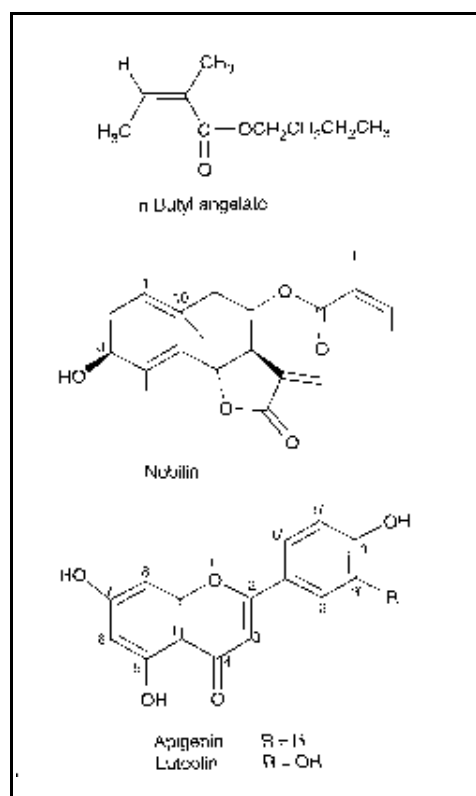
None known.

Dosage

Internally: unless otherwise prescribed, three times daily; dried flower heads. 1.5-3g or in infusion; liquid extract (1:1 70% ethanol), 1.5-3 ml.; tincture (1:5, 45% ethanol) 3-5 ml.

Topically: as infusion in poultices or mouthwashes; semi-solid preparations, containing 5-15% of the drug or equivalent.

9. Sellar, W.: The Directory of essential oils. Daniel 1992. ISBN No. 0-85207-239-2.



Sellar refers to Chamomile as both *Anthemis nobilis* (Roman Chamomile) and *Matricaria chamomilia* (German Chamomile)

Aroma: A fruity, apple-like fragrance.

Features: Indigenous to Britain and cultivated in Germany, France, and Morocco. Both Roman and German Chamomile share many features; about 12 in high with white flowers, yellow centre and slightly furry leaves. German Chamomile is a little smaller. Essential oil from both types contain azulene (a powerful anti-inflammatory agent) not actually present in the plant, but formed in the oil. German Chamomile contains a little more and is a deep blue colour - sometimes known as 'Hungarian Chamomile' - just to confuse the issue.

History and Myth: According to Culpeper, the Egyptians dedicated this herb to the sun since it cured fevers (heat). Other sources say it is a moon herb because it has a cooling effect. Certainly the Egyptian priests recognised its soothing properties where nervous complaints were concerned. It has come down in history as the plants' physician because it cures other shrubs when planted nearby.

The name is derived from the Greek meaning 'ground apple' and the Latin 'nobilis' refers to the noble flowers. Used extensively in shampoos throughout the ages particularly to highlight and condition fair hair. These days it is often employed in cosmetics and perfumes. Chamomile tea has been a popular aid to digestion as well as promoting sound sleep. Also though to help jaundice and liver problems - perhaps that is why it is sometimes added to liqueurs!

Chemical constituents

Anthemis nobilis: Angelic, methacrylic, tiglic (acid), azuline (sesquiterpene).

Matricaria chamomila: cuminic (aldehyde), azuline (sesquiterpene).

Properties: Analgesic, antiallergenic, anticonvulsive, antidepressant, antiemetic, antiphlogistic, antipruritic, antirheumatic, antiseptic, antispasmodic, carminative, cholagogue, cicatrisant, digestive, diuretic, emollient, emmenagogue, febrifuge, hepatic, nervine, sedative, splenic, stomachic, sudorific, tonic, vermifuge, vulnerary.

Precautions: An emmenagogue, so should be avoided in the early months of pregnancy.

Mind: A very soothing oil, easing anxiety, tension, anger and fear. Promotes relaxation, gives patience, peace and allays worries. Calms the mind and often helpful with insomnia.

Body: Its analgesic action eases dull muscular pain particularly when connected to nervous conditions. Low back pain seems to respond well. In the same way useful for headaches, neuralgia, toothache and earache.

Useful with menstrual problems since helps to regulate the menstrual cycle and eases period pain. Seems to be a popular choice for calming irritable effects of Pre Menstrual Tension (PMT) and the menopause.

Soothes the stomach and often relieves gastritis, diarrhoea, colitis, peptic ulcers, vomiting, wind, inflammation of the bowels - may be useful for irritable bowel syndrome. Also said to be useful with liver problems, jaundice, as well as disorders of the genito-urinary tract.

Indicated for use with repeated infections since stimulates production of white corpuscles which help to fight bacteria and fortify the defence system. Could be effective against anaemia.

Effect on the skin: Soothes burns, blisters, inflamed wounds, ulcers and boils. Could be helpful with dermatitis, acne, herpes, psoriasis, hypersensitive skin as well as allergic conditions generally. Smooths out broken capillaries, improving elasticity. Good for dry and itchy skin, eases puffiness and strengthens the tissues. An excellent skin cleanser.

10. **S.Price:** Practical Aromatherapy. 1987 Thorsons Publishing ISBN 0-7225-1525-1.

Price says that Roman chamomile is distilled from the dried flowers of *Anthemis nobilis*. Used a lot because of its azulene content which is not present in the flower but forms as the essential oil is distilled out of the plant. Chamomile changes with exposure to light and air from blue to brownish-yellow. Roman Chamomile produced in Belgium is light blue-green-yellowish-brown. In England the centre for this oil is Long Melford.

German chamomile (from Germany, Hungary and Russia) is deep blue and contains more azulene. It is distilled from *Matricaria chamomilla*.

Moroccan chamomile is obtained from *Ormenis mixta* which is grown wild.

Chamomile is helpful for most disorders and has a very low toxicity, therefore it is very useful for treating children. It is used in shampoos to lighten blond hair.

Digestive: diarrhoea, flatulence, gastritis, indigestion (especially in children), liver disorders, loss of appetite, peptic ulcers, stomach ulcers.

Head: conjunctivitis, earache, teething, toothache.

