



Cochrane
Library

Cochrane Database of Systematic Reviews

Cranberries for treating urinary tract infections (Review)

Jepson RG, Mihaljevic L, Craig JC

Jepson RG, Mihaljevic L, Craig JC.
Cranberries for treating urinary tract infections.
Cochrane Database of Systematic Reviews 1998, Issue 4. Art. No.: CD001322.
DOI: [10.1002/14651858.CD001322](https://doi.org/10.1002/14651858.CD001322).

www.cochranelibrary.com

TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	3
OBJECTIVES	3
METHODS	3
RESULTS	5
DISCUSSION	5
AUTHORS' CONCLUSIONS	5
ACKNOWLEDGEMENTS	6
REFERENCES	7
CHARACTERISTICS OF STUDIES	8
APPENDICES	9
WHAT'S NEW	10
HISTORY	10
CONTRIBUTIONS OF AUTHORS	11
DECLARATIONS OF INTEREST	11
SOURCES OF SUPPORT	11
DIFFERENCES BETWEEN PROTOCOL AND REVIEW	11
NOTES	11
INDEX TERMS	11

[Intervention Review]

Cranberries for treating urinary tract infections

Ruth G Jepson¹, Lara Mihaljevic², Jonathan C Craig³

¹Scottish Collaboration for Public Health Research and Policy (SCPHRP), Edinburgh, UK. ²Haberfield, Australia. ³Cochrane Kidney and Transplant, Centre for Kidney Research, The Children's Hospital at Westmead, Westmead, Australia

Contact address: Ruth G Jepson, ruth.jepson@ed.ac.uk, ruth.jepson@scphrp.ac.uk.

Editorial group: Cochrane Kidney and Transplant Group.

Publication status and date: Stable (no update expected for reasons given in 'What's new'), published in Issue 8, 2020.

Citation: Jepson RG, Mihaljevic L, Craig JC. Cranberries for treating urinary tract infections. *Cochrane Database of Systematic Reviews* 1998, Issue 4. Art. No.: CD001322. DOI: [10.1002/14651858.CD001322](https://doi.org/10.1002/14651858.CD001322).

Copyright © 1998 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

ABSTRACT

Background

Cranberries (particularly in the form of cranberry juice) have been used widely for several decades for the prevention and treatment of urinary tract infections (UTIs). The aim of this review is to assess the effectiveness of cranberries in treating such infections.

Objectives

To assess the effectiveness of cranberries for the treatment of UTIs.

Search methods

We searched the Cochrane Kidney and Transplant Register of Studies up to 18 August 2020 through contact with the Information Specialist using search terms relevant to this review. Studies in the Register are identified through searches of CENTRAL, MEDLINE, and EMBASE, conference proceedings, the International Clinical Trials Register (ICTRP) Search Portal and ClinicalTrials.gov.

Selection criteria

All randomised controlled trials (RCTs) or quasi-RCTs of cranberry juice or cranberry products for the treatment of UTIs. Studies of men, women or children were included.

Data collection and analysis

Titles and abstracts of studies that were potentially relevant to the review were screened by one author, RJ, who discarded studies that were clearly ineligible but aimed to be overly inclusive rather than risk losing relevant studies. Authors RJ and LM independently assessed whether the studies met the inclusion criteria. Further information was sought from the authors where papers contained insufficient information to make a decision about eligibility.

Main results

No studies were found which fulfilled all of the inclusion criteria. Three studies were excluded because they did not have any relevant outcomes and one study is ongoing, however its current status is unknown.

Authors' conclusions

After a thorough search, no RCTs which assessed the effectiveness of cranberry juice for the treatment of UTIs were found. Therefore, at the present time, there is no good quality evidence to suggest that it is effective for the treatment of UTIs. Well-designed parallel group, double blind studies comparing cranberry juice and other cranberry products versus placebo to assess the effectiveness of cranberry juice in treating UTIs are needed. Outcomes should include reduction in symptoms, sterilisation of the urine, side effects and adherence to

therapy. Dosage (amount and concentration) and duration of therapy should also be assessed. Consumers and clinicians will welcome the evidence from these studies.

