Angelica sinensis (Dong quai)

Description

Angelica sinensis (commonly known as dong quai) is a fragrant, perennial herb found in mainland China, Japan, and Korea. Other common names for dong quai include Chinese Angelica, dang gui (Chinese), toki (Japanese), tanggwi (Korean), and kinesisk kvan (Danish). A member of the Umbelliferae family, Angelica produces white flowers that bloom in umbrella-like clusters in June-July. A typical plant grows to a height of approximately six feet (two meters). The dried root is valued for its therapeutic properties. Its flavor is a distinct blend of bitter, sweet, and pungent, and its overall effect is warming in nature. Chinese herbalists have used Angelica for thousands of years to strengthen heart, lung, and liver meridians, as well as lubricate the bowel. It is considered a blood tonic, and has been used by generations of women for health concerns such as menstrual pain and regulating the menstrual cycle.

Active Constituents

Dong quai root contains 0.4-0.7 percent volatile oil, the key components of which are n-butylidenephthalide, ligustilide, n-butylphthalide, ferulic acid, nicotinic acid, and succinic acid. Significant amounts of vitamin A and carotenoids (0.675%), vitamin B12 (0.25-0.40 mcg/100 g), vitamin E, ascorbic acid, folinic acid, biotin, various phytosterols (e.g., beta-sitosterol), calcium, magnesium, and other essential macrominerals are also found in dong quai root. Other constituents include n-valerophenone-O-carboxylic acid, delta-2,4-dihydrophthalic anhydride, uracil, adenine, carvacrol, safrole, isosafrole, sesquiterpenes, beta-cadinene, n-dodecanol, n-tetradecanol, palmitic acid, angelic acid, myristic acid, sucrose (40%), and a polysaccharide with a molecular weight of approximately 3,000.

Natural coumarin derivatives have been attributed to dong quai, but reports differ regarding which ones are truly present. The coumarin derivatives include angelol, angelicone, bergapten, oxyypeucedanin, osthole, psoralen, and 7-desmethylsuberosin.

Mechanisms of Action

Due to its varied constituents, several pharmacological actions may be attributed to dong quai. Such characteristics include anticoagulation and antiplatelet activity, as well as hematopoiesis, immune support, and uterine tonicity.
Angelica sinensis

Anticoagulant Activity
Coumarins and coumarin derivatives, natural anticoagulants in Angelica spp., have been associated with both the bioactivity and toxicity of the plants; however, A. sinensis contains a lower coumarin content compared to other closely related species.  

Antiplatelet Action
Ferulic acid, one of the constituents of dong quai, can inhibit the polymerization of platelets in blood circulation. It retards platelet release of 5-hydroxytryptamine (5-HT) and adenosine diphosphate (ADP). Both ferulic acid and an aqueous extract of dong quai were found to inhibit platelet aggregation and serotonin release.  

Immune Support and Hematopoiesis
Lymphocyte proliferation assays indicate dong quai consistently exerts an immunostimulatory effect. A high molecular weight polysaccharide found in dong quai has demonstrated immunostimulating activity and a blood tonifying effect by inducing hematopoiesis in the bone marrow. This is accomplished, in part, by either direct or indirect stimulation of macrophages, fibroblasts, erythrocytes, granulocytes, and lymphocytes, and can induce an increased secretion of human growth factors from muscle tissue.  

Antifibrotic Action
A mixture of dong quai and Astragalus demonstrated antifibrotic activity in a recent animal study. Rat models with chronic puromycin-induced nephrosis were treated with either a dong quai and Astragalus mixture (3 mL/day) or enalapril (10 mg/kg). The normal control group received saline, and another group received puromycin but no treatment. After 12 weeks the untreated rats showed marked renal fibrosis. However, dong quai and Astragalus significantly retarded the progression of renal fibrosis and deterioration of renal histological damage, with effects comparable to enalapril.  

Antispasmodic Activity
Ligustilide, butylidenephthalide, and butylphthalide were found to have antispasmodic activity against rat uterine contractions and in other smooth muscle systems. The components were characterized as non-specific antispasmodics with a mechanism different from papaverine.  

Clinical Indications

Cardiovascular Disease
Dong quai has demonstrated quinidine-like activity on the heart. It can prolong the refractory period, lower blood pressure, and correct experimental atrial fibrillation induced by atropine, pituitrin, strophanthin, acetylcholine, or electrical stimulation. Dong quai can dilate the coronary vessels, increase coronary flow, and reduce respiratory rate. An animal study using a water-based extract of dong quai demonstrated a marked protective effect against myocardial dysfunction and myocardial injury induced by ischemia.  

