

Cranberry SAP-UTI

Science-based cranberry (whole berry) concentrate for UTI prevention

Native to North America, cranberries have been used as a medicinal agent for centuries. Cranberries contain proanthocyanidins, which have been shown to inhibit the fimbrial adhesion of bacteria, including *Escherichia coli*, to the urinary tract epithelium, hence preventing bacterial proliferation and infection. These unique proanthocyanidin compounds, and not acidification of the urine, are suggested to be pivotal in preventing urinary tract infections (UTIs).

SUPPLEMENT FACTS

Serving Size: 1 Capsule		Servings: 60
	Amount Per Serving	% Daily Value
Cranberry (<i>Vaccinium macrocarpon</i>) fruit	600 mg	**

**Daily Value not established

Other ingredients: Non-GMO vegetable capsule composed of hypromellose and purified water.

This product is non-GMO.

Contains no: Gluten, soy, corn, wheat, dairy, eggs, yeast, citrus, sugar, starch, preservatives, artificial flavor or color.

Cranberry SAP-UTI (concentrate) contains 60 vegetable capsules per bottle.

DIRECTIONS FOR USE

Adults: Take 1 capsule once or twice daily or as directed by your healthcare practitioner.

2 capsules provide 54 mg of proanthocyanidins.

INDICATION

Cranberry SAP-UTI supplies a minimum daily dose of 54 mg of proanthocyanidins from whole cranberry extract to optimize protection against the adhesion of bacteria to urinary tract and bladder walls. Scientific research has shown that proanthocyanidin-rich cranberry supplementation interferes with bacterial adhesion and prevents occurrence of UTIs.

NATURAL SYNERGISTIC BLEND

Cranberries contain a diverse range of phytochemicals. **Cranberry SAP-UTI** is manufactured from whole ripe red cranberries containing the berry's natural blend of antioxidants and other phytonutrients. The synergy of the complex phytonutrient blend provides increased bioavailability and protective health benefits.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for each **Cranberry SAP-UTI** lot number have been tested by an ISO 17025-accredited third-party laboratory for identity, potency, and purity.



Scientific Advisory Panel (SAP):
adding nutraceutical research
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CRANBERRIES AND PROANTHOCYANIDINS

Cranberries or *Vaccinium macrocarpon* are one of three fruits native to North America and have been used as a medicinal agent by Native Americans for centuries.^[1, 2] The single strength juice extracted from cranberries is highly acidic (pH 2.5), astringent and quite unpalatable.

Cranberries contain a wide variety of diverse compounds which are responsible for the fruits' biological effects.^[3] Cranberries supply a rich phytonutrient blend containing anthocyanidins, proanthocyanidins, flavonol glycosides, sugars, organic acids and phenolic acids.

Proanthocyanidins are a group of condensed tannins (polyphenolic compounds) that have been isolated from cranberry fruit and that are believed to be responsible for the health benefits associated with cranberry intake.^[4] Specifically, increased dietary consumption of cranberry products has been associated with a reduced risk of urinary tract infection (UTI) and maintenance of urinary tract health.^[1, 2, 4-7]

URINARY TRACT INFECTIONS (UTIs)

Urinary tract infection is defined by the presence of microorganisms in the urinary tract, including the bladder, prostate, collecting system and kidneys.^[2] Annually, UTIs are responsible for more than 11 million physician visits in the United States.^[5]

UTIs have a high resistance to first-line antibiotic therapy,^[5] and treatment with antibiotics is associated with side effects such as nausea, diarrhea, and *Candida* infections.^[6]

UTIs are approximately 50 times more prevalent in adult women than adult men; however, UTIs can occur in men, women and children.^[7] It has been estimated that 30% of women will experience at least one UTI during their lifetime,^[7] and of these women, 25% will experience frequent recurrent infections.^[8]

Women are most susceptible to UTIs because they have a short urethra that allows for bacteria to easily ascend into the bladder.^[7] Pregnancy, sexual activity, aging, and use of urogenital medical devices (i.e. catheters) increase the risk and severity of UTIs. Symptoms of UTIs include frequent and urgent need to urinate, cloudy urine, painful urination, and lower-back pain.^[2]

MECHANISMS OF ACTION

Acidification of the Urine?