Menstrual: haemorrhage, irregularity, irritation, menopause, painful

Muscular: all aches and pains - especially after sport, arthritis, and rheumatism.

Nervous: anxiety, depression, hysteria, insomnia, irritability, neuralgia, tantrums (in children), tonic.

Skin: acne, antiallergic, antiseptic, broken veins, burns, dermatitis, dryness, hyper-sensitivity, inflammation, irritability, wounds.

11. **Spoerke, D.G.:** Herbal Medications. Woodbridge Press (Santa Barbara, California 93160). 1990. ISBN No. 0-88007-181-8.

Spoerke refers to *Anthemis nobilis* as Chamomile.

Known principles: The primary ingredient of Chamomile appears to be as volatile oil containing tiglic acid esters. Boiling will destroy the oil. Chamomile also contains small amounts of anthemic acid (a bitter), tannic acid, resin, anthesterol, anthe, chamazulene, and apigenin (7-D-glycoside).

Mode of action: The agent is primarily an aromatic bitter, but the volatile oil may be a mucopus membrane irritant and spasmolytic. The apigenin and chamazulene are also spasmolytic agents. Chamazulene has some anti-inflammatory and antibacterial properties. Unfortunately, both the apigenin and the chamazulene are in such small concentrations that little physiologic activity is expected.

Alleged uses: Although all parts of this plant are utilised, the dried flower heads are most frequently used. The flowers prepared as an infusion, liquid extract, or tea, are taken orally as an antispasmodic or digestive aid. Externally, it is applied to abscesses as a poultice.

Toxicity: Large amounts of the infusions have been reported to produce vomiting. The herb itself may cause skin rashes or serious allergic reactions in individuals known to be sensitive to ragweed pollens.

This herb should not be confused with *Matricaria chamomilla* (German Chamomile).

12. **Launert, E.:** The Hamlyn Guide to Edible & Medicinal Plants of Europe and Northern

Europe. 1981, 4th. impression 1989. Hamlyn. ISBN No.0-600-56395-2.

Launert refers to *Chamaemelum nobile* or *Anthemis nobilis* as Chamomile. The active ingredients are essential oil with angelica-acid, apigenin, bitter principle, resin. The effects are similar to *Chamomilla recutita* but only mildly relieves or prevents spasms. The flower heads are used; collect on a dry sunny day and dry in the shade.

This drug can be used as indicated for *Chamomilla recutita*, but is not equally effective. A strong infusion (4 teaspoons per cup water, allow to stand for 10 minutes) is used for rinsing hair, has a mildly bleaching effect and heightens its blondness.

Chamomilla suaveolens (Pursh) Rydb. or *Matricaria matricarioides* is Pineapple Weed.

It contains essential oils. It prevents or relieves spasms and kills worms. The flower heads or the entire flowering herb is used. Obsolete in both alleopathy and homoeopathy, is occasionally used in the home as an infusion for intestinal worms and as a sedative. There are no harmful side effects.

13. **R.C.Wren:** Potter's New Cyclopaedia of Botanical Drugs and Preparations, 1985 8th impression, published C.W.Daniels. ISBN 0-85032-009-7.

Potter refers to *Anthemis nobilis* Linné as Roman Chamomile or Double Chamomile. It is cultivated to a small extent in England, but to a larger extent in Belgium and France.

Taste is aromatic and very bitter. In English Chamomile Flowers a few of the central florets are tubular. Wild Chamomile Flowers, having only an outer row of ligulate florets, are known as Scotch Chamomiles.

The flowers and herb are used.

Medicinal use: Stomachic, antispasmodic, tonic. An old-fashioned but extremely efficacious remedy for hysterical and nervous affections in women. Also used as an emmenagogue. The flowers combined with crushed poppy heads make a good poultice for allaying pains, when other means have failed. As a lotion it is also excellent for external application in toothache, earache, neuralgia, etc. The herb and flowers are equally valuable.

14. **S.Y.Mills:** The A-Z of Modern Herbalism, A comprehensive guide to Practical Herbal Therapy. Thorsons 1989 (retitled) ISBN No. 0-7225-1882-X.

Mills (B65) refers to *Anthemis nobilis* as Roman Chamomile, True or Perennial Chamomile. The odour is strong and characteristic.

Details of this remedy are similar to those for Wild Chamomile (German). Although this has traditionally been the herbalist's favourite, to the point of there being a specially cultivated double-flowered variety that is most highly regarded, in practice there is little to distinguish between the actions of this flower and the wild chamomile.

15. **The British Pharmaceutical Codex**, 1923. An Imperial Dispensatory for the use of

Medical Practitioners and Pharmacists. The Pharmaceutical Press. London.

British Pharmaceutical Codex 1923. Chamomile Flowers consist of the dried flower-heads of *Anthemis nobilis*, indigenous to Britain and cultivated in Belgium and France. Those collected from cultivated plants are alone official. The dried flower-heads form hemispherical masses about 12 to 20mm in diameter, the yellow disc florets of the wild plant having been changed more or less completely into white ligulate florets, and the flower-heads are then known as double or semi-double, according to the extent to which this change has taken place. Chamomile flowers are particularly characterised by the solid, conical receptacle and by the abundant, blunt, narrow, scaly paleae.

German Chamomiles (*Matricaria chamomilla*, Linné) have a hollow conical receptacle and no paleae, whilst feverfew flowers (*Chrysanthemum parthenium*, Bernh.) have flat receptacles, and any paleae that may be present are acute.

True Chamomiles have a strong aromatic odour and bitter taste. They yield about 5% ash on incineration. In its wild state the chamomile plant produces flower heads consisting of two or three rows of bracts surrounding a single row of ray florets with white ligulate corollas, the centre being occupied by numerous yellow tubular florets closely packed on a solid conical receptacle, which bears in addition numerous chaffy paleae. Such wild flowers are often collected by Scottish cottars for their own use, any excess being sold to druggists and known as Scotch Chamomiles, but they are scarcely a commercial article.

Constituents: Chamomile flowers contain 0.8-1.0% of a volatile oil, a crystalline bitter glucoside (anethemic acid), and a phytosterol (anthesterol), together with wax, fatty oil, and glucose. Anethemic acid is glucosidal and easily hydrolysed, the bitter taste at the same time disappearing. Preparations of Chamomile should therefore be subjected as little as possible to the action of heat.