PLAIN LANGUAGE SUMMARY

Still waiting for evidence about whether cranberries are a useful treatment for urinary tract infections

Cranberries contain a substance that can prevent bacteria from sticking on the walls of the bladder. This may help reduce bladder and other urinary tract infections (UTIs). Cranberries (usually as cranberry juice) have been used to try and treat UTIs, particularly in high risk groups such as older people. Cranberries have few adverse effects. The review found no evidence from studies about the effects of cranberry juice or other cranberry products on UTIs.

BACKGROUND

The term urinary tract infection (UTI) refers to the presence of a certain threshold number of bacteria in the urine (usually greater than 100,000/mL). It consists of cystitis (bacteria in the bladder), urethral syndrome and pyelonephritis (infection of the kidneys). Lower UTIs involve the bladder, whereas upper UTIs also involve the kidneys (pyelonephritis). Bacterial cystitis (also called acute cystitis) can occur in men and women and the signs and symptoms include dysuria (pain on passing urine), frequency, cloudy urine, occasionally haematuria (blood in the urine), and is often associated with pyuria (urine white cell count greater than 10,000/mL). Urethral syndrome (frequency and dysuria syndrome) is used to describe approximately 50% of women with these complaints who have either no bacterial growth or counts less than 100,000 colony-forming units (cfu)/mL on repeated urine cultures. Pyelonephritis most commonly occurs as a result of cystitis, particularly in the presence of transient (occasional) or persistent backflow of urine from the bladder into the ureters or kidney pelvis (vesicoureteric reflux). Signs and symptoms include flank pain or back pain, fever, chills with shaking, general ill feeling plus those symptoms of a lower UTI. Acute pyelonephritis can be severe in the elderly, in infants, and in people who are immunosuppressed (for example, those with cancer or AIDS). Some people have recurrent UTIs with an average of two to three episodes/year (Roberts 1979; Wong 1984). Children typically present with a high fever and systemic symptoms such as lethargy (tiredness), vomiting and poor feeding.

Although UTIs can occur in both men and women, they are about 50 times more common in adult women than adult men. This may be because women have a shorter urethra that may allow bacteria to ascend more easily into the bladder. Symptomatic infection of the bladder (lower tract UTI) has been estimated to occur in up to 30% of women at some stage during their lives (Kelly 1977). Most UTIs arise from the 'ascending' route of infection. The first step is colonisation of periurethral tissues with uropathogenic organisms, followed by the passage of bacteria through the urethra. Infection arises from bacterial proliferation (growth) within the otherwise sterile urinary tract. In children, UTI occurs more commonly in boys up to the age of 6 to 12 months, but overall occurs about three times more often in girls (1% to 3% in boys, 3% to 7% in girls) (Hellstrom 1991; Winberg 1974).

Cranberries (particularly in the form of cranberry juice) have been used widely for several decades for the prevention and treatment of UTIs. Cranberries contain quinic acid, malic acid and citric acid as well as glucose and fructose. Until recently, it was suggested that the quinic acid caused large amounts of hippuric acid to be excreted in the urine which then acted as an antibacterial agent (Kinney 1979). Several studies, however, have shown no difference in the levels, or only a transient (short lived) effect thus casting some doubt on this theory (Kahn 1967; McLeod 1978). More recently, it has been demonstrated that cranberries prevent bacteria (particularly *E. coli*) from adhering (sticking) to uroepithelial cells that line the wall of the bladder (Schmidt 1988; Sobota 1984). Cranberries contain two compounds which inhibit adherence - fructose and a polymeric compound of unknown nature (Zafiri 1989). Although many juices contain fructose, only cranberries and blueberries contain the polymeric compound (Ofek 1991).

