Red Clover

*Trifolium pratense* L. Family: *Fabaceae*

**Overview**

Red clover (RC) is a short-lived perennial herb growing 1 to 2 feet that produces purplish-pink tubular flowers. Native to Europe, Asia, and Africa, the herb is widely cultivated for its flowers and as a green manure and nitrogen-rich crop. The genus name *Trifolium* is derived from the Latin *tres* meaning *three* and *folium* for *leaf;* the species *pratense* is Latin for *growing in meadows.*

**History and Cultural Significance**

In Greek and Roman mythology, the three-leaf clover represents the triad goddesses. The rare four-leaf clover became a popular Christian symbol due to the cross shape. In medieval folk rhyme, the four-leaf clover symbolizes complete happiness. Each leaf is thought to represent a different aspect of happiness including fame, wealth, faithful lover, and excellent health.

RC leaves are eaten as salad greens and the flowers are dried for use in teas. The Chinese have traditionally used an infusion of RC flowers internally as an expectorant, while Russians used an infusion to treat bronchial asthma. European cultures also utilized RC as a medicinal herb to aid in liver and digestive ailments. Various Native American cultures are the leaves as food and used the plant for sore eyes and in a salve for burns, as well as for whooping cough, fevers, menopause, and cancers.

RC is an excellent forage crop for hay, silage, and livestock grazing, and it is also recognized for its importance in soil conservation and crop rotation due to its ability to fix nitrogen in soil.

**Recent Research**

Recent research on RC has focused on its isoflavone content, as RC is a rich source of four dietary isoflavones—formononetin, daidzein, genistein, and biochanin A. High dietary intake of these phytoestrogens (mainly as found in soy foods) has been implicated in buffering the effect of reduced estrogen in menopause women.

In a systematic review of herbs used to treat menopausal symptoms, 4 studies focused on RC. The review's authors concluded that RC may possibly be beneficial for certain menopausal symptoms. In 2 of the reviewed trials, an RC extract standardized to 40 mg of isoflavones reduced the frequency and severity of hot flashes by about 50% compared to placebo. A subsequent trial showed no statistically significant benefits of 2 red clover preparations over placebo in reducing hot flashes. However, despite a growing body of clinical data suggesting benefits in the treatment of various menopause symptoms, a systematic review of 5 randomized trials on RC in menopausal women found no statistically significant effect of RC on hot flash frequency.

Two other trials suggest that the isoflavones in RC may slow the rate of bone loss and may even help build bone in post-menopausal women. One study showed decreased bone loss over 12 months compared to placebo, concluding that RC isoflavones may have a protective effect on the lumbar spine in women.

Another trial demonstrated a significant increase in the cortical bone of the proximal radius and ulna after 6 months of use.

RC isoflavones have numerous potential benefits for cardiovascular health. One clinical trial tested the effects of purified RC isoflavones on total cholesterol, concluding that these isoflavones provided no significant benefits on LDL (low-density lipoproteins, “cholesterol”), HDL (high-density lipoproteins, “good cholesterol”), or total cholesterol. Several other trials suggest that RC isoflavones have beneficial effects on lipid levels in men and women.

In a clinical trial, isoflavones induced apoptosis (programmed cell death) in moderate-grade tumors; this related data suggests that RC may help slow or stop growth of prostate cancer. In a clinical trial, isoflavones induced apoptosis (programmed cell death) in moderate-grade tumors; this related data suggests that RC may help slow or stop growth of prostate cancer.

Another trial demonstrated a significant increase in the cortical bone of the proximal radius and ulna after 6 months of use. RC isoflavones have numerous potential benefits for cardiovascular health. One clinical trial tested the effects of purified RC isoflavones on total cholesterol, concluding that these isoflavones provided no significant benefits on LDL (low-density lipoproteins, “cholesterol”), HDL (high-density lipoproteins, “good cholesterol”), or total cholesterol. Several other trials suggest that RC isoflavones have beneficial effects on lipid levels in men and women.

In a clinical trial, isoflavones induced apoptosis (programmed cell death) in moderate-grade tumors; this related data suggests that RC may help slow or stop growth of prostate cancer.

Another trial demonstrated a significant increase in the cortical bone of the proximal radius and ulna after 6 months of use. Another trial demonstrated a significant increase in the cortical bone of the proximal radius and ulna after 6 months of use.

RC extracts have also shown potential for men in prostate health. Epidemiological evidence (i.e., from population studies) suggests that a high dietary intake of isoflavones reduces the risk of prostate cancer and promotes general prostate health.

In a clinical trial, isoflavones induced apoptosis (programmed cell death) in moderate-grade tumors; this related data suggests that RC may help slow or stop growth of prostate cancer.

Another trial showed RC isoflavones reduced arterial stiffness and vascular resistance in normotensive men and postmenopausal women.

In clinical trials involving over 1,000 women, standardized RC extracts were well tolerated and resulted in no reported adverse events. The mildly estrogenic activity of RC isoflavones is many times less than that of steroidal estrogen. One study in pre-menopausal women demonstrated an anti-estrogenic effect by relieving breast pain associated with cyclical mastalgia.

Another trial on the long-term effect of an RC-derived isoflavone supplement taken daily for 1 year concluded that (unlike conventional hormone replacement therapy) the RC supplement did not increase mammographic breast density.

RC extracts have also shown potential for men in prostate health. Epidemiological evidence (i.e., from population studies) suggests that a high dietary intake of isoflavones reduces the risk of prostate cancer and promotes general prostate health.

In a clinical trial, isoflavones induced apoptosis (programmed cell death) in moderate-grade tumors; this related data suggests that RC may help slow or stop growth of prostate cancer.

Another review of phytotherapies for men with benign prostatic hyperplasia (BPH) concludes that isoflavones, particularly RC extract, are potential therapies for promoting prostate health in men with the non-cancerous prostate growth associated with advancing age.

While there is growing clinical evidence for the benefits of RC extracts, most trials have been relatively small. Larger

*Continues on page 6*
studies are needed for conclusive evidence on RC and/or RC-derived isoflavones for the potential benefits of lowering cholesterol and blood-pressure or the management of menopausal symptoms. Potential also exists for RC extracts as a source of dietary isoflavones for prostate and cardiovascular health in men. HG

REFERENCES


4. Moerman DE. Native American cardiovascular health in men. HG of dietary isoflavones for prostate and/or RC-derived isoflavones for studies are needed for conclusive evidence on RC and/or RC-derived isoflavones for the potential benefits of lowering cholesterol and blood-pressure or the management of menopausal symptoms. Potential also exists for RC extracts as a source of dietary isoflavones for prostate and cardiovascular health in men. HG