Action and uses: The bitter principle of chamomile has well-marked stomachic properties, and its volatile oil is effective as an antispasmodic. It is used internally to improve the appetite and aid digestion, and for this purpose the extract and infusion are administered in atonic dyspepsia. A warm infusion of the drug acts as an emetic. The flowers are sometimes employed externally in the form of a poultice. Used as a warm fomentation, chamomile is a popular remedy in the early stages of inflammation. A decoction of chamomile and bruised poppy capsules is a popular fomentation for bruises, and deep-seated inflammations; for dental abscesses the fomentation is applied inside the mouth. The oil may be combined in pills with purgatives to diminish the tendency to griping.

Oleum anthemidis, B.P. Oil of Chamomile.

Oil of chamomile is obtained by distillation of the recently dried flowers of the Roman Chamomile *Anthemis nobilis*, cultivated in Europe and America. It occurs, when freshly distilled, as a blue liquid, becoming greenish and brownish-yellow under the influence of air and light, having a strong, but pleasant aromatic odour, and a burning taste. It has a faintly acid reaction.

Specific gravity 0.905 to 0.915.

Rotation -1° to $+3^{\circ}$

Saponification number 250 - 300

Refractive Index 1.445 at 25°C

[The oil from the German Chamomile, *Matricaria chamomilla* Linné has a Specific gravity 0.930 to 0.940, and solidifies at 0°C .]

Soluble in alcohol (10 in 3), and forms a clear solution with 6 parts of alcohol (70%).

Constituents: The oil consists chiefly of a mixture of esters of angelic and tiglic acids (two isomeric acids of the formula $\text{C}_5\text{H}_8\text{O}_2$) with butyl and amyl alcohol, and butyric acid; it also contains an alcohol, anthemol, $\text{C}_{10}\text{H}_{16}\text{O}$ and a hydrocarbon, anthemene, $\text{C}_{18}\text{H}_{36}$, which forms crystalline needles melting at 63°C . The blue colouration of the freshly distilled oil is due to the presence of a hydrocarbon which has been named azulene. It can be extracted by strong mineral acids.

Actions and uses: Oil of chamomile is employed for its aromatic carminative action on the stomach, and is given with purgative medicines to prevent griping. Pills containing 12 minims of the oil in each may be prepared by massing with soap and powdered liquorice root or powdered marshmallow root.

Dose: 3-18 centimils ($1/2$ to 3 minims).

16. **G.Wood and F.Bache.** The Dispensary of the United States of America. 15th edition. 1883. J.B.Lippincott & Co.

The United States Dispensary 1883. The flower heads of *Anthemis nobilis*, or common chamomile; wild and cultivated.

Several species of *Anthemis* have been employed in medicine.

A. nobilis, which is the subject of the article, is by far the most important.

Anthemis cotula or mayweed, was formerly recognised by the U.S. Pharmacopoeia.

A. pyrethrum, which affords the pellitory root, is among the officinal plants.

A. arvensis, a native of this country and of Europe, bears flowers which have an acrid bitter taste, and possess medical properties analagous though much inferior to those of common chamomile. They may be identified by their want of smell.

A. tinctoria is occasionally employed as a tonic and vermifuge in Europe.

Matricaria suaveolens is said to yield the chamomile of the Indian bazaars.

Though not a native of America, chamomile grows wild in some parts of this vcountry, and is occasionally cultivated in garden for family use; the whole herb being employed. The medicine, as found in our shops, consists chiefly of the double flowers, and is imported from Germany and England. From the former country the flowers of *Matricaria chamomilla* are also occasionally imported under the name of chamomile. In France, the flowers of two other plants are sold indiscriminately with those of *Anthemis nobilis*; viz, those of *Pyrethrum parthenium* (the *Chrysanthemum parthenium* of Persoon) or Feverfew, and those of *Anthemis*

parthenoide, De Cand., or the *Matricaria parthenoides*, Desf.

[The text gives the chemistry, which is omitted here because of later information - ACD]

Medical properties and uses

Chamomile is a mild tonic, in small doses acceptable and corroborant to the stomach, in large doses capable of acting as an emetic. In cold infusion it is often advantageously used in cases of enfeebled digestion, whether occurring as an original affection, or consequent upon some acute disease. It is especially applicable to that condition of general debility, with languid appetite, which often attends convalescence from idiopathic fevers.

As a febrifuge it formerly enjoyed much reputation, and was employed in intermittents and remittents; but we have remedies much more efficient, that it is now seldom used in this capacity. The tepid infusion is very often given to promote the operation of emetics or to assist the stomach in relieving itself when oppressed by its content.

The flowers are sometimes applied externally in the form of fomentation, in cases of irritation or inflammation of the abdominal viscera, and as a general incitant in flabby, ill-conditioned ulcers. The dose of the powder as a tonic is from half a drachm to a drachm (1.95 - 3.9g) three or four times a day, or more frequently. The infusion is usually preferred. The decoction and extract cannot exert the full influence of the medicine; as the volatile oil is driven off at the boiling temperatures.

17. **P. Schauenberg, F. Paris:** Guide to Medicinal Plants. 1990 First paperback edition (Paris 1974). Lutterworth Press ISBN No. 0-7188-2820-8.

Schauenberg and Paris say that the plant produces an essential oil containing chamazulene, coumarin, flavonic heterosides and esters of angelic acid.

Properties: Antispasmodic, affecting the digestive system, tonic and stomachic.

Applications: An infusion of the plant is used for migraines, neuralgias, spasms of the alimentary canal, nervous sickness and as a febrifuge. Used externally as a decoction, it is effective in treating ulcers, wounds and conjunctivitis. It is sometimes used cosmetically to brighten fair hair or to treat scalp disorders.

The plant has been used medicinally since the 16th century.

18. **In a data sheet from Martin Watt.** He refers to *Chamaelum nobile* Lin. also known as *Anthemis nobilis*. A number of varieties or chemotypes are used commercially. Synonyms: Roman, English or Common Chamomile.

Habitat: naturalised throughout Europe, but cultivated worldwide for its medicinal, flavour and cosmetic properties.