UTIs are one of the most common medical conditions requiring outpatient treatment, and complications resulting from persistent and repeated infections necessitate well over one million hospital admissions annually in the USA (Patton 1991). Traditionally UTIs have been treated by antibiotic therapy, but these are expensive, can have side effects and may lead to resistance. The aim of this review is to assess the effectiveness of cranberries in treating symptomatic and asymptomatic UTIs. Although cranberry juice is the form of cranberries most widely used, other cranberry products include cranberry powder in hard or soft gelatin capsules. The amount and concentration of cranberry juice needed to be effective for the treatment of UTIs has not yet been ascertained. One uncontrolled trial, however, found that over 50% of patients had a positive clinical response after consuming 450 mL of cranberry juice for three weeks (Papavas 1966).

Cranberries for the prevention of UTIs in susceptible populations is examined in another review by the same authors (Jepson 2008).

OBJECTIVES

We wished to test the following hypotheses:

- Cranberry juice and other cranberry products are more effective than placebo/no treatment for the treatment of UTIs.
- Cranberry juice and other cranberry products are more effective than any other therapy for the treatment of UTIs.

If studies are included in this review in the future, an attempt will be made to quantify the side effects of cranberry juice and the findings will be taken into account in the discussion to determine the benefit-risk of the treatment.

METHODS

Criteria for considering studies for this review

Types of studies

All randomised controlled trials (RCTs) of cranberry juice (or derivatives) versus placebo, no treatment or any other treatment. Quasi-RCTs (e.g. those studies which randomised participants by date of birth, or case record number) will be included, but the quality of the studies will be taken into account during the analysis. Cross-over studies will be excluded, because they are not appropriate for short term treatment of acute conditions.

Types of participants

Inclusion criteria

Studies of men, women or children with one the following:

1. a symptomatic lower UTI,
 2. a symptomatic upper UTI,
 3. an asymptomatic UTI.
- Symptomatic is defined as having one or more of the following symptoms: dysuria, frequency, urgency.
 - Studies of participants with either a history recurrent UTIs or an in-dwelling catheter must have specified that participants have a confirmed UTI (asymptomatic or symptomatic) prior to randomisation.

- If studies become available for inclusion in this review, these three groups will be analysed separately. Furthermore, the causative organism (e.g. *E. coli*) and the methods used to diagnose upper and lower UTIs will be subjected to sensitivity analysis.
- The participants in the studies can be from any setting (hospital, clinic, community).

Exclusion criteria

- Studies of the prevention of UTIs in susceptible groups of the population (these will be analysed in a separate review by the same authors)
- Studies of any urinary tract condition not caused by bacterial infection (e.g. interstitial cystitis which is a chronic inflammation of the bladder wall)

Types of interventions

Cranberry juice or a cranberry product (e.g. cranberry capsules) given for at least five days. If studies become available for inclusion in this review, dosage (amount and concentration), duration of treatment and length of treatment will be taken into account in subgroup analyses (see methods section for more details).

Types of outcome measures

Primary outcomes

- Number of symptomatic and asymptomatic UTIs in each group at the end of the treatment period.

The 'gold standard' bacteriological criterion for diagnosis of UTI includes microbiological confirmation from a mid-stream specimen of urine (MSU) (or similar method) with greater than 100 000 bacterial cfu/mL, often associated with pyuria (white cells in the urine). In some situations a bacterial count of less than 100 000 /mL is acceptable (e.g. when a supra-pubic bladder tap or a catheter urine specimen is obtained). If studies become available for inclusion in this review, sensitivity analyses will be carried out on the causative organism (e.g. *E. coli*), the method of collecting a specimen of urine (i.e. catheter, MSU or 'clean catch' specimen) and the presence of mixed organisms in the urine (which signifies contamination).

Secondary outcomes

- Reduction in severity of symptoms.
- Adherence to therapy.
- Side effects.

