

DIALIX T.U. - Published Research Abstracts

Vaccinium macrocarpon

[Br J Nutr.](#) 2010 Aug 31:1-9. [Epub ahead of print]

The effectiveness of dried cranberries (*Vaccinium macrocarpon*) in men with lower urinary tract symptoms.

[Vidlar A](#), [Vostalova J](#), [Ulrichova J](#), [Student V](#), [Stejskal D](#), [Reichenbach R](#), [Vrbkova J](#), [Ruzicka F](#), [Simanek V](#).

Department of Urology, University Hospital, Olomouc, Czech Republic.

Abstract

Lower urinary tract symptoms (LUTS) are a common condition in older men. The objective of the present study was to evaluate the efficacy and tolerability of cranberry (*Vaccinium macrocarpon*) powder in men at risk of prostate disease with LUTS, elevated prostate-specific antigen (PSA), negative prostate biopsy and clinically confirmed chronic non-bacterial prostatitis. Forty-two participants received either 1500 mg of the dried powdered cranberries per d for 6 months (cranberry group; n 21) or no cranberry treatment (control group; n 21). Physical examination, International Prostate Symptom Score, quality of life (QoL), five-item version of the International Index of Erectile Function (IIEF-5), basic clinical chemistry parameters, haematology, Se, testosterone, PSA (free and total), C-reactive protein (CRP), antioxidant status, transrectal ultrasound prostate volume, urinary flow rate, ultrasound-estimated post-void residual urine volume at baseline, and at 3 and 6 months, and urine ex vivo anti-adherence activity were determined in all subjects. In contrast to the control group, patients in the cranberry group had statistically significant improvement in International Prostate Symptom Score, QoL, urination parameters including voiding parameters (rate of urine flow, average flow, total volume and post-void residual urine volume), and lower total PSA level on day 180 of the study. There was no influence on blood testosterone or serum CRP levels. There was no statistically significant improvement in the control group. The results of the present trial are the first firm evidence that cranberries may ameliorate LUTS, independent of benign prostatic hyperplasia or C-reactive protein level.

PMID: 20804630 [PubMed - as supplied by publisher]

[Crit Rev Food Sci Nutr](#). 2010 Aug;50(7):666-79.

Bioactive compounds in cranberries and their biological properties.

[Côté J](#), [Caillet S](#), [Doyon G](#), [Sylvain JF](#), [Lacroix M](#).

Research Laboratory in Applied Food Science, INRS-Institut Armand-Frappier, Laval, Quebec, Canada.

Abstract

Cranberries are healthy fruit that contribute color, flavor, nutritional value, and functionality. They are one of only three fruits native to America. Over the past decade, public interest for the North American cranberry (*Vaccinium macrocarpon*) has been rising with reports of their potential health benefits linked to the numerous phytochemicals present in the fruit--the anthocyanins, the flavonols, the flavan-3-ols, the proanthocyanidins, and the phenolic acid derivatives. The presence of these phytochemicals appears to be responsible for the cranberry property of preventing many diseases and infections, including cardiovascular diseases, various cancers, and infections involving the urinary tract, dental health, and *Helicobacter pylori*-induced stomach ulcers and cancers. Recent years have seen important breakthroughs in our understanding of the mechanisms through which these compounds exert their beneficial biological effects, yet these remain to be scientifically substantiated. In this paper these characteristics, as well as the antioxidant, radical scavenging, antibacterial, antimutagen, and anticarcinogen properties of cranberry major bioactive compounds are explained.

PMID: 20694928 [PubMed - in process]

[Int J Immunopathol Pharmacol](#). 2010 Apr-Jun;23(2):611-8.

Inhibitory activity of cranberry extract on the bacterial adhesiveness in the urine of women: an ex-vivo study.

[Tempera G](#), [Corsello S](#), [Genovese C](#), [Caruso FE](#), [Nicolosi D](#).

