

Antioxidant Activity of Tea Unaffected by Milk



Green Tea, *Camellia sinensis*. Photo © 2000 Steven Foster.

The antioxidant activity of both green and black tea (*Camellia sinensis* (L.) Kuntze, Theaceae) in the body (in vivo) is well established, but an important question remains: Does the addition of milk to tea inhibit the bioavailability of antioxidant tea polyphenols? Not according to the results of this Dutch study, which showed that a single dose of either black or green tea, with or without milk, caused a significant rise in plasma antioxidant activity.¹

The crossover study compared the antioxidant effects of green tea, black tea, and non-carbonated mineral water, with or without milk, in 21 healthy volunteers. Each participant received a dose of one of the six test substances on six different days. A single dose of tea was defined as 2 g of tea solids in 300 ml of water (Lipton Research Blend, Lipton, Englewood Cliffs, NJ). The researchers utilized the ferric reducing ability of plasma (FRAP) assay to measure both plasma antioxidant and catechin levels. Blood samples were taken before consumption of the test substances and again 30, 60, 90, and 120 minutes after consumption. According to the results, both green and black tea caused a significant rise in plasma antioxidant and catechin levels, but the effect of green tea was significantly greater at all time points. The addition of milk to either type of tea did not significantly alter responses.

While a limited number of studies support these results, others have shown that milk had a negative impact on the antioxidant capacity of tea. An earlier study published in the *European Journal of Clinical Nutrition* concluded that while the addition of milk to tea had no effect on antioxidant activity *in vitro*, it did appear to interfere with absorption of tea polyphenols *in vivo*. The authors of the older study offered two possible explanations for this effect. First, because milk proteins can cause complexation (binding) of tea polyphenols, the researchers proposed that milk/polyphenol complexes resist gastric breakdown, rendering the polyphenols unavailable for absorption. They also theorized that milk might hinder polyphenol absorption by increasing gastric pH.²

The authors of the more recent study suggested that the antioxidant assay utilized by Serafini and colleagues (called the Total Radical trapping Ability of Plasma, or TRAP assay) might be less reliable than the FRAP method, as TRAP may be associated with a higher degree of variability. — Evelyn Leigh, *HRF* □

1. Leenen R, Roodenburg AJC, Tijburg LBM, Wiseman SA. A single dose of tea with or without milk increases plasma antioxidant activity in humans. *Eur J Clin Nutr* 2000;54:87-92.

2. Serafini M, Ghiselli A, Ferro-Luzzi A. *In vivo* antioxidant effect of green and black tea in man. *Eur J Clin Nutr* 1996;50:28-32.

Willow Bark Extract Reduces Low Back Pain

In spite of its long and compelling history of traditional use, there is little research-based information on willow bark (*Salix alba* L., Salicaceae) as a pain reliever, and dosages recommended by official sources are often contradictory. To clarify dosage issues, a team of German researchers conducted a four-week clinical trial designed to compare the effectiveness and safety of two different dosages of willow bark extract for alleviating flare-ups of low back pain.¹ Results showed that both the high and low doses of willow bark extract afforded significantly more pain relief than placebo, but the higher dose of willow bark (240 mg/day) was significantly more effective than either the low-dose treatment (120 mg/day) or the placebo.

The placebo-controlled study involved 210 chronic low-back pain sufferers currently experiencing exacerbations of pain (rated 5 or higher out of a possible score of 10 on a visual pain-approximation scale). The study participants were randomly assigned to receive willow bark extract at a low dose (120 mg/day) or a high dose (240 mg/day), or placebo. Patients were permitted to supplement their test treatment as needed, with up to 400 mg per day of tramadol, a prescription pain reliever.

Ninety-one percent of patients completed the trial. The main outcome measured was pain relief, defined as the proportion of patients reporting freedom from pain for at least 5 days during



Willow, *Salix* spp. Photo © 2000 Steven Foster.

the last week of treatment, without the use of tramadol. Secondary measurements were the proportion of patients who needed to use tramadol during the study and improvement in symptoms from baseline. According to the results, 39 percent of participants in the high-dose willow group were pain-free during the final week of treatment, as compared to 21 percent of the low-dose group and only six percent of the placebo group. For those taking the higher dose of willow bark, pain relief was evident after only one week, and significantly more people in the placebo group required tramadol during each week of the study. There was a similar low rate of mild adverse effects among all three groups, some of which were attributed to tramadol. One patient in the low-dose willow group experienced an allergic reaction (swollen eyes and itching) that the investigators believed was treatment-related.