Search methods for identification of studies

Electronic searches

We searched the [Cochrane Kidney and Transplant Register of Studies](#) up to 18 August 2020 through contact with the Information Specialist using search terms relevant to this review. The Register contains studies identified from the following sources:

1. Monthly searches of the Cochrane Central Register of Controlled Trials (CENTRAL)
2. Weekly searches of MEDLINE OVID SP
3. Searches of kidney and transplant journals, and the proceedings and abstracts from major kidney and transplant conferences

4. Searching of the current year of EMBASE OVID SP
5. Weekly current awareness alerts for selected kidney and transplant journals
6. Searches of the International Clinical Trials Register (ICTRP) Search Portal and ClinicalTrials.gov.

Studies contained in the Register are identified through searches of CENTRAL, MEDLINE, and EMBASE based on the scope of Cochrane Kidney and Transplant. Details of search strategies, as well as a list of handsearched journals, conference proceedings and current awareness alerts, are available on the Cochrane Kidney and Transplant website under [CKT Register of Studies](#).

See Appendix 1 for search terms used in strategies for this review.

Searching other resources

1. Searching other resources: Reference lists of review articles, relevant studies and clinical practice guidelines.
2. Contacting relevant individuals/organisations seeking information about unpublished or incomplete studies.

Data collection and analysis

Selection of studies

The search strategy described previously was employed to obtain titles and, where possible, abstracts of studies that were potentially relevant to the review. The titles and abstracts were screened by RJ, who discarded studies that were clearly ineligible but aimed to be overly inclusive rather than risk losing relevant studies. Authors RJ and LM independently assessed, using full copies of the papers, whether the studies met the inclusion criteria, with disagreements resolved by discussion and consultation with the third author JC. Further information was sought from the authors of papers which contained insufficient information to make a decision about eligibility.

Data extraction and management

If studies which meet the inclusion criteria are identified in the future, RJ will provide LM with the full articles of the included studies and both authors will independently extract information using specially designed data extraction forms. For each included trial, information will be collected regarding the location of the study, methods of the study (as per quality assessment checklist), the participants (sex, age, eligibility criteria), the nature of the interventions, and data relating to the outcomes specified previously. Where possible, missing data (including side effects) will be sought from the authors. Discrepancies in the data extraction will be referred to JC for discussion.

Assessment of risk of bias in included studies

The following items will be assessed using the risk of bias assessment tool ([Higgins 2008](#)) (see Appendix 1).

- Was there adequate sequence generation?
- Was allocation adequately concealed?
- Was knowledge of the allocated interventions adequately prevented during the study?
- Were incomplete outcome data adequately addressed?
- Are reports of the study free of suggestion of selective outcome reporting?

- Was the study apparently free of other problems that could put it at a risk of bias?

Measures of treatment effect

If studies which meet the inclusion criteria are identified in the future, statistical analyses will be performed where possible. Briefly, the risk ratio (RR) will be used as the measure of effect for each dichotomous outcome. Where continuous scales of measurement are used to assess the effects of treatment, these data will be analysed in continuous form (i.e. mean difference). If different scales have been used in different studies, where possible, the results will be standardised and then combined (i.e. standardised mean difference).

Assessment of heterogeneity

Heterogeneity in the data will be noted and cautiously explored using previously identified characteristics of the studies, particularly assessments of quality.

Data synthesis

Where there is sufficient data, a summary statistic for each outcome will be calculated using both a fixed effects and a random effects model.

Subgroup analysis and investigation of heterogeneity

If studies which meet the inclusion criteria are identified in the future, the groups described previously (see under types of participants) will be analysed separately with the following subgroups:

- dosage (amount and concentration).
- frequency and duration of treatment.

Where possible, we will be seeking data from within studies where these comparisons have been made, rather than making comparisons across studies.

Sensitivity analysis

Sensitivity analyses will be undertaken to examine the stability of the results in relation to a number of factors including study quality, the source of the data (published or unpublished), the causative organism (e.g. *E.coli*), the method used for confirming the presence of bacteria in the urine (e.g. catheter specimen of urine or midstream specimen of urine) and the method of diagnosing upper or lower UTI.

RESULTS

Description of studies

No studies assessing the treatment of UTIs with cranberry juice (or other cranberry products) which met all of the inclusion criteria were found.