Department of Microbiological and Gynaecological Sciences, University of Catania, Italy. tempera@unict.it

Abstract

Strains of uropathogenic *E. coli* are responsible for approximately 90% of community-acquired, uncomplicated cystitis, and fimbriae represent the adhesive factors enabling *E. coli* to be anchored to uroepithelial cells in the first step of the infectious process. Recently, a few studies have shown that a correlation between the consumption of cranberry (*Vaccinium macrocarpon*) and prevention of UTI is related to the ability of proanthocyanidins to reduce the bacterial adhesion to uroepithelial cells. In this study we evaluate the inhibitory activity of urine of healthy women treated with tablets containing cranberry extract on the adhesiveness of *E. coli* to uroepithelial human cells. Two groups of 12 female volunteers each, aged between 18 and 65 years, were enrolled, one group with negative history and one group with positive history of recurrent cystitis. Subjects were treated with the active product or placebo in a random, cross-over, double-blinded sequence for one week in each of the two treatment sequences. Urine samples were collected at the beginning and the end of each study period. Tests of bacterial adhesiveness were performed with two strains of *E. coli* (ATCC 25922 and ATCC 35218) on HT1376 human bladder carcinoma cells. Significant reductions of bacterial adhesiveness were observed in women who received cranberry extract (-50.9%; p less than 0.0001), regardless of their medical history and the treatment period in the cross-over sequence. No changes were observed with placebo (-0.29%; n.s.). This ex-vivo study showed that the assumption of cranberry extract in suitable amounts can have an anti-adhesive activity on uropathogenic *E. coli*.

PMID: 20646356 [PubMed - indexed for MEDLINE]

[J Clin Gastroenterol](#). 2010 Sep;44 Suppl 1:S61-2.

Overview on cranberry and urinary tract infections in females.

[Rossi R](#), [Porta S](#), [Canovi B](#).

Sofar SpA-Trezzano Rosa, Milan, Italy. rrossi@sofarfarm.it

Abstract

Cranberry (*Vaccinium macrocarpon*) has been used for decades to prevent urinary tract infections (UTIs) that are among the most common bacterial infections in women. As to the traditional use of cranberry and its A-type proanthocyanidins' ability to inhibit adherence of the bacterial P fimbriae in a dose-dependent manner, clinical trials have been conducted on different subpopulations. A Cochrane meta-analysis in 244 females with symptomatic UTI suggests that the effect was more pronounced in women with recurrent UTIs than elderly males and females or people requiring catheterization. A first head-to-head trial in older females has been published comparing effectiveness of a low-dose antibiotic versus cranberry in which investigators suggest that cranberry products may have a role in older females with recurrent UTI. Still with regard to antibiotic treatment in women, a recently published study investigated also the potential cranberry juice interaction with beta-lactam antibiotics supporting the hypothesis that cranberry juice in usual quantities as prophylaxis for UTI is not likely to alter the pharmacokinetics of these oral antibiotics. In addition, the effects of cranberry in pregnant female patients have been investigated. A first pilot trial has been published in which, while a possible protective effect was shown, more than one third of the females withdrew mainly for gastrointestinal upset.

PMID: 20495471 [PubMed - in process]

[BMC Infect Dis.](#) 2010 Apr 14;10:94.

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.

[Howell AB](#), [Botto H](#), [Combescure C](#), [Blanc-Potard AB](#), [Gausa L](#), [Matsumoto T](#), [Tenke P](#), [Sotto A](#), [Lavigne JP](#).

Institut National de la Santé et de la Recherche Médicale, Espri26, Université Montpellier 1, Nîmes, France.

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.

PMID: 20398248 [PubMed - indexed for MEDLINE]

[Urologe A](#). 2009 Oct;48(10):1203-5,1207-9.

[Myth or truth. Cranberry juice for prophylaxis and treatment of recurrent urinary tract infection]

[Article in German]

[Mathers MJ](#), [von Rundstedt F](#), [Brandt AS](#), [König M](#), [Lazica DA](#), [Roth S](#).