Extracted from: The flowers with some leaves, which yield around 1% of essential oil. This oil is now produced in several countries around the world. English grown chamomile has

always been considered the best quality essential oil.

Description: The colour of this essential oil can range from nearly clear to a transparent blue-green. The odour is pleasant with a fruity, apple-like character.

Composition: This may vary tremendously depending on the source of the oil. Traditional information as well as scientific research has tended to concentrate on the European varieties of Roman Chamomile. Therefore oils coming from different varieties grown in other countries, and with a substantial difference in chemical composition, can not be expected to have the same physio-medical properties. The major constituents of European oils are a number of angelates which make up around 40-60% of the oil. Chamazulene is present in small amounts as is camphene, terpinenes and myrcene.

Health and safety data: *Anthemis nobilis* oil at 4% dilution caused no irritation or sensitisation on humans. Ref. A. Kligman 1973 report to R.I.F.M. There are a few rare reports in the literature of people who have developed dermatitis as a result of using products containing this oil, but these reactions seem far less frequent than the reports of adverse reactions to the fresh plant material.

The oral LD50 in rats exceeded 5g/Kg. The dermal LD50 in rabbits exceeded 5g/Kg. Ref. O. Moreno 1973, report to R.I.F.M.

Roman Chamomile was granted GRAS status in 1965 by FEMA. The Council of Europe 1970 allowed its use in foods.

Historical use: Most varieties of Chamomile have been used for thousands of years for their extensive therapeutic, beauty and food flavouring properties. The commonest method of use has been to extract some of the therapeutic agents in hot water such as in a cup of chamomile tea. The flowers have been used as strewing herbs and in ancient times (as now) a good way of extracting some of the properties was to infuse the flowers in hot animal fats or vegetable oils. The ancient Egyptians utilised this method and today are still one of the world's leading producers of chamomile flowers and essential oils.

Most of the traditional uses of chamomile, have been fully justified by modern scientific research. Several of the natural chemicals in Roman and German Chamomile oils have properties which contribute to their very ancient reputation for wound healing, these properties are particularly valuable where damage has occurred to the skin with over exposure to sunlight, or where the skin's natural defences have been reduced by constant exposure to irritants such as detergents, bleaches or just by washing up.

Validated medicinal activity: Extensive trials of the oil on rats have confirmed that it has a potent sedative effect as well as being a long lasting anti-inflammatory. Ref. M. Melegari et al. 1988 *Fitoterapia* V. LIX n.6.

Tests have shown that although Roman chamomile is mildly bacteriacidal it is not as powerful as German chamomile in this respect.

By blending the two chamomile oils a broad spectrum agent can be produced with a wide

variety of antimicrobial, anti-inflammatory and tissue healing actions. The odour (with or without massage) can help relax people suffering from stress related ailments.

Room fragrance: Ideal on its own, or perhaps mixed with lavender. An ideal mental relaxant. It may help alleviate the soreness and irritation of inflamed mucous membranes caused by hayfever, colds, and bronchial infections.

Baths: A very relaxing fragrance, and the vapour may help relieve the above conditions. A few drops in the bath may help relieve irritable skin conditions such as eczema and psoriasis (provided one is not allergic to these oils).

Inhalants: Used as an inhalant from a bowl of hot (not boiling) water, Roman and German Chamomile oils plus perhaps lavender are very good decongestants for the nasal passages. The vapour breathed in through the mouth may help reduce bronchial congestion resulting from coughs, colds or flue.

First Aid: If no other antiseptics are available, this oil may be used on minor wounds and burns to help prevent infection and perhaps enhance healing. The oil is ideal diluted for short term use as a healing agent for the skin. Roman chamomile oil is used in creams to help heal soreness caused by breast feeding and nappy rashes.

Contraindications: Apart from skin sensitivity in a tiny number of people, this oil is very safe.

19. **Council of Europe.** Plant Preparations used as ingredients of cosmetic products. 1st. edition. Strasbourg 1989. HMSO. ISBN No. 92-871-1689-X

Anthemis nobilis L. [Syn: *Chamaemelum nobile* L.]

Botanical Family: Asteraceae

Common name:	Chamomile Roman	(English CTFA name)
	Camomille romaine	(French)
	Romische kamille	(German)
	Camomilla romana	(Italian)
	Manzanilla romana	(Spanish)
	Roomse kamille	(Dutch)

Parts used: Flower heads

Chemical composition:

Essential oil 0.25-2%

- hydrocarbons (α -pinene, β -pinene, limonene, β -myrcene, camphene, sabinene, gamma-terpinene, p-cymene, β -caryophyllene, α -copanene, β -copanene, calarene, delta-cadinene, β -selinene, β -bourbonene, humulene, germacrene-D, gamma-cadinene, β -bisabolene, α -cubebene, β -cubebene, chamazulene, 4-isopropenylbenzene, 4-isopropenyltoluene)
- Alcohols (butanol, isoamyl alcohol, 3-methyl-1-pentanol, hexanol, borneol, pinocarveol, myrtenol, anthemol, farnesol, nerolidol)
- Aldehydes (myrtenal)
- Ketones (5-isopropyl-2-propyl-2-cyclohexene-1-one, 5-isopropyl-2-(2-methyl-propyl)-2-

cyclohexene-1-one, pinocamphone, pinocarvone, (E)-1-(2,6-dimethylphenyl)-2-buten-1-one, β -damascenone, 5-(3-furyl)-2-methyl-1-penten-3-one)

- Acids (methacrylic, butyric, isobutyric, angelic)

- Esters (hexyl acetate, isoamyl propionate, n-butyl-isobutyrate, isobutyl isobutyrate, isobutyl butyrate, 2-methyl-allyl isobutyrate, a-methyl-butyl-a-methyl butyrate, a-methyl-butyl isobutyrate, hexyl butyrate, isoamyl butyrate, isoamyl-2-methyl butyrate, isobutyl isovalerianate, 2-methyl-2-propyl angelate, propyl angelate, butyl angelate, isobutyl angelate, isoamyl angelate, 3-methylamyl angelate, 2-methylidenpropan-1,3-diyl-1-angelyl-3-isobutyrate, 2-methylpropan-1,3-diyl-1-angelyl-3-isobutyrate, butan-1,3-diyl-1-angelyl-3-isobutyrate, 2-hydroxy-2-methyl-3-butenyl angelate, isobutyl-3-hydroxy-2-methyliden butyrate, butyl-3-hydroxy-2-methyliden butyrate, 2-methylbutyl-3-hydroxy-2-methyliden butyrate, 3-methylbutyl-3-hydroxy-2-methyliden butyrate, tiglyl ester, isoamyl tiglate)

- (Ep)oxides (1,8-cineole)

Preparation: essential oil

Manufacturing Process: Steam distillation of the dried flowers.