Three studies were excluded from the review. One trial ([Nahata 1982](#)) was a randomised cross-over trial, comparing methenamine mandelate alone, methenamine mandelate plus ascorbic acid, or methenamine mandelate plus ascorbic acid and cranberry juice for people with UTIs. No relevant outcomes were presented, however, and the main purpose of the studies was to see the effect of the methenamine on formaldehyde concentration. The author was

contacted, but could not provide any further information about the trial. Another cross-over trial ([DuGan 1966](#)) compared cranberry juice with no treatment for the reduction of urinary odours (which could have been caused by a UTI). From the description of the trial it is unlikely it was randomised and the report contained no relevant outcomes. The third study ([NCT01861353](#)) investigated starting cranberry juice early to prevent recurrent urinary tract infection. See [Characteristics of excluded studies](#) for more details about both these studies.

One ongoing study was identified from 2006, however its current status is listed as unknown ([NCT00305071](#)).

- [NCT00305071](#) will enrol women aged 20 to 65 with non-complicated acute bacterial cystitis. The intervention group will receive 3-day oral trimethoprim/sulfamethoxazole (80/400 mg) 2 tablets twice a day on day 1 to 3 plus oral compound cranberry extract tablets (UmayC, 900 mg) 2 tablets three times a day on day 1 to 7. The control group will receive same oral antibiotics plus identical placebo prescribed as the same protocol of intervention arm. Outcomes to be assessed are time to symptoms relief and pyuria eradication rate. This study has not started recruiting.

Risk of bias in included studies

No studies were found which met the inclusion criteria for this review.

Effects of interventions

No studies were found which met the inclusion criteria for this review.

DISCUSSION

No studies assessing cranberries for the treatment of UTIs which met our inclusion criteria were found. Only a few uncontrolled studies examining the effectiveness of cranberry juice in treating the symptoms of UTI have been reported. Two of these did show a beneficial effect ([Papapoulos 1966](#); [Rodgers 1991](#)) but no firm conclusions can be drawn from such studies.

AUTHORS' CONCLUSIONS

Implications for practice

No RCTs have been performed to assess the effectiveness of cranberry juice or cranberry products for the treatment of UTIs. Therefore, at the present time, there is no evidence to suggest that cranberry juice or other cranberry products are effective in treating UTIs.

Implications for research

More research is need to assess the effectiveness of cranberry juice in treating UTIs. Well-designed parallel group, double blind studies of cranberry juice and other cranberry products for the treatment of UTIs are needed. The outcomes should include reduction in symptoms, sterilisation of the urine, side effects and adherence to therapy. Dosage (amount and concentration) and duration of therapy should also be evaluated. Consumers and clinicians will welcome the evidence from these studies.

ACKNOWLEDGEMENTS

- Ruth Jepson would like to thank the Nuffield Trust for giving her a short term fellowship for this review.
- The authors would also like to thank the following people for replying to correspondence, even though they could provide no further information:
 - * Prof Nahata ([Nahata 1982](#))
 - * Dr RJ Woodward (Larkhill Green Farm - cranberry tablets)

REFERENCES

References to studies excluded from this review

DuGan 1966 {published data only}

DuGan CR, Cardaciootto PS. Reduction of ammonial urinary odors by the sustained feeding of cranberry juice. *Journal of Psychiatric Nursing* 1966;**4**(5):467-9.

Nahata 1982 {published data only}

Nahata MC, Cummins B A, McLeod DC. Effect of urinary acidifiers on formaldehyde concentration and efficacy with methenamine therapy. *European Journal of Clinical Pharmacology* 1982;**22**(3):281-4. [MEDLINE: 7106162]

Nahata MC, Cummins BA, McLeod DC, Butler R. Predictability of methenamine efficacy based on type of urinary pathogen and pH. *Journal of the American Geriatrics Society* 1981;**29**(5):236-9. [MEDLINE: 7014695]

Nahata MC, McLeod DC. Lack of effect of ascorbic acid, hippuric acid, and methenamine (urinary formaldehyde) on the copper-reduction glucose test in geriatric patients. *Journal of the American Geriatrics Society* 1980;**28**(5):230-3. [MEDLINE: 7365188]

NCT01861353 {published data only}

Tapiainen T, Salo J. Cranberry-lingonberry Juice started during acute infection in prevention of urinary tract infections in children. www.clinicaltrials.gov/ct2/show/NCT01861353 (first received 23 May 2013).