Urologische Gemeinschaftspraxis Remscheid, Kooperationspraxis der Klinik für Urologie und Kinderurologie, Klinikum Wuppertal, Universität Witten/Herdecke, Fastenrathstrasse 1, 42853, Remscheid, Deutschland. drmathers@urologie-remscheid.de

Abstract

Recurrent urinary tract infections are a frequent problem in urological practice. Long-term antibiotic prophylaxis can cause resistance of some intestinal bacteria, and after therapy is stopped, infections often resume. In controlled studies, general recommendations for prophylaxis were shown to inhibit reinfection. One of these recommendations is the consumption of cranberries. A review of the literature in PubMed as well as the recently published Cochrane database systematic review confirmed that daily consumption of cranberries prevents recurrent urinary tract infections. In vitro studies have shown that binding of the P fimbriae of *Escherichia coli* to the uroepithelial tissue can be inhibited in the presence of proanthocyanidins, the active ingredient of cranberries. In clinical studies, the evidence is not so pronounced. Many other bacteria have fimbriae, but only a few subpopulations have P fimbriae. P fimbriae are frequent in *E. coli*, so this adhesion can be prevented. However, in a subanalysis of randomized and controlled studies, it was shown that women with recurrent urinary tract infections might profit from consuming cranberries.

PMID: 19636526 [PubMed - indexed for MEDLINE]

[Ginecol Obstet Mex.](#) 2009 Nov;77(11):512-7.

[Cranberry juice and its role in urinary infections]

[Article in Spanish]

[Ruz EN](#), [González CC](#), [Jaen Sde L](#), [Escoto PG](#), [Urquiza EK](#), [Rosenfield LO](#), [Ortiz CS](#), [Castellanos PV](#).

Grupo Multidisciplinario para el Estudio del Arándano, México. eneriruz@hotmail.com

Abstract

The urinary tract infection is a worldwide health problem, with a ratio of 9 to 1 in women compared with men. In 80% of the cases, the causing bacteria is Escherichia coli. During reproductive life this infection represents a great amount of work disabilities, hence the need to insist on its prophylaxis. The red cranberry juice is an option to prevent urinary tract infection, a quality demonstrated in several recent publications which emphasize that its mechanism of action lies in the effect exerted by proantocyanidines, especially those of type A, in the urothelium that prevent Escherichia coli from adhering to this and exerts its antibacterial action, which is achieved with the ingestion of at least 300 mL of juice every day.

PMID: 20085135 [PubMed - indexed for MEDLINE]

[Drugs](#). 2009;69(7):775-807. doi: 10.2165/00003495-200969070-00002.

Cranberry and urinary tract infections.

[Guay DR](#).

Department of Experimental and Clinical Pharmacology, College of Pharmacy, University of Minnesota, Minneapolis, Minnesota 55455, USA. guayx001@umn.edu

Abstract

Urinary tract infection (UTI) refers to the presence of clinical signs and symptoms arising from the genitourinary tract plus the presence of one or more micro-organisms in the urine exceeding a threshold value for significance (ranges from 10^2 to 10^3 colony-forming units/mL). Infections are localized to the bladder (cystitis), renal parenchyma (pyelonephritis) or prostate (acute or chronic bacterial prostatitis). Single UTI episodes are very common, especially in adult women where there is a 50-fold predominance compared with adult men. In addition, recurrent UTIs are also common, occurring in up to one-third of women after first-episode UTIs. Recurrences requiring intervention are usually defined as two or more episodes over 6 months or three or more episodes over 1 year (this definition applies only to young women with acute uncomplicated UTIs). A cornerstone of prevention of UTI recurrence has been the use of low-dose once-daily or post-coital antimicrobials; however, much interest has surrounded non-antimicrobial-based approaches undergoing investigation such as use of probiotics, vaccines, oligosaccharide inhibitors of bacterial adherence and colonization, and bacterial interference with immunoreactive extracts of *Escherichia coli*. Local (intravaginal) estrogen therapy has had mixed results to date. Cranberry products in a variety of formulations have also undergone extensive evaluation over several decades in the management of UTIs. At present, there is no evidence that cranberry can be used to treat UTIs. Hence, the focus has been on its use as a preventative strategy. Cranberry has been effective *in vitro* and *in vivo* in animals for the prevention of UTI. Cranberry appears to work by inhibiting the adhesion of type I and P-fimbriated uropathogens (e.g. uropathogenic *E. coli*) to the uroepithelium, thus impairing colonization and subsequent infection. The isolation of the component(s) of cranberry with this activity has been a daunting task, considering the hundreds of compounds found in the fruit and its juice derivatives. Reasonable evidence suggests that the anthocyanidin/proanthocyanidin moieties are potent antiadhesion compounds. However, problems still exist with standardization of cranberry products, which makes it extremely difficult to compare products or extrapolate results. Unfortunately, most clinical trials have had design deficiencies and none have evaluated specific key cranberry-derived compounds considered likely to be active moieties (e.g. proanthocyanidins). In general, the preventive efficacy of cranberry has been variable and modest at best. Meta-analyses have established that recurrence rates over 1 year are reduced approximately 35% in young to middle-aged women. The efficacy of cranberry in other groups (i.e. elderly, paediatric patients, those with neurogenic bladder, those with chronic indwelling urinary catheters) is questionable. Withdrawal rates have been quite high (up to 55%), suggesting that these products may not be acceptable over long periods. Adverse events include gastrointestinal intolerance, weight gain (due to the excessive calorie load) and drug-cranberry interactions (due to the inhibitory effect of flavonoids on cytochrome P450-mediated drug metabolism). The findings of the Cochrane Collaboration support the potential use of cranberry products in the prophylaxis of recurrent UTIs in young and middle-aged women. However, in light of the heterogeneity of clinical study designs and the lack of consensus regarding the dosage regimen and formulation to use, cranberry products cannot be recommended for the prophylaxis of recurrent UTIs at this time.

