

Yarrow – (*Achillea millefolium*)



Features - Common yarrow is a flowering plant in the family Asteraceae. It is native to temperate regions of the Northern Hemisphere in Asia, Europe, and North America. *A. millefolium* is an erect, herbaceous, perennial plant that produces one to several stems 0.2–1 m (0.66–3.28 ft) in height, and has a spreading rhizomatous growth form.

North American First Nation Ethnobotany – Used as herbal medicine across the continent, chewed for toothaches, infusion poured in ears for earaches, analgesic and cold remedy. Used leaves for headaches by inhaling in a steam. Tea to reduce fever and aid in sleep. Poultice mixed with water and applied to burns. Used as an insect repellent. Used to treat headaches, stings, cuts, sores, burns, and nosebleeds. Used for stomach disorders.

Global Uses – Chinese medicine gives it praise for the ability to affect the kidney, spleen, liver and energy channels throughout the body.

In antiquity, yarrow was known as *herbal militaris*, for its use in stanching the flow of blood from wounds.^[4] Other common names for this species include gordaldo, nosebleed plant, old man's pepper, devil's nettle, sanguinary, milfoil, soldier's woundwort, thousand-leaf, and thousand-seal. In the Middle Ages, yarrow was part of a herbal mixture known as gruit used in the flavoring of beer prior to the use of hops.^[36] The flowers and leaves are used in making some liquors and bitters. *A. millefolium* has seen historical use as in traditional medicine, often because of its astringent effects.^[1] The herb is purported to be a diaphoretic, astringent,^[37] tonic,^[37] stimulant and mild aromatic. It contains isovaleric

acid, salicylic acid, asparagin, sterols, flavonoids, bitters, tannins, and coumarins.^[citation needed] The genus name *Achillea* is derived from mythical Greek character, Achilles,^[37] who reportedly carried it with his army to treat battle wounds. This medicinal use is also reflected in some of the common names, such as staunchweed and soldier's woundwort.

In classical Greece, Homer tells of the centaur Chiron, who conveyed herbal secrets to his human pupils, and taught Achilles to use yarrow on the battle grounds of Troy.

Medicinal Potential – Chemical Constituents: Alkaloids (betonicine, stachydrine, trigonelline); Coumarins; Flavonoids (apigenin, luteolin, quercetin); Salicylic acid; Sesquiterpene lactones (achillin, achillicin); Polyacetylenes; Volatile oil with variable content (linalool, camphor, sabinene, chamazulene); Triterpenes; Tannins; Sterols and plant acids.

Uses of whole plant:

Yarrow (*Achillea millefolium*) plant has flexible medicinal use and it is very resourceful as a herbal medication is established from the fact that various parts of the plant can be used for healing different disorders. The flowers, essential oil, leaves as well as aerial parts are useful in some way or the other.

Flowers:

Infusion: An infusion of yarrow flowers can be prepared by steeping the flowers into boiling water for some time. If taken internally, the infusion is useful for upper respiratory phlegm. It may also be useful to heal eczema when applied externally as a wash.

Inhalation: Fresh yarrow flowers may be added to boiling water and the aroma inhaled to cure hay fever and mild asthma.

Essential oil

Massage oil: With a view to get relief from swollen joints, dilute 5 to 10 drops of yarrow oil in 25 ml of permeated St. John's wort oil and massage the amalgamation on the affected areas.

Chest rub: To alleviate chesty colds and drive out influenza, dilute 20 drops of essential yarrow (*Achillea millefolium*) oil in 25 ml of almond or sunflower oil and blend it with eucalyptus, peppermint, hyssop or thyme oil and rub the mixture on the chest.

Leaves

Fresh: Inserting yarrow (*Achillea millefolium*) leaf into the nostril helps in curbing nose bleed.

Poultice: Cuts and scratches on the body can be healed by wrapping cleansed fresh yarrow leaves on the affected regions.

Aerial parts

Infusion: An infusion prepared with the aerial parts of the yarrow plant is useful in reducing fevers. The infusion is also useful as a digestive stimulant.

Tincture: Yarrow (*Achillea millefolium*) tincture is useful for healing urinary disorders and menstrual problems. It is also recommended for cardiovascular complaints.

Compress: soak a pad in the yarrow infusion or dilute the yarrow tincture to get relief from varicose veins

Pharmacological Actions

The volatile oils work as antibacterial, anti-inflammatory and diuretic agents. The tannins are aggressive astringents. The alkaloids are both hypotensive and hypoglycemic. Yarrow (*Achillea millefolium*) even has coumarin in its cells which works as an anti-thrombotic to reduce high blood pressure. The bitter compounds that the tongue detects are due to flavonoids such as saponins and unpleasant tasting but powerful alkaloids like achilleine, trigonelline and betonicine. These are the proven facts for yarrow's actions in the digestive system, tissues and the blood stream.