References to ongoing studies

NCT00305071 {published data only}

Huang PC. Effect of adjuvant treatment with compound cranberry extract tablets in acute bacterial cystitis. www.clinicaltrials.gov/ct2/show/NCT00305071 (first received 21 March 2006).

Additional references

Hellstrom 1991

Hellstrom A, Hanson E, Hansson S, Hjalmas K, Jodal U. Association between urinary symptoms at 7 years old and previous urinary tract infection. *Archives of Disease in Childhood* 1991;**66**(2):232-4. [MEDLINE: 2001110]

Higgins 2008

Higgins JP, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.0.0 [updated February 2008]. The Cochrane Collaboration. 2008. Available from www.cochrane-handbook.org.

Jepson 2008

Jepson RG, Craig JC. Cranberries for preventing urinary tract infections. *Cochrane Database of Systematic Reviews* 2008, Issue 1. Art. No: CD001321. [DOI: [10.1002/14651858.CD001321.pub3](https://doi.org/10.1002/14651858.CD001321.pub3)]

Kahn 1967

Kahn HD, Panariello VA, Saeli J, Sampson JR, Schwartz E. Effect of cranberry juice on urine. *Journal of the American Dietetic Association* 1967;**51**(3):251-4. [MEDLINE: 6035629]

Kelly 1977

Kelly J. Clinical syndromes of urinary tract infection. *Current Therapeutic Research* 1977;**38**(7):15-21.

Kinney 1979

Kinney AB, Blount M. Effect of cranberry juice on urinary pH. *Nursing Research* 1979;**28**(5):287-90. [MEDLINE: 38439]

McLeod 1978

McLeod DC, Nahata MC. Methenamine therapy and urine acidification with ascorbic acid and cranberry juice. *American Journal of Hospital Pharmacy* 1978;**35**(6):654. [MEDLINE: 27096]

Ofek 1991

Ofek I, Goldhar J, Zafriri D, Lis H, Adar R, Sharon N. Anti-Escherichia coli adhesin activity of cranberry and blueberry juices. *New England Journal of Medicine* 1991;**324**(22):1599. [MEDLINE: 1674106]

Papas 1966

Papas PN, Brusca CA, Ceresia GC. Cranberry juice in the treatment of urinary tract infections. *Southwestern Medicine* 1966;**47**(1):17-20. [MEDLINE: 5900988]

Patton 1991

Patton JP, Nash DB, Abrutyn E. Urinary tract infection: Economic considerations. *Medical Clinics of North America* 1991;**75**(2):495-513. [MEDLINE: 1996046]

Roberts 1979

Roberts AP, Phillips R. Bacteria causing symptomatic urinary tract infection or bacteriuria. *Journal of Clinical Pathology* 1979;**32**(5):492-6. [MEDLINE: 381327]

Rodgers 1991

Rodgers J. Pass the cranberry juice. *Nursing Times* 1991;**87**(48):36-7. [MEDLINE: 1754454]

Schmidt 1988

Schmidt DR, Sobota AE. An examination of the anti-adherence activity of cranberry juice on urinary and nonurinary bacterial isolates. *Microbios* 1988;**55**(224-225):173-82. [MEDLINE: 3063927]

Sobota 1984

Sobota AE. Inhibition of bacterial adherence by cranberry juice: potential use for the treatment of urinary tract infections. *Journal of Urology* 1984;**131**(5):1013-6. [MEDLINE: 6368872]