PMID: 19441868 [PubMed - indexed for MEDLINE]

[Drugs Today \(Barc\)](#). 2007 Jan;43(1):47-54.

Cranberry juice for the prevention and treatment of urinary tract infections.

[Santillo VM](#), [Lowe FC](#).

Department of Urology, St. Luke's-Roosevelt Hospital, New York, New York, USA.

Abstract

There is widespread belief that cranberry juice can treat urinary tract infections (UTIs). There is no conclusive evidence from either in vitro or in vivo studies to confirm this. However, there is strong in vitro and in vivo evidence confirming the hypothesis that UTIs can be prevented by decreasing bacterial adherence to uroepithelial cells. For people with recurrent uncomplicated UTIs, routine utilization of cranberry products may offer an alternative methodology to antibiotic prophylaxis.

PMID: 17315052 [PubMed - indexed for MEDLINE]

Arctostaphylos uva-ursi

[World J Urol.](#) 2002 Nov;20(5):285-93. Epub 2002 Oct 17.

Botanical medicines for the urinary tract.

[Yarnell E.](#)

Abstract

Four important categories of urologic herbs, their history, and modern scientific investigations regarding them are reviewed. Botanical diuretics are discussed with a focus on *Solidago* spp (goldenrod) herb, *Levisticum officinale* (lovage) root, *Petroselinum crispus* (parsley) fruit, and *Urtica dioica* (stinging nettle) herb. Urinary antiseptic and anti-adhesion herbs, particularly *Arctostaphylos uva-ursi* (uva-uri) leaf, *Juniperus* spp (juniper) leaf, and *Vaccinium macrocarpon* (cranberry) fruit are reviewed. The antinephrotoxic botanicals *Rheum palmatum* (Chinese rhubarb) root and *Lespedeza capitata* (round-head lespedeza) herb are surveyed, followed by herbs for symptoms of benign prostatic hyperplasia, most notably *Serenoa repens* (saw palmetto) fruit, *Urtica dioica* root, and *Prunus africana* (pygeum) bark.

PMID: 12522584 [PubMed - indexed for MEDLINE]

[Phytother Res.](#) 1999 May;13(3):222-5.

**Effect of extracts of *Orthosiphon stamineus* Benth, *Hieracium pilosella* L.,
Sambucus nigra L. and *Arctostaphylos uva-ursi* (L.) Spreng. in rats.**

[Beaux D](#), [Fleurentin J](#), [Mortier F](#).

Laboratoire de Pharmacognosie, Centre des Sciences de l'Environnement, Metz, France.

Abstract

Aqueous extracts of *Sambucus nigra* and *Arctostaphylos uva-ursi* and hydroalcohol extracts of *Orthosiphon stamineus* and *Hieracium pilosella* were tested for their diuretic activities in rats; pharmacological evaluation revealed that they led to an increase in urine flow. Urinary sodium excretion in rats was increased with *O. stamineus* and *S. nigra*.

PMID: 10353162 [PubMed - indexed for MEDLINE]

[Int Urol Nephrol.](#) 1994;26(5):507-11.