Biological activity

Anti Microbial activity

Yarrow (*A. millefolium*) is recognized as a powerful medicinal plant is widely distributed and has been used medicinally for thousands of years. In a study, *A. millefolium* showed antibacterial activity against *S. typhimurium* and *S. aureus* with predicted MICs on the order of 10 s of $\mu\text{g/mL}$ or 10 s of mg/mL , respectively. A number of studies have investigated the antibacterial properties of this species and found similar results to those presented here. One difference, however, is that two studies found that ether-hexane-methanol extracts of Yarrow caused inhibition zones against *E. coli* in disc diffusion assays, whereas the study with aqueous extracts of flower, leaves, roots, and shoots and a separate study of essential oil and methanolic extracts did not. These differing results could be due to the different extraction methods used or regional variation in the chemical constituents of the plants. It is well known that Yarrow represents a diverse, polyploid complex that is probably composed of dozens of species with varying biochemical compositions. The biochemical diversity of this complex has been fairly well described, and it has been hypothesized that phenolic compounds such as flavonoids and phenolcarboxylic acids may underlie the observed antimicrobial activity.

Cholagogue Activity

The cholagogue activity of yarrow (*Achillea millefolium*) may be due to the presence of unsaturated fatty acids. At the least, it has been observed unsaturated fatty acids have good cholagogue effects, and they are present in yarrow.

Anti Hypertensive activity

The control of Hypertension is an important element in the management of cardiovascular diseases. Study showed that yarrow (*Achillea millefolium*) exhibits a high angiotensin converting enzyme inhibition, hence used in the treatment of hypertension.

Anti Inflammatory activity

Yarrow oil (*Achillea millefolium*) possesses good Anti inflammatory activity and used to treat rheumatism, muscle aches and heal inflamed cuts or wounds. Its phytochemical constituent, Flavonoids, along with having an effect on prostaglandin production, possess antiinflammatory. Another component of yarrow that is a powerful anti-inflammatory is azulene, which comprises almost half of yarrow's chemical composition.

Antioxidant Activity

In a Study the in vitro antimicrobial and antioxidant activities of the essential oil and methanol extracts of *Achillea millefolium* subsp. *millefolium* Afan. (Asteraceae) were investigated. GC-MS analysis of the essential oil resulted in the identification of 36 compounds constituting 90.8% of the total oil. Eucalyptol, camphor, alpha-terpineol, beta-pinene, and borneol were the principal components comprising 60.7% of the oil. The oil strongly reduced the diphenylpicrylhydrazyl radical (IC₅₀)=1.56 micro g/ml) and exhibited hydroxyl radical scavenging effect in the Fe(3+)-EDTA-H(2)O(2) deoxyribose system (IC₅₀)=2.7 micro g/ml). It also inhibited the nonenzymatic lipid peroxidation of rat liver homogenate (IC₅₀)=13.5 micro g/ml). The polar phase of the extract showed antioxidant activity. The oil showed antimicrobial activity against *Streptococcus pneumoniae*, *Clostridium perfringens*, *Candida albicans*, *Mycobacterium smegmatis*, *Acinetobacter woffii* and *Candida krusei* while water-insoluble parts of the methanolic extracts exhibited slight or no activity. This study confirms that the essential oil of yarrow (*Achillea millefolium*) possesses antioxidant and antimicrobial properties in vitro.

Anti nociceptive activity

In a study the hydroalcohol extracts of *Achillea millefolium* L. (AM) and *Artemisia vulgaris* L. (AV), both belonging to the Asteraceae family, were evaluated by the hot plate, writhing, formalin and intestinal transit tests in an attempt to confirm their folk use as analgesic, antiinflammatory and antispasmodic agents. AM 500 and 1000 mg/kg significantly inhibited abdominal contortions by 65% and 23%, respectively, whereas AV 500 and 1000 mg/kg inhibited them by 48% and 59%, respectively. None of the extracts produced differences in the intestinal transit in mice, nor in the response time in the hot plate or in the immediate or late responses in the formalin test. In HPLC/DAD analyses 'fingerprint', monitored at 360 and 270 nm, both hydroalcohol extracts showed the same flavonoid glycoside as a principal constituent, which was identified as rutin. A high content of caffeic acid derivatives were also found in both extracts. The main differences were observed at 240 nm: AM had a higher content of rutin, while in AV the hydroxybenzoic acid derivative was the major component.

Anti cancer activity

Yarrow (*Achillea millefolium*) possesses good Anti cancer activity. The phytochemical constituent of yarrow that is the flavonoids and sesquiterpenoids have antiproliferative effects against mouse P-388 leukemia cells and cervix epithelial adenocarcinoma (HeLa), breast epithelial adenocarcinoma (MCF-7) and skin epidermoid carcinoma (A431) cells.

Anti Diarrheal and Gastroprotective activity

The astringent feature of yarrow (*Achillea millefolium*) makes it a useful medication in stopping diarrhea and dysentery as well as impedes hemorrhage from the intestinal coatings. In addition, yarrow's sterile and antiinflammatory qualities help in healing infections and swollen organs like in the case of gastritis and enteritis.