Examples of specification:

Specific gravity at 15°C: 0.904 - 0.912

Optical rotation at 20°C : -0° 40' to +0° 48'

Refractive index at 20°C : 1.4410 - 1.4461

Acid number : 4.2 - 11.2

Intended cosmetic benefit and recommended maximum concentration.

Soothing, refreshing, anti-itching.

0.15% in products for delicate skins, lotions for eyelids, baby creams and lotions.

Other possible effects:

Anti-irritant, mild antiseptic.

Toxicological data

f anim. f man. k m o p

Index of abbreviations

c: chronic toxicity

e: eye irritation

f: skin irritation

h: subchronic toxicity

i: metabolism study

j: photosensitisation

k: phototoxicity

l: sensitisation animals

m: sensitisation man

n: mutagenicity
o: acute oral toxicity
p: acute dermal toxicity
q: special toxicity studies
r: reproduction studies
s: teratogenicity

If in parenthesis, letters indicate toxicity data concerning relevant active principles.

Notes

RIFM monograph	GRAS LIST	CE 48 N2
Br. Herbal Ph.	Martindale 28th ed.	Merck Index 10th ed.
BP 1980	DAB 9	FU IX
Ph. Fr. IX	OAB 1981	

Evaluations and remarks

Group 3

Selected Toxicological references

Craker E. and Simon J.E. (1980). Herb, spices and medicinal plants, Vol.1, 236-280, Oryx Press.

Opdyke, D.J.L. (1974). Fragrance raw materials monographss: Chamomile oil: German and Roman, Food. Cosmet. Toxicol. 12, 851-853.

The book goes on to give the glycolic extract

Chemical composition

- Essential oil (see above)
- Germacranolides (hydroxyisonobiline, 3-dehydronobiline, 1,10-epoxynobiline, nobiline, 3-epinobiline)
- Flavonoids (luteolin-7-glucoside, cosmosioside, anthemoside, apigenin, apiin)
- Phenol acids (caffeic acid and relevant glucosides)
- Coumarins
- Phytosterols (β -sitosterol, stigmasterol, taraxasterol)
- Catechols (L-epicatechol)
- Choline
- Inositol
- Fatty acids (oleic, linolic, palmitic, stearic)
- Triacontane

Intended cosmetic benefit and recommended maximum concentration.

Soothing, refreshing, anti-itching, hair bleaching.

Up to 5% as anti-irritant in preparations for delicate skins and mucous membranes, eyelids. Sun products.

Other possible effects:

Anti-irritant, mild antiseptic, anti-inflammatory, healing.

Toxicological data

f anim. f man. k m o p

Notes

RIFM monograph	GRAS LIST	CE 48 N2
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Opdyke, D.J.L. (1974). Fragrance raw materials monographss: Chamomile oil: German and Roman, Food. Cosmet. Toxicol. 12, 851-853.

20. **W.C.Evans:** Trease and Evans, Pharmacognosy. 13th edition. Balliere Tindall ISBN 0-7020-1357-9.

Trease and Evans. Roman chamomile flowers are the expanded flower-heads of *Anthemis nobilis* (*Chamaemelum nobile*), collected from cultivated plants and dried. Chamomiles are cultivated in the south of England and in Belgium, France, Germany, Hungary, Poland, Yugoslavia, Bulgaria, Egypt and Argentina. The double or semi-double florets form the commercial drug. They are included in the BP and EP.

The BP requires that the drug is not less than 0.7% of volatile oil and not more than 10% water.

Constituents: Chamomiles contain 0.4-1.0% of volatile oil which is blue when freshly distilled, owing to the presence of azulene. Chamomiles also contain dihydroxycinnamic acid and apigenin (a trihydroxyflavone), both free and as a glucoside. Four chemotypes based on the sesquiterpene bisabolol have been described from samples of various geographical origin.

Uses: Considerable quantities of chamomile are used in domestic medicine in the form of an

infusion (for dyspepsia etc.) or poultice or in shampoo powders. For the production of volatile oil, the entire aerial parts are used.

21. **A.Y.Leung**: Encyclopedia of Common Natural Ingredients used in food, drugs and cosmetics. 1st. edition. John Wiley 1980 ISBN No. 0-471-04954-9.

Leung refers to German Chamomile as *Matricaria chamomilla* and Roman Chamomile as *Chamaemelum nobile* (L.) All. (syn. *Anthemis nobili* L.)

Synonyms: *Matricaria*, Hungarian Chamomile, wild chamomile, and sweet false chamomile (*M. chamomilla*); English Chamomile and Garden Chamomile (*C. nobile*); camomile.

German Chamomile contains variable amounts of volatile oil (0.24-1.9%); flavonoids including apigenin, apigenin-7-D-glucoside, apiin (apigenin-7-apiosyl-glucoside), rutin (quercetin-3-rutinoside), luteolin, and quercimeritrin (quercetin-7-D-glucoside), among others; coumarins including umbelliferone (7-hydroxycoumarin) and its methyl ether (herniarin); proazulenes (matricin, matricarin, etc.); plant acids and fatty acids; a polysaccharide containing D-galacturonic acid as the major component; choline; amino acids; and others.

The volatile oil contains chazulene, farnesene, α -bisabolol oxide A, α -bisabolol oxide B, α -bisabolone oxide A, and ϵ - γ -dicycloether as major constituents, with their relative concentrations varying considerably depending on the sources.