Urolithiasis and phytotherapy.

[Grases F](#), [Melero G](#), [Costa-Bauzá A](#), [Prieto R](#), [March JG](#).

Department of Chemistry, University of Balearic Islands, Palma de Mallorca, Spain.

Abstract

The effects of seven plants with suspected application to prevent and treat stone kidney formation (*Verbena officinalis*, *Lithospermum officinale*, *Taraxacum officinale*, *Equisetum arvense*, *Arctostaphylos uva-ursi*, *Arctium lappa* and *Silene saxifraga*) have been studied using female Wistar rats. Variations of the main urolithiasis risk factors (citraturia, calciuria, phosphaturia, pH and diuresis) have been evaluated. It can be concluded that beneficial effects caused by these herb infusions on urolithiasis can be attributed to some disinfectant action, and tentatively to the presence of saponins. Specifically, some solvent action can be postulated with respect to uric stones or heterogeneous uric nucleus, due to the basifying capacity of some herb infusions. Nevertheless, for all the mentioned beneficial effects, more effective and equally innocuous substances are well known.

PMID: 7860196 [PubMed - indexed for MEDLINE]

[Pharmazie](#). 1978 Aug;33(8):536-7.

Investigation of iridoid substances in *Arctostaphylos uva-ursi*.

[Jahodár L](#), [Leifertová I](#), [Lisá M](#).

Abstract

Active principles of bearberry have been studied for several decades. The drug *Folium uvae-ursi* is useful to the pharmaceutical industry (in production of medicinal teas) for its disinfective effect on the urinary tract which is derived from the content of phenolic glucosides. This work is a part of the total evaluation of the drug from the point of view of contents of active principles, biogenesis, isolation, qualitative and quantitative differences during the vegetative period, and the changes during technological treatment and pharmacological activity of its active principles.

PMID: 569336 [PubMed - indexed for MEDLINE]

[Planta Med.](#) 2005 Feb;71(2):147-52.

Urinary excretion of arbutin metabolites after oral administration of bearberry leaf extracts.

[Quintus J](#), [Kovar KA](#), [Link P](#), [Hamacher H](#).

Pharmazeutisches Institut, Eberhard-Karls-Universität Tübingen, Tübingen, Germany.

Abstract

An HPLC assay with fluorimetric detection of the arbutin metabolites hydroquinone glucuronide (2) and hydroquinone sulphate (6) in urine was developed and validated. Methylarbutin (4) and 6 were synthesised as reference substances. Compound 2 was prepared enzymatically from hydroquinone and uridine 5'-diphosphoglucuronic acid using the glucosyltransferase system of rat liver microsomes and enriched by two liquid-liquid and an additional solid phase extraction. Compound 2 as the main component of this purified product was identified by UV and fluorescence spectroscopy, by HPLC-MS, and by enzymatic hydrolysis to hydroquinone (5). The assay yields precise and accurate urine levels of 2, 5 and 6 in the concentration range expected after oral administration of recommended therapeutic doses of bearberry leaf extract. In a preliminary pharmacokinetic study on 3 volunteers the time-dependent renal excretion of arbutin metabolites 2, 5 and 6 was investigated after ingestion of an aqueous bearberry leaf extract containing an arbutin dose recommended by the German Kommission E. More than half of the administered dose of arbutin was excreted within 4 hours mainly in form of the metabolites 2 and 6 and more than 75 % of the total applied arbutin was excreted within 24 h. The elimination of 5 was negligible in 2 out of 3 volunteers. The excretion of this metabolite in the third test person reached 5.6 % of the total administered arbutin dose. The preliminary pharmacokinetic results confirm that renal elimination of toxicologically critical concentrations of the metabolite 5 will not be expected.

PMID: 15729623 [PubMed - indexed for MEDLINE]

Olea europaea

[J Altern Complement Med.](#) 2007 Jan-Feb;13(1):103-9.

Antioxidant capacity of 55 medicinal herbs traditionally used to treat the urinary system: a comparison using a sequential three-solvent extraction process.

[Wojcikowski K](#), [Stevenson L](#), [Leach D](#), [Wohlmuth H](#), [Gobe G](#).

