

Dosage effect on uropathogenic *Escherichia coli* anti-adhesion activity in urine following consumption of cranberry powder standardized for proanthocyanidin content: a multicentric randomized double blind study.

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Source

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Abstract

BACKGROUND:

Ingestion of cranberry (*Vaccinium macrocarpon* Ait.) has traditionally been utilized for prevention of urinary tract infections. The proanthocyanidins (PACs) in cranberry, in particular the A-type linkages have been implicated as important inhibitors of primarily P-fimbriated *E. coli* adhesion to uroepithelial cells. Additional experiments were required to investigate the persistence in urine samples over a broader time period, to determine the most effective dose per day and to determine if the urinary anti-adhesion effect following cranberry is detected within volunteers of different origins.

METHODS:

Two separate bioassays (a mannose-resistant hemagglutination assay and an original new human T24 epithelial cell-line assay) have assessed the ex-vivo urinary bacterial anti-adhesion activity on urines samples collected from 32 volunteers from Japan, Hungary, Spain and France in a randomized, double-blind versus placebo study. An in vivo *Caenorhabditis elegans* model was used to evaluate the influence of cranberry regimen on the virulence of *E. coli* strain.

RESULTS:

The results indicated a significant bacterial anti-adhesion activity in urine samples collected from volunteers that consumed cranberry powder compared to placebo ($p < 0.001$). This inhibition was clearly dose-dependent, prolonged (until 24 h with 72 mg of PAC) and increasing with the amount of PAC equivalents consumed in each cranberry powder regimen.

An in vivo *Caenorhabditis elegans* model showed that cranberry acted against bacterial virulence: *E. coli* strain presented a reduced ability to kill worms after a growth in urines samples of patients who took cranberry capsules. This effect is particularly important with the regimen of 72 mg of PAC.

CONCLUSIONS:

Administration of PAC-standardized cranberry powder at dosages containing 72 mg of PAC per day may offer some protection against bacterial adhesion and virulence in the urinary tract. This effect may offer a nyctohemeral protection.