Roman Chamomile contains up to 1.75% volatile oil; about 0.6% of bitter sesquiterpene lactones (germacranolides) which include nobilin, 3-epinobilin, 1,10-epoxynobilin, and 3-dehydronobilin; flavonoids (apigenin, apigenin, apiin, quercetin, luteolin-7-glucoside, etc); coumarins (e.g. scopoletin-7- β -glucosid); choline; fatty acids; and others.

The volatile oil contains mainly (ca. 85%) esters of angelic and tiglic acids (e.g. butyl, amyl, isoamyl, and hexyl angelates or tiglates). Other constituents reported to be present include α -pinene, farnesol, nerolidol, chamazulene, 1-trans-pinocarveol, 10trans-pinocarvone, and 1,8-cineole, among others. Relative concentrations of the constituents vary depending in sources of the oil.

Pharmacology or biological activities

German chamomile has been reported to have numerous pharmacological properties, some of which are the following: The oil has bactericidal and fungicidal activities, particularly against Gram-positive bacteria (e.g. *Staphylococcus aureus*) and *Candida albicans*. It also reduced blood urea concentration in rabbits to a normal level.

Chamazulene, a major component of the oil, has pain relieving, wound-healing, antispasmodic, anti-inflammatory, and antimicrobial properties.

α -bisabolol, another constituent of the oil, has anti-inflammatory, antimicrobial and antipeptic activities.

The cyclic ethers (e.g. en-yn-dicycloether) also have antimicrobial, anti-inflammatory, antianaphylactic, and antispasmodic properties.

The tea has marked hypnotic effect.

Umbelliferone has fungistatic properties.

Roman chamomile is emetic in large doses. Three sesquiterpene lactones (nobilin, 1,10-epoxynobilin and 3-dehydronobilin) isolated from Roman Chamomile have been reported to exhibit anti-tumour activities in vitro against human cancer cells.

Both German and Roman Chamomile have been reported to cause contact dermatitis in humans. Available data indicate both German and Roman chamomile oils to be generally non-toxic when applied externally.

Pharmaceutical and Cosmetic use

Both German and Roman Chamomile extracts are used in pharmaceutical preparations, with the former more frequently used; they are used in antiseptic ointments, creams, and gels to treat cracked nipples, sore gums, and inflammations and for wound healing. The volatile oils are used in carminative, antispasmodic, and tonic preparations among others.

Extracts of both German and Roman Chamomile are used in cosmetics including bath preparations, hair dye formulas (for blond hair), shampoos, preparations to prevent sunburns, mouth ashes, and others.

The oils are used as fragrance components or active ingredients in soaps, detergents, creams, lotions, and perfumes. Use levels from as low as 0.0005% in detergents to a maximum of 0.4% in perfumes.

Folk medicine

German Chamomile has been used since ancient times in treating colic, diarrhoea, indigestion, insomnia, infantile convulsions, toothache, bleeding and swollen gums, and other ailments, usually in the form of an infusion, decoction or tincture. Also used for sciatica, gout, lumbago, skin problems, and inflammation, in the form of compresses.

Roman chamomile is used essentially for the same purposes. Both German and Roman chamomiles have been reportedly used in cancers.

22. In a data sheet, we read the typical analysis of "Blue Chamomile oil" to be as follows:-

Chamazulene	7.4%
α -Bisabolol	28.5%
β -Farnesene	42.7%
Sesquiphelandrene	2.1%
Caryophyllene	2.3%
Bisabolol oxide	2.1%

Water	1.0%
Alcohol	0.1%

Blue colour comes from chamazulene, the active ingredient is a-bisabolol, which has anti-inflammatory properties (guaranteed quantity of a-bisabolol at 22% but usually it is > 25%, the percentage variation is counter balanced by that of farnesene.

23. Zyczynska-Baloniak I Matuszelewska H Dudzinska J: Neutral constituents of the flowers of *Anthemis nobilis* L. *Acta Pol Pharm* (1971) 28(6):625-34. [No Abstract Available]

24. Debelmas J Besson P Herisset A: [Attempts at the "industrial lyophilization" of medicinal plants. II. Roman camomile (*Anthemis nobilis* L.). (Comparative influence of lyophilization and different methods of desiccation on the quality of the flower head)]. *Essais de "lyophilisation industrielle" des plantes medicinales. II. Camomille romaine (Anthemis nobilis L.). (Influence comparee de la lyophilisation et de differents modes de dessiccation sur la qualite des capitules). Ann Pharm Fr* (1966 Sep-Oct) 24(9):587-92 contd (Published in French) . [No Abstract Available]

25. Rucker G Mayer R Lee KR: [Peroxides as plant constituents. 6. Hydroperoxides from the blossoms of Roman camomile, *Anthemis nobilis* L] Peroxide als Pflanzeninhaltsstoffe, 6. Mitt.: Hydroperoxide aus den Blütenkopfen der Römischen Kamille, *Anthemis Nobilis* L. *Arch Pharm (Weinheim)* (1989 Nov) 322(11):821-6 (Published in German)

From the ethanol extract of the blossoms of *Anthemis nobilis* L. (syn. *Chamaemelum nobile* L.), six new hydroperoxides (1-6) were isolated, besides the known 1 beta-hydroperoxyisobilin (7). The structures were elucidated by spectroscopic methods and in some cases ascertained by synthesis. Compounds 2 and 3 show a medium antibacterial activity.

26. Rossi T Melegari M Bianchi A Albasini A Vampa G: Sedative, anti-inflammatory and anti-diuretic effects induced in rats by essential oils of varieties of *Anthemis nobilis*: a comparative study. *Pharmacol Res Commun* (1988 Dec) 20 Suppl 5:71-4

The pharmacological properties of essential oils obtained from two varieties of *Anthemis nobilis* was studied. The two varieties, named "white-headed" or double flowered and "yellow-headed", present considerable morphological differences and yield essential oils with different composition. These essential oils proved to possess interesting anti-inflammatory and sedative properties, especially that derived from the "White-headed" variety.

Institutional address: Dipartimento di Scienze Farmaceutiche, Università di Modena, Italy.

27. Grabarczyk H Drozd B Hladon B Wojciechowska J: Sesquiterpene lactones. Part XV. New cytostatic active sesquiterpene lactone from herb of *Anthemis nobilis* L. *Pol J Pharmacol Pharm* (1977 Jul-Aug) 29(4):419-23.