Winberg 1974

Winberg J, Andersen HJ, Bergstrom T, Jacobsson B, Larson H, Lincoln K. Epidemiology of symptomatic urinary tract infection in childhood. *Acta Paediatrica Scandinavica - Supplement* 1974;**252**:1-20. [MEDLINE: 4618418]

Wong 1984

Wong ES, Fennell CI, Stamm WE. Urinary tract infection among women attending a clinic for sexually transmitted diseases. *Sexually Transmitted Diseases* 1984;**11**(1):18-23. [MEDLINE: 6546811]

Zafiri 1989

Zafiri D, Ofek I, Adar R, Pocino M, Sharon N. Inhibitory activity of cranberry juice on adherence of type 1 and type P fimbriated *Escherichia coli* to eucaryotic cells. *Antimicrobial Agents & Chemotherapy* 1989;**33**(1):92-8. [MEDLINE: 2653218]

CHARACTERISTICS OF STUDIES
Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
DuGan 1966	<p>Cross-over RCT of cranberry juice versus no treatment. The 220 participants were elderly and from two hospital wards - one male and one female. The female ward received the cranberry juice first followed by the male ward.</p> <p>This trial was excluded because from the description of the study design, it looked unlikely that this trial had been randomised. Also, the outcome was urinary odours, and no information was given about urinary tract infections. Furthermore, cross-over trials may not be a relevant trial design for acute conditions such as urinary tract infections.</p>
Nahata 1982	<p>Cross-over RCT of 27 people with bacteriuria comparing methenamine mandelate alone, with ascorbic acid or with ascorbic acid and cranberry juice. The primary purpose of this review was to assess the effect of methenamine on formaldehyde concentrations. Each patient was randomised to 5 days of each therapy.</p> <p>The trial was excluded because it contained no relevant outcomes. Furthermore, cross-over trials may not be a relevant trial design for acute conditions such as urinary tract infections.</p>
NCT01861353	Looking at the effects of starting cranberry juice early after an acute to prevent recurrent urinary tract infection

RCT - randomised controlled trial

Characteristics of ongoing studies [ordered by study ID]

[NCT00305071](#)

Study name	Effect of adjuvant treatment with compound cranberry extract tablets in acute bacterial cystitis
Methods	<ul style="list-style-type: none"> • Double-blind, placebo-controlled RCT
Participants	<ul style="list-style-type: none"> • 60 females, 20-65 years • Inclusion criteria: female patient with non-complicated acute bacterial cystitis • Exclusion criteria: recent (less than one month) urinary tract infection, partially treated acute cystitis; anatomical or function disease of the lower urinary tract; patients received radical pelvic surgery; associated bladder stone disease; upper urinary tract anomaly or urolithiasis; systemic - infection with body temperature higher than 38°C - known allergic reaction to cranberry or vitamin C; pregnant or prepare to be pregnant
Interventions	<p>Intervention group</p> <ul style="list-style-type: none"> • Will receive 3-day oral trimethoprim/sulfamethoxazole (80/400 mg) 2 tablets twice a day on day 1 to 3 plus oral compound cranberry extract tablets (UmayC, 900 mg) 2 tablets three times a day on day 1 to 7 <p>Control group</p>

NCT00305071 (Continued)

- Will received same oral antibiotics plus identical placebo prescribed as the same protocol of intervention arm. For patients with known allergic reaction to sulfa drug, the empirical antibiotics will be replaced by cephalexin (250 mg) 2 capsules four times a day.