A recent histological study demonstrated a preparation of dong quai and Ligusticum significantly protected human umbilical vein endothelial cells against hydrogen peroxide damage, primarily by inhibiting reactive oxygen species formation and promoting endothelial nitric oxide synthase (eNOS) expression. This might be the mechanism of the above-noted cardio-protective activity.  

Nephrotic Syndrome
An herbal preparation of Astragalus and dong quai has long been used in China to treat nephrotic syndrome, as it was thought to elicit antifibrotic effects. In a recent animal study the Astragalus/dong quai mixture was found to retard the progression of renal fibrosis and deterioration of renal function with an effect similar to the drug enalapril.  

Dysmenorrhea
Two general components of dong quai affect uterine smooth muscle in opposite ways. The antispasmodic component of the herb is attributed to constituents of the volatile oil, such as
ligustilide, butylidenephthalide, and butylphthalide. As a balance, the uterine stimulat-
ing aspect is attributed to the water-soluble, non-
volatile constituents of the herb.1,2,4,10

Animal experiments in vivo have demon-
strated increased excitability of the uterus, where
the contractive rhythm of uterine smooth muscle
changed from fast, weak, and irregular to slower,
stronger, and more coordinated (more rhythmic),
depending on uterine tone. This is believed to be
the pharmacological basis for use of dong quai
during dysmenorrhea.1 The root does not exert
estrogenic activity.10,14

Menopause

One of the most common applications for
don quai in the United States is for relief of va-
somotor symptoms associated with menopause.
Such symptoms include hot flashes, skin flush-
ing, perspiration, and chills. The mechanism of
action, however, is still unclear. In a randomized,
double-blind, placebo-controlled clinical trial, 71
postmenopausal women received either dong quai
root (4.5 g) or placebo daily for 24 weeks.14 There
were no differences in vasomotor symptoms be-
tween the two groups, and there appeared to be
no estrogen-like effects on vaginal epithelial tis-
tue. The use of dong quai alone can be criticized
because traditional Chinese practitioners never
prescribe it alone, but rather in combination with
several other herbs. The researchers chose to study
don quai alone because many women in the
United States who take it to relieve menopausal
symptoms purchase the herb over-the-counter as
a single entity. Women should be discouraged from
using dong quai alone for the relief of menopausal
complaints.

An herbal mixture containing Angelica
sinensis root, Paeonia lactiflora root, Ligusticum
rhizome, Atractylodes rhizome, Alismatis rhi-
zone, and Sclerotium poria has been reported to
reduce menopausal disturbances, including vaso-
motor symptoms by 70 percent.10,14

Drug-Botanical Interactions

Dong quai may potentiate the therapeutic
and adverse effects associated with antiplatelet
medication. A small pharmacokinetic study con-
ducted on rabbits observed the interaction between
don quai and warfarin. Single subcutaneous doses
of warfarin (2 mg/kg) were administered with or
without oral dong quai extract (2 g/kg, twice daily
for three days). The dong quai treatment did not
effect prothrombin time on its own, but signifi-
cantly lowered the value three days after co-ad-
ministration with warfarin. No significant varia-
tion in the pharmacokinetic parameters of warfarin
were observed after dong quai treatment for ei-
er single-dose administration or steady-state
concentrations of warfarin.2,15

In a case report, a 46-year-old woman,
who had been taking 5 mg/day warfarin for nearly
two years and had an international normalized ra-
tio (INR) stabilized at 2-3, experienced an increase
in her INR to 4.9 over the course of approximately
two months.16 Changes in medication regimen,
diet, alcohol consumption, or other lifestyle fac-
tors that may affect INR were sufficiently ruled
out. However, the patient stated that for the past
four weeks she had been taking dong quai for
perimenopausal symptoms as recommended by an
herbalist, and had forgotten to mention this ear-
lier. The dosage was one 565-mg tablet 1-2 times/
day. The patient was instructed to discontinue dong
quai, and within four weeks her INR declined to
the therapeutic range of 2.48. In view of this in-
formation, caution is advised for patients receiv-
ing chronic treatment with warfarin.