From fresh and dried herb (without inflorescences) of *Anthemis nobilis* L. a new sesquiterpene lactone C₂₀H₂₆O₆ was isolated. This compound showed a cytotoxic activity at a level of ED₅₀ HeLa -- 0.56 microgram/ml (1.5 x 10⁻⁶ M), and ED₅₀ KB -- 1.23

microgram/ml (3-5 x 10⁻⁶ M), what qualifies it for further in vivo studies.

28. Grabarczyk H Drozd B Hladon B Wojciechowska J: SESQUITERPENE LACTONES. PART XV. NEW CYTOSTATIC ACTIVE SESQUITERPENE LACTONE FROM HERB OF ANTHEMIS NOBILIS L. Pol J Pharmacol Pharm (1977) 29(4):419-423 1977

A new sesquiterpene lactone, C₂₀H₂₆O₆, with cytostatic activity was isolated from the herb *Anthemis nobilis* L. The isolated lactone fraction inhibited the growth of passaged in vitro tumor cell tissue cultures from human tumors (HeLa and KB cultures). This lactone has a mol wt of 362 daltons, a melting point of 144-146 C, and an optical rotation of +35.4 degrees (D line of sodium; 20 C). Its structure is similar to that of nobiline. This compound demonstrated cytotoxic activity at a level of ED₅₀ (HeLa) of 0.56 microg/ml (1.5 x 10⁻⁶M) and ED₅₀ (KB) of 1.23 microg/ml (3.5 x 10⁻⁶M). These results qualify this compound for further in vivo studies on animals with transplanted tumors. (8 Refs)

Institutional address: 19 Niestachowska, 60-619 Poznan, Poland

29. **Grieve**, Maud: A Modern Herbal – the medicinal, culinary, cosmetic and economic properties, cultivation and folklore of herbs, grasses, fungi, shrubs and trees with all their modern scientific uses. 1998 Tiger Books International, London. ISBN No.1-85501-249-9.

Chamomile, Common

Botanical: *Anthemis nobilis* (LINN.)

Family: N.O. Compositae

Synonyms: Manzanilla (Spanish). Maythen (Saxon).

Parts Used: Flowers and herb.

Chamomile is one of the oldest favourites amongst garden herbs and its reputation as a medicinal plant shows little signs of abatement. The Egyptians revered it for its virtues, and from their belief in its power to cure ague, dedicated it to their gods. No plant was better known to the country folk of old, it having been grown for centuries in English gardens for its use as a common domestic medicine to such an extent that the old herbals agree that 'it is but lost time and labour to describe it.'

Description: The true or Common Chamomile (*Anthemis nobilis*) is a low-growing plant, creeping or trailing, its tufts of leaves and flowers a foot high. The root is perennial, jointed and fibrous, the stems, hairy and freely branching, are covered with leaves which are divided into thread-like segments, the fineness of which gives the whole plant a feathery appearance. The blooms appear in the later days of summer, from the end of July to September, and are borne solitary on long, erect stalks, drooping when in bud. With their outer fringe of white ray-florets and yellow centres, they are remarkably like the daisy. There are some eighteen white rays arranged round a conical centre, botanically known as the receptacle, on which the yellow, tubular florets are placed- the centre of the daisy is, however, considerably flatter than that of the Chamomile.

All the Chamomiles have a tiny, chaffy scale between each two florets, which is very minute and has to be carefully looked for but which all the same is a vital characteristic of the genus *Anthemis*. The distinction between *A. nobilis* and other species of *Anthemis* is the shape of these scales, which in *A. nobilis* are short and blunt.

The fruit is small and dry, and as it forms, the hill of the receptacle gets more and more conical.

The whole plant is downy and greyishgreen in colour. It prefers dry commons and sandy soil, and is found wild in Cornwall, Surrey, and many other parts of England.

Small flies are the chief insect-visitors to the flowers.

History: The fresh plant is strongly and agreeably aromatic, with a distinct scent of apples - a characteristic noted by the Greeks, on account of which they named it 'ground-apple' - *kamai* (on the ground) and *melon* (an apple) - the origin of the name Chamomile. The Spaniards call it 'Manzanilla,' which signifies 'a little apple,' and give the same name to one of their lightest sherries, flavoured with this plant.

When walked on, its strong, fragrant scent will often reveal its presence before it is seen. For this reason it was employed as one of the aromatic strewing herbs in the Middle Ages, and used often to be purposely planted in green walks in gardens. Indeed walking over the plant seems specially beneficial to it.

'Like a chamomile bed -

The more it is trodden

The more it will spread,'

The aromatic fragrance gives no hint of its bitterness of taste.

The Chamomile used in olden days to be looked upon as the 'Plant's Physician,' and it has been stated that nothing contributes so much to the health of a garden as a number of Chamomile herbs dispersed about it, and that if another plant is drooping and sickly, in nine cases out of ten, it will recover if you place a herb of Chamomile near it.

Parts Used Medicinally: The whole plant is odoriferous and of value, but the quality is chiefly centred in the flower-heads or capitula, the part employed medicinally, the herb itself being used in the manufacture of herb beers.

Both single and double flowers are used in medicine. It is considered that the curative properties of the single, wild Chamomile are the more powerful, as the chief medical virtue of the plant lies in the central disk of yellow florets, and in the cultivated double form the white florets of the ray are multiplied, while the yellow centre diminishes. The powerful alkali contained to so much greater extent in the single flowers is, however, liable to destroy the coating of the stomach and bowels, and it is doubtless for this reason that the British Pharmacopoeia directs that the 'official' dried Chamomile flowers shall be those of the double, cultivated variety.

The double-flowered form was already well known in the sixteenth century. It was introduced into Germany from Spain about the close of the Middle Ages.

Chamomile was largely cultivated before the war in Belgium, France and Saxony and also in England, chiefly in the famous herb-growing district of Mitcham. English flowerheads are considered the most valuable for distillation of the oil, and during the war the price of English and foreign Chamomile reached an exorbitant figure.