Research Potential - Yarrow (*Achillea millefolium*) causes contact dermatitis, photosensitization, and other allergic reactions may occur in sensitive individuals. This herb has approval status by the German Commission E. Yarrow (*Achillea Millefolium*) Extract is an extract of the yarrow plant, *Achillea millefolium*, supplied in polypropylene glycol, which is reported to function as a "biological additive" in cosmetic products. Sesquiterpene lactones, polyacetylenes, simple coumarins, and flavonoids have been

identified among the many components of *A. millefolium*. Yarrow Extract was reportedly used in 65 cosmetic formulations. Historically, Yarrow (*Achillea Millefolium*) Extract was reported to be used at concentrations of < or =25%, but recent data indicate that this ingredient is supplied with actual Yarrow (*Achillea Millefolium*). Extract content of 2% to 25% and used at concentrations of 0.5% to 10%. Only limited toxicity data were available. Guinea pigs were sensitized to crude extracts of the whole plant and the flowers of *A. millefolium*. *A. millefolium* tea was weakly genotoxic in a somatic mutation and recombination test using *Drosophila melanogaster*. In clinical testing, product formulations containing 0.1% to 0.5% of ingredient that actually contained 2% of Yarrow Extract were generally not irritating. In provocative testing, patients reacted to a Composite mix that contained yarrow, as well as to yarrow itself. Also in clinical testing, a formulation containing 0.1% Yarrow (*Achillea Millefolium*) Extract (2% Yarrow in propylene glycol and water) was not a sensitizer in a maximization test and alcoholic extracts of dried leaves and stalks of *A. millefolium* did not produce a phototoxic response. These data were not considered sufficient to support the safety of this ingredient in cosmetics. The types of data (all testing is to be performed on cosmetic-grade ingredients) still required include (1) ultraviolet (UV) absorption data, if absorption occurs in the UVA or UVB range, photosensitization data are needed; (2) gross pathology and histopathology in skin and other major organ systems associated with repeated exposures; (3) reproductive and developmental toxicity data; (4) two genotoxicity studies, one using a mammalian system, if positive, a 2-year dermal carcinogenicity assay performed using National Toxicology Program (NTP) methods may be needed; and (5) clinical sensitization testing at maximum concentration of use. In the absence of these data, it was concluded that the available data are insufficient to support the safety of Yarrow (*Achillea Millefolium*) Extract for use in cosmetic products.

Abortifacient activity

Yarrow (*Achillea millefolium*) also has traditionally been used as an abortifacient, emmenagogue, contraceptive, and for stimulating uterine contractions. For this reason, it is contra-indicated for use in pregnancy. There has, however, been little scientific research carried out to either confirm or refute this recommendation. Female rats were dosed, orally by gavage using 56 times the human dose of yarrow daily on either gestation days (GD) 1-8 or GD 8-15. Two groups of controls were included; the first received water and the second received an equivalent dose of ethanol to that found in the yarrow preparation over the two gestation periods. On GD 20, rats were sacrificed, placentae were weighed, and corpora lutea counted. The fetuses were weighed and examined for signs of external, internal or skeletal malformations. In the study it was found that yarrow, when administered to rats at 56 times the human dose, was associated with reduced fetal weight and increased placental weight. In the absence of a no observable effect level for these variables it must be concluded that the consumption of yarrow is contraindicated during pregnancy until further investigations have been carried out.

In the last decades, pharmacological studies became intensive, although human clinical investigations are still rare. Recent findings have confirmed several traditional uses.

The largest number of data accumulated for antioxidant and anti-inflammatory effects. There are positive results on the analgesic, anti-ulcer, choleric, hepatoprotective and wound healing activities. First results on other interesting therapeutical areas - antihypertensive, antidiabetic, antitumor, antispermatogenic activities - need confirmation. Yarrow can be used also as an insect repellent. Contact dermatitis as adverse effect may be connected to sesquiterpenes. The diversity and complexity of the effective compounds of yarrow species explains the broad spectrum of their activity. According to this

literature the pharmacological effects are mainly due to the essential oil, proazulenes and other sesquiterpene lactones, dicaffeoylquinic acids and flavonoids. Achillea species have different chemical and therapeutical values. Despite of numerous data, correct evaluation of the results is difficult because of missing generally accepted taxonomical nomenclature. The used chemical-analytical methods and bio-assays are utmost diverse, making the comparison complicated. Further research on the activity is needed using exactly defined plant material, standardized methods and chemical analysis.

Food and Drink Uses – At this point most of the usage is medicinal. However, Yarrow is being tried as a meat and fish spice in Northern Saskatchewan, in combination with Sweet Gale and other ingredients.

Commercial Potential – Further research could lead to the production of concentrates that could have various uses in medicine and health care products.

Potential Quantities in Northern Saskatchewan – Yarrow is fairly common, and significant volume can be harvested. Supply of up to 500 kg (dried) is possible at this point. Given development time, this supply could be increased exponentially.

Harvest Window – Harvest is best in the plant's flowering months from June to August.

References: Wikipedia; <http://plantwatch.naturealberta.ca/choose-your-plants/common-yarrow/>;
<https://www.herbwisdom.com/herb-yarrow.html>;
<http://globalresearchonline.net/journalcontents/volume9issue2/Article-022.pdf>