Side Effects and Toxicity

Although no reported side effects have
occurred with the use of authentic dong quai, vari-
ous sources continue to warn of potential photo-
sensitivity reactions due to psoralen and bergapten
content.7 Both psoralen and bergapten are
furanocoumarins widely studied for their photo-
sensitizing properties.17 Other related species of
Angelica (e.g., A. gigas, A. dahurica and A.
pubescens) pose a greater risk than dong quai due
to their higher furanocoumarin content.7
Angelica sinensis Monograph

There has been one isolated case of a man who developed gynecomastia (mammary glandular hyperplasia) after taking dong quai capsules daily for approximately one month. The label on the bottle indicated “100% dong quai (Angelica sinensis) root powder. No fillers or additives.” The patient discontinued the “dong quai” pills and his gynecomastia had regressed completely when examined three months later. It is important to note that the pills in question were not properly analyzed to confirm or refute the purity of the product. Consequently, the authors could not rule out presence of a pharmacologically active contaminant that may have contributed to the patient’s condition.

The oral LD₅₀ of a concentrated (8:1 to 16:1) dong quai extract in rats was measured at 100 g/kg body weight. Intravenous administration of the essential oil to animals at doses of 1 mL/kg can cause a drop in blood pressure and depression of respiration.

Contraindications
Dong quai is contraindicated in pregnancy, particularly in the first trimester, due to potential uterine stimulant and relaxant effects.

Dosage
Dong quai is available in several different forms, and dosages vary accordingly. Typical oral dosages are as follows:
- Dried root: 3-15 g daily by decoction
- Powdered root: 1-2 g 3 times daily
- Tea: 1 cup 1-3 times daily (1 g per cup)
- Tincture (1:2): 4-8 mL (1-2 tsp) per day
- Capsules/Tablets: 500 mg 1-6 times daily

References
Monograph

**Angelica sinensis**


---

**Statement of Ownership, Management, and Circulation**

(Required by 39 USC 3685)

1. Publication title: Alternative Medicine Review
2. Publication number: 0017-641
3. Filing date: October 1, 2004
4. Issue frequency: Quarterly
5. Number of issues published annually: Four
6. Annual subscription price: US $95.00
7. Mailing address, office of publication: 25820 Highway 2 West, Sandpoint, Bonner County, Idaho 83864-7364
   Contact Person: Kelly Czap  Telephone: 208-263-1337
8. Mailing address, general business office of publisher: P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
9. Names/mailing addresses of publisher, editor, and managing editor:
   Publisher: A. F. Czap, P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
   Editor: Kathleen Head ND, P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
   Managing Editor: Kelly Czap, P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
10. Owners:
    Thorne Research, Inc., P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
    A. F. Czap, P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
    Kelly A. Czap, P.O. Box 25, Dover, Bonner County, Idaho 83825-0025
11. Bondholders, mortgagees, other security holders owning or holding one percent of total amount of bonds, mortgages, or other securities: None
12. Tax Status: Not applicable
13. Publication Title: Alternative Medicine Review
14. Issue date for circulation data: September 2004
15. Extent and nature of circulation
   Average number of copies each issue during preceding 12 months / actual number of copies of single issue published nearest filing date:
   a. Total number of copies (net press run): 6625 / 6500
   b. Paid and/or requested circulation:
      (1) paid/requested outside-county mail subscriptions stated on Form 3541: 3639 / 3596
      (2) paid in-county subscriptions stated on Form 3541: 0 / 0
      (3) sales through dealers, carriers, street vendors, counter sales and other non-USPS paid distribution: 0 / 0
      (4) other classes mailed through USPS: 55 / 55
   c. Total paid and/or requested circulation (sum of 15b (1),(2),(3), and (4)): 3694 / 3651
   d. Free distribution by mail (samples, complimentary, other free):
      (1) outside-county as stated on Form 3541: 2371 / 2344
      (2) in-county as stated on Form 3541: 0 / 0
      (3) other classes mailed through the USPS: 0 / 0
   e. Free distribution outside the mail (carriers or other means): 0 / 0
   f. Total free distribution (sum of 15d and 15e): 2371 / 2344
   g. Total distribution (sum of 15c and 15f): 6065 / 5995
   h. Copies not distributed: 560 / 505
   i. Total (sum of 15g and h): 6625 / 6500
   j. Percent paid and/or requested circulation (15c/15g x 100): 61% / 61%
16. Publication of Statement of Ownership: printed in December 2004
17. Signature and title of Editor: Kathleen Head, ND, Editor Date: October 1, 2004