The willow bark preparation used in the study was a dry extract containing 0.153 mg of salicin per mg of extract, manufactured by Plantina GmbH of Munich, Germany. According to the researchers, results of this trial support earlier reports that willow bark extract "standardized to yield 240 mg of salicin" is an effective pain reliever.^{2,3} — Evelyn Leigh, HRF □

1. Chrubasik S, Eisenberg E, Balan E, Weinberger T, Luzzati R, Conradt C. Treatment of low back pain exacerbations with willow bark extract: A randomized double-blind study. *Am J Med* 2000;109:9-14.

2. Schaffner E. Eidenrinde—Ein Antiarrheumatikum der modernen Phytotherapie? In: Chrubasik S, Wink M, eds. *Rheumatherapie mit Phytopharmaka*. Stuttgart: Hippokrates-Verlag;1997:125-7.

3. Schmid B, Tschirdewahn B, Katter I, et al. Analgesic effects of willow bark extract in osteoarthritis: results of a clinical double-blind trial. *Fact* 1998;3:186.

Vitex Improves Symptoms of PMS

A large new clinical trial adds to the growing body of evidence supporting the use of the small fruits of vitex, also known as chastetree (*Vitex agnus-castus* L., Verbenaceae), in the treatment of premenstrual syndrome (PMS), a variable complex of symptoms affecting up to 40 percent of fertile women.¹ According to results of the open-label German trial, 93 percent of study participants reported that their PMS symptoms either decreased or disappeared altogether after treatment with vitex over the course of three menstrual cycles.

According to the investigators, PMS has been associated with up to 150 different symptoms, most of which fall into four classic "symptom complexes" defined as depression, anxiety, craving, and hyperhydration (DACH). Their study was designed to assess the efficacy and tolerability of a new solid vitex preparation called Femicur®, manufactured by Schaper & Brummer GmbH & Co., Salzgitter, Germany. Each capsule contains 1.6 – 3.0 mg dried extract of vitex berry in a ratio of 6.7 – 12.5:1, equivalent to 20 mg of dried berry.

The 1,634 study participants received treatment with one capsule twice daily of Femicur, and changes from baseline were recorded on questionnaires completed by physicians based on interviews conducted before treatment and again after three menstrual



Vitex, *Vitex agnus-castus*. Photo © 2000 Steven Foster.

cycles. The questionnaires were specifically designed to determine the effect of vitex on psychological and physical symptoms, the four classic DACH complexes, and single groups of characteristic symptoms. Improvement was assessed according to the standard Clinical Global Impression Scale, which allows patients to rate symptomatic change on a scale of one to seven (very much improved to very much worse).

At the end of the trial, statistically significant decreases were observed in the frequency of all symptoms and DACH complexes. Forty-two percent of patients reported that they were no longer affected by PMS, 51 percent had a decrease in symptoms, six percent reported no change, and one percent reported an increase in the number of symptoms. Eighty-six percent of physicians noted that vitex treatment had "a pronounced efficacy," and 81 percent of participants rated their status after treatment as "very much or much better." With regard to tolerability, 94 percent of the women rated the vitex preparation as good or very good, and no serious side effects were reported. Minor side effects reported by the remaining women included mild skin reactions and gastrointestinal upset.

In an interesting aside, the authors suggested that vitex may have had a positive effect on fertility for some women who had trouble becoming pregnant before the trial. They noted, "Data from this trial support the occasionally described restoration of fertility by *Vitex* treatment. No woman was pregnant at the start of *Vitex* therapy, and 19 of the 23 women who conceived while on *Vitex* treatment belonged to the group of 126 women (8%) who had been to date unsuccessful at becoming pregnant." — Evelyn Leigh, HRF □

1. Loch E-G, Selle H, Boblitz N. Treatment of premenstrual syndrome with a phytopharmaceutical formulation containing *Vitex agnus castus*. *Journal of Women's Health & Gender-Based Medicine* 2000;9(3):315-20.