The 'Scotch Chamomile' of commerce is the Single or Wild Chamomile, the yellow tubular florets in the centre of the head being surrounded by a variable number of white, ligulate or strap-shaped ray florets. The 'English Chamomile' is the double form, with all or nearly all the florets white and ligulate. In both forms the disk or receptacle is solid and conical, densely covered with chaffy scales, and both varieties, but especially the single, have a strong aromatic odour and a very bitter taste.

Cultivation and Preparation for Market: Chamomile requires a sunny situation. The single variety, being the wild type, flourishes in a rather dry, sandy soil, the conditions of its natural habits on wild, open common-land, but the double-flowered Chamomile needs a richer soil and gives the heaviest crop of blooms in moist, stiffish black loam.

Propagation may be effected by seed, sown thinly in May in the open and transplanting when the seedlings are large enough to permanent quarters, but this is not to be recommended, as it gives a large proportion of single-flowered plants, which, as stated above, do not now rank for pharmaceutical purposes as high as the double-flowered variety, though formerly they were considered more valuable.

The usual manner of increasing stock to ensure the double-flowers is from 'sets,' or runners of the old plants. Each plant normally produces from twelve to fourteen sets, but may sometimes give as many as from twenty-five to fifty. The old plants are divided up into their sets in March and a new plantation formed in well-manured soil, in rows 2 1/2 feet apart, with a distance of 18 inches between the plants. Tread the small plants in firmly, it will not hurt them, but make them root better. Keep them clean during the summer by hand-weeding, as hoeing is apt to destroy such little plants. They will require no further attention till the flowers are expanded and the somewhat tedious process of picking commences.

In autumn, the sets may be more readily rooted by placing a ring of good light soil about 2 or 3 inches from the centre of the old plant and pressing it down slightly.

Chemical Constituents: The active principles are a volatile oil, of a pale blue colour (becoming yellow by keeping), a little Anthemis acid (the bitter principle), tannic acid and a glucoside.

The volatile oil is yielded by distillation, but is lost in the preparation of the extract. Boiling also dissipates the oil.

Medicinal Action and Uses: Tonic, astringent, anodyne and antispasmodic. The official preparations are a decoction, an infusion, the extract and the oil.

The infusion, made from 1 OZ. of the flowers to 1 pint of boiling water and taken in doses of a tablespoonful to a wineglass, known popularly as Chamomile Tea, is an old-fashioned but extremely efficacious remedy for hysterical and nervous affections in women and is used also as an emmenagogue. It has a wonderfully soothing, sedative and absolutely harmless effect. It is considered a preventive and the sole certain remedy for nightmare. It will cut short an attack of delirium tremens in the early stage. It has sometimes been employed in intermittent fevers.

Chamomile Tea should in all cases be prepared in a covered vessel, in order to prevent the escape of steam, as the medicinal value of the flowers is to a considerable extent impaired by any evaporation, and the infusion should be allowed to stand on the flowers for 10 minutes at least before straining off.

Combined with ginger and alkalies, the cold infusion (made with 1/2 oz. of flowers to 1 pint of water) proves an excellent stomachic in cases of ordinary indigestion, such as flatulent colic, heartburn, loss of appetite, sluggish state of the intestinal canal, and also in gout and periodic headache, and is an appetizing tonic, especially for aged persons, taken an hour or more before a principal meal. A strong, warm infusion is a useful emetic. A concentrated infusion, made eight times as strong as the ordinary infusion, is made from the powdered flowers with oil of chamomile and alcohol and given as a stomachic in doses of 1/2 to 2 drachms, three times daily.

Chamomile flowers are recommended as a tonic in dropsical complaints for their diuretic and tonic properties, and are also combined with diaphoretics and other stimulants with advantage.

An official tincture is employed to correct summer diarrhoea in children. Chamomile is used with purgatives to prevent griping, carminative pills being made from the essential essence of the flowers. The extract, in doses of 10 to 15 grains, combined with myrrh and preparations of iron, also affords a powerful and convenient tonic in the form of a pill. The fluid extract of flowers is taken in doses of from 1/2 to 1 drachm; the oil, B.P. dose, 1/2 to 3 drops.

Apart from their employment internally, Chamomile flowers are also extensively used by themselves, or combined with an equal quantity of crushed poppy-heads, as a poultice and fomentation for external swelling, inflammatory pain or congested neuralgia, and will relieve where other remedies have failed, proving invaluable for reducing swellings of the face caused through abscesses. Bags may be loosely stuffed with flowers and steeped well in boiling water before being applied as a fomentation. The antiseptic powers of Chamomile are stated to be 120 times stronger than sea-water. A decoction of Chamomile flowers and poppyheads is used hot as fomentation to abscesses - 10 parts of Chamomile flowers to 5 of poppy capsules, to 100 of distilled water.

The *whole herb* is used chiefly for making herb beers, but also for a lotion, for external application in toothache, earache, neuralgia, etc. One ounce of the dried herb is infused in 1 pint of boiling water and allowed to cool. The herb has also been employed in hot fomentations in cases of local and intestinal inflammation.

Culpepper gives a long list of complaints for which Chamomile is 'profitable,' from agues and sprains to jaundice and dropsy, stating that 'the flowers boiled in Iye are good to wash the head,' and tells us that bathing with a decoction of Chamomile removes weariness and eases pain to whatever part of the body it is employed. Parkinson, in his *Earthly Paradise* (1656), writes:

'Camomil is put to divers and sundry users, both for pleasure and profit, both for the sick and the sound, in bathing to comfort and strengthen the sound and to ease pains in the diseased.'

Turner says:

'It hath floures wonderfully shynynge yellow and resemblynge the appell of an eye . . . the herbe may be called in English, golden floure. It will restore a man to hys color shortly yf a man after the longe use of the bathe drynke of it after he is come forthe oute of the bathe. This herbe is scarce in Germany but in England it is so plenteous that it groweth not only in gardynes but also VIII mile above London, it groweth in the wylde felde, in Rychmonde grene, in Brantfurde grene.... Thys herbe was consecrated by the wyse men of Egypt unto the Sonne and was rekened to be the only remedy of all agues.'

The dried flowers of *A. nobilis* are used for blond dyeing, and a variety of Chamomile known as Lemon Chamomile yields a very fine essential oil.