Cranberries are very acidic, containing quinic acid, malic acid and citric acid.^[1, 3, 7] Early research observed that cranberry quinic acid produced large amounts of hippuric acid, a strong antibacterial agent excreted in the urine.^[1, 4, 7]

For years, researchers believed that the bacteriostatic effect of cranberry consumption was related to the acidification of urine; however, several studies failed to confirm this hypothesis, as consumption of cranberries only produced very slight increases in urinary acidity, and did not alter antibacterial activity in the urinary tract.^[1, 2] Due to a lack of scientific substantiation, urinary acidification is no longer believed to be the mechanism responsible for the action of cranberry on UTIs.^[1, 4]

Antiadherence

UTIs are most often caused by uropathogenic bacteria that are harbored in the colon and ascend up the urinary tract, adhere to mucosal surfaces, proliferate, and cause infection.^[4] The most common urinary pathogen, accounting for 85% of UTIs, is *Escherichia coli*.^[2]

The bacterial cell wall of *E. coli* contains protein-like fibres called fimbriae that readily attach to uroepithelial cells.^[9] *E. coli* fimbriae produce two fimbrial adhesions: type 1 (mannose-sensitive) and P-type (mannose-resistant).^[1, 9] It is the adherence of bacteria (*E. coli*) to uroepithelial cells that is the critical step in the development of UTIs.^[9]

Cranberries contain two anti-adhesion compounds: fructose and proanthocyanidins.^[1, 4, 9] While fructose inhibits type 1 fimbrial *E. coli* adhesion, proanthocyanidins competitively inhibit P-type fimbrial adhesion and proliferation, resulting in an increased excretion of *E. coli* in the urine.

To date, there is substantial *in vitro* and *in vivo* evidence showing that proanthocyanidins effectively inhibit P-type *E. coli* from adhering to uroepithelial cells^[4, 9] from 2 to 10 hours after ingesting cranberries.^[1] However, since proanthocyanidins are more effective at preventing bacterial adherence than displacing adhered bacteria from uroepithelial cells, cranberry consumption is indicated for prevention rather than treatment of UTIs.^[1, 4]

CRANBERRIES, UTIs, AND NUTRITION RESEARCH

Randomized intervention trials have observed a clinical benefit of cranberry products in preventing UTIs.^[1, 10-13]

Scientific evidence reports that sexually active women with recurrent UTIs show greatest benefit from the preventative effects of cranberry intake, with an associated 50% reduction in UTI disease morbidity.^[1]

Furthermore, evidence from a randomized clinical trial on elderly women reported a significant reduction in bacteria and exudate found in the urine after cranberry juice intake.^[13]

An epidemiological study on first-time UTIs and sexual behaviors found that regular consumption of cranberry juice was associated with a decreased risk of UTIs.^[14]

As compared to the preventive effect of cranberry in UTIs, there are no scientific studies evaluating the effectiveness of cranberry products in the treatment of UTIs.^[1, 7] More scientific evidence is needed to confirm the provocative findings obtained to date.

SAFETY OF CRANBERRIES

Intake of cranberries is considered to be safe.^[1] However, high intakes of cranberry juice may have a laxative effect.^[1] Cranberries contain moderately high levels of oxalate, and Terris et al.^[15] reported that patients at risk of nephrolithiasis (kidney/urinary stones) should avoid dietary supplementation of cranberries.

In 2004, the Committee on Safety of Medicines warned health professionals about the possibility of interaction between warfarin and cranberry juice.^[16] However, it is not known whether other cranberry products, such as capsules or concentrates, might also interact with warfarin, though similar caution should be considered. Currently, there is not enough information available to assess the interaction of cranberry intake with the use of dietary supplements and medications.

ACCEPTABILITY OF CRANBERRY PRODUCTS

Cranberry juice cocktail, a sweetened, high-calorie beverage containing about 27-33% cranberry juice, is the most common form of cranberry consumption.^[1, 2] However, due to the high patient-dropout rates in clinical studies associated with intolerance of long-term cranberry juice intake, cranberry capsules may be better tolerated.^[1]

Moreover, a study conducted by Strothers^[9] found that cranberry tablets are now more cost-effective than organic cranberry juice. Therefore, having similar clinical results, taking cranberry supplements (capsules or tablets) may be a better alternative to drinking cranberry juice for the prevention of UTIs.

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