Outcomes	Primary outcome measures <ul style="list-style-type: none"> • Time to symptoms relief Secondary outcome measures <ul style="list-style-type: none"> • Pyuria eradication rate
Starting date	April 2006
Contact information	Contact: Po-Chien Huang, MD 886-3-3179599 ext 8223 m001435@e-ms.com.tw Contact: Hung-Ju Yang, MD 886-3-3179599 ext 8225 m001436@e-ms.com.tw
Notes	Recruitment status at 21 March 2006: not yet recruiting No results published as at 18 August 2020

APPENDICES
Appendix 1. Electronic search strategies

Database	Search terms
CENTRAL	<ol style="list-style-type: none"> 1. MeSH descriptor: [Beverages] this term only 2. MeSH descriptor: [Fruit] this term only 3. MeSH descriptor: [Phytotherapy] this term only 4. MeSH descriptor: [Vaccinium macrocarpon] this term only 5. Vaccinium macrocarpon:ti,ab,kw (Word variations have been searched) 6. vaccinium oxycoccus:ti,ab,kw (Word variations have been searched) 7. vaccinium vitisidaea:ti,ab,kw (Word variations have been searched) 8. cranberry or cranberries:ti,ab,kw (Word variations have been searched) 9. {or #1-#8} 10.MeSH descriptor: [Urinary Tract Infections] this term only 11.MeSH descriptor: [Bacteriuria] this term only 12.MeSH descriptor: [Pyuria] this term only 13.MeSH descriptor: [Cystitis] this term only 14.uti or utis:ti,ab,kw (Word variations have been searched) 15.cystitis:ti,ab,kw (Word variations have been searched) 16.pyelonephritis:ti,ab,kw (Word variations have been searched) 17.bacteriuria:ti,ab,kw (Word variations have been searched) 18.urinary tract infection*:ti,ab,kw (Word variations have been searched) 19.{or #10-#18} 20.{and #9, #19}
MEDLINE	<ol style="list-style-type: none"> 1. Beverages/ 2. FRUIT/

(Continued)

3. cranberr\$.tw.
4. (fruit\$ and (juice\$ or beverage\$ or drink\$)).tw.
5. PHYTOTHERAPY/
6. Vaccinium macrocarpon/
7. vaccinium oxycoccus.tw.
8. vaccinium vitisidaea.tw.
9. or/1-8
10. Urinary tract infections/
11. Bacteriuria/
12. Pyuria/
13. Cystitis/
14. (uti or utis).tw.
15. cystitis.tw.
16. pyelonephritis.tw.
17. bacter\$.tw.
18. urinary tract infection\$.tw.
19. or/10-18
20. and/9,19

EMBASE

1. cranberry/
2. cranberry juice/
3. cranberry extract/
4. vaccinium macrocarpon.tw.
5. vaccinium vitisidaea.tw.
6. vaccinium oxycoccus.tw.
7. cranberr\$.tw.
8. or/1-7
9. urinary tract infection/
10. pyuria/
11. bacteriuria/
12. asymptomatic bacteriuria/
13. cystitis/
14. (uti or utis).tw.
15. urinary tract infection\$.tw.
16. bacteriuria.tw.
17. cystitis.tw.
18. or/9-17
19. and/8,18

WHAT'S NEW

Date	Event	Description
19 August 2020	Review declared as stable	Search of register undertaken 18 August 2020; no new or ongoing studies were identified

HISTORY

Protocol first published: Issue 4, 1998

Cranberries for treating urinary tract infections (Review)

Copyright © 1998 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Review first published: Issue 4, 1998

Date	Event	Description
18 March 2015	Amended	Updated search strategies for MEDLINE, EMBASE, CENTRAL
13 July 2010	Amended	13 July 2010: Searched for new studies, none identified

CONTRIBUTIONS OF AUTHORS

- The titles and abstracts were screened by RJ.
- RJ and LM independently assessed studies.
- Disagreements resolved by discussion and consultation with JC.
- The quality of all studies which were deemed eligible for the review were then assessed independently by two of the reviewers RJ and LM.
- Discrepancies resolved by discussion with the third, JC.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- Nuffield Trust, UK

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

New Cochrane methodology shall be used ([Higgins 2008](#)).

NOTES

As of Issue 8, 2020 this Cochrane Review is no longer being updated. There have been no studies published on this topic there are currently no new registered ongoing studies.

INDEX TERMS

Medical Subject Headings (MeSH)

Beverages; Fruit [*therapeutic use]; *Phytotherapy; Urinary Tract Infections [*therapy]

MeSH check words

Humans