

# STANDARDIZED CRANBERRY TABLET INHIBITS UROPATHOGENIC BACTERIAL ADHESION IN CANINE URINE

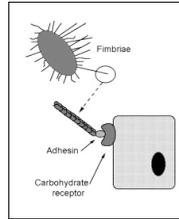


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**Purpose:** Use of cranberry juice has been shown to be effective in decreasing the recurrence of UTIs in women. In dogs, as with humans, *Escherichia coli* (*E. coli*) is the most common pathogen associated with UTIs. Initially it was thought that the acidity in cranberry acidified the urine, preventing bacterial growth. However, studies have demonstrated that cranberry consumption decreases the adhesion of P-fimbriated *E. coli* (Pf *E. coli*) to uroepithelial cells, eliminating the bacteria from the bladder by normal urination. The active anti-adhesion component(s) of the cranberry, the proanthocyanidins (PACs), have an unusual A-type linkage not found in most other foods containing PACs. The current study was undertaken to assess canine urinary bacterial anti-adhesion activity following dosing of a standardized cranberry tablet developed for use in maintenance of canine urinary tract health.

Bacterial adhesion to uroepithelial cells is the first step in initiation of a urinary tract infection. Bacteria bind to specific cell receptors, multiply and cause infection. Inhibition of the adhesion step may help prevent infections from progressing.

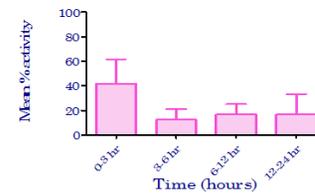


**Methods:** To assess effects of a cranberry powdered supplement containing a standardized dose of PACs on urine anti-adhesion (AA) activity, six male beagle dogs 3-8 years old weighing 13 - 14.7 kg (mean 14.1 kg) with normal clinical chemistry, hematology, coagulation profile, and urinalysis were used. Urine samples were tested in an *ex vivo* assay for the ability to agglutinate human red blood cells (HRBC) specific for Pf *E. coli*. Each dog was administered one Crananidin™ tablet daily for three weeks containing 16 mg of bioactive PACs (mean dose 1.14 mg/kg bw). Twenty-four hour serial urine samples were collected on days 1, 3, 5, 7 and 21 with collection periods at 0-3, 3-6, 6-12 and 21-24 hours post administration. Clinical chemistry and hematology profiles were performed on days 7 and 21 and urinalysis on day 21. AA assays were performed in triplicate and averaged. AA activity was scored based on the following scale: 0 = no anti-adhesion activity, 0.5 = 25%, 1 = 50%, 1.5 = 75% and 2 = 100% anti-adhesion activity.

**Results:** Control urine collected prior to dosing demonstrated hemagglutination activity, and thus had no AA activity. AA activity was observed in the urine of half the dogs within 3 hours of the initial Crananidin™ administration. By Day 5, all dogs exhibited AA activity in the urine, which peaked on Day 7 with a mean AA activity of 80% ± 26.5% over the 24-hour urine collection period. The mean urinary AA activity on Day 21 was 73% ± 28.5%, and was sustained over the entire 24-hour urine collection period. In addition, AA activity was maintained in the urine for at least 3 days after discontinuation of the Crananidin™. These same dogs received ½ tablet of Crananidin™ (0.5 mg/kg bw PACs) in a second study, but only slight urinary anti-adhesion activity was observed. No clinically significant clinical chemistry or hematology changes were observed.

**Conclusions:** This *ex vivo* study shows that the bioactive PACs in Crananidin™ produce metabolites in the urine of dogs sufficient to reduce adhesion of Pf *E. coli* and could have potential in the maintenance of canine urinary tract health. Dosing and clinical efficacy studies suggest that 1 mg/kg is effective canine dosage.

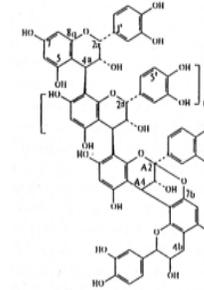
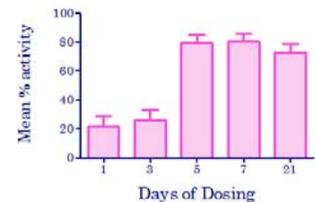
Mean Percent Anti-adhesion Activity after 1 Day of Crananidin®



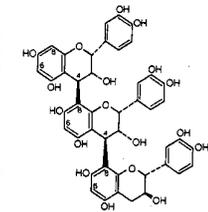
Mean Percent Anti-adhesion Activity after 7 Days of Crananidin®



Mean Daily Percent Anti-adhesion Activity over 21 Days of Crananidin®

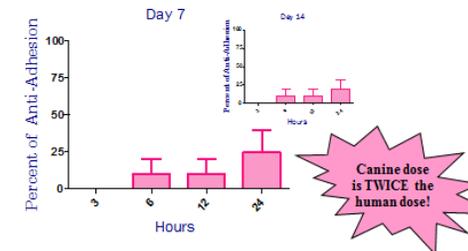


A-type linkage (Cranberry)



B-type linkage (Grape)

Mean percent anti-adhesion activity after seven days of Crananidin® (0.5mg/kg)



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