Molecular and Cellular Pathology, School of Medicine, University of Queensland, Brisbane, Queensland, Australia. kwojciko@scu.edu.au

Abstract

BACKGROUND: The prevalence of chronic renal disease exceeds 10% in industrialized societies. Oxidative damage is thought to be one of the main mechanisms involved in nearly all chronic renal pathologies.

OBJECTIVE: We aimed to use the oxygen radical absorbance capacity (ORAC) method and a sequential multisolvent extraction process to compare the in vitro antioxidant capacity of 55 medicinal herbs and prioritize them for in vivo studies investigating the value of herbal therapies in the treatment of renal disorders.

METHODS: The herbs were chosen on the basis of their traditional use in kidney or urinary system disorders, or because they have attracted the attention of recent investigations into renal pathologies. The three solvents used for extraction were ethyl acetate, methanol, and 50% aqueous methanol. *Silybum marianum* (milk thistle) seed and *Camellia sinensis* (tea) leaf, both known to possess high antioxidant capacity, were included for comparison.

RESULTS: Twelve of the 55 herbs were comparable to or exceeded ORAC levels of milk thistle seed or tea leaf. The highest radical-scavenging activity was found in *Olea europaea* (olive leaf), *Cimicifuga racemosa* (black cohosh), *Rheum palmatum* (rhubarb), *Glycyrrhiza glabra* (licorice), and *Scutellaria lateriflora* (Virginia skullcap).

CONCLUSIONS: The antioxidant capacity of many of the herbs studied may, at least in part, be responsible for their reputation as being protective of organs of the urinary system. Overall, the combined ORAC values for the methanol and aqueous methanol extracts comprised 84% of the total ORAC value. Sequential extraction with solvents of different polarities may be necessary to fully extract the antioxidant principles from medicinal plants.

PMID: 17309384 [PubMed - indexed for MEDLINE]

[J Altern Complement Med.](#) 2007 Jan-Feb;13(1):103-9.

Antioxidant capacity of 55 medicinal herbs traditionally used to treat the urinary system: a comparison using a sequential three-solvent extraction process.

[Wojcikowski K](#), [Stevenson L](#), [Leach D](#), [Wohlmuth H](#), [Gobe G](#).

Molecular and Cellular Pathology, School of Medicine, University of Queensland, Brisbane, Queensland, Australia. kwojciko@scu.edu.au

Abstract

BACKGROUND: The prevalence of chronic renal disease exceeds 10% in industrialized societies. Oxidative damage is thought to be one of the main mechanisms involved in nearly all chronic renal pathologies.

OBJECTIVE: We aimed to use the oxygen radical absorbance capacity (ORAC) method and a sequential multisolvent extraction process to compare the in vitro antioxidant capacity of 55 medicinal herbs and prioritize them for in vivo studies investigating the value of herbal therapies in the treatment of renal disorders.

METHODS: The herbs were chosen on the basis of their traditional use in kidney or urinary system disorders, or because they have attracted the attention of recent investigations into renal pathologies. The three solvents used for extraction were ethyl acetate, methanol, and 50% aqueous methanol. *Silybum marianum* (milk thistle) seed and *Camellia sinensis* (tea) leaf, both known to possess high antioxidant capacity, were included for comparison.

RESULTS: Twelve of the 55 herbs were comparable to or exceeded ORAC levels of milk thistle seed or tea leaf. The highest radical-scavenging activity was found in *Olea europaea* (olive leaf), *Cimicifuga racemosa* (black cohosh), *Rheum palmatum* (rhubarb), *Glycyrrhiza glabra* (licorice), and *Scutellaria lateriflora* (Virginia skullcap).

CONCLUSIONS: The antioxidant capacity of many of the herbs studied may, at least in part, be responsible for their reputation as being protective of organs of the urinary system. Overall, the combined ORAC values for the methanol and aqueous methanol extracts comprised 84% of the total ORAC value. Sequential extraction with solvents of different polarities may be necessary to fully extract the antioxidant principles from medicinal plants.

PMID: 17309384 [PubMed - indexed for MEDLINE]

Althaea officinalis

[J Clin Pharm Ther.](#) 2010 Feb;35(1):11-48.

Phytotherapeutics: an evaluation of the potential of 1000 plants.

[Cravotto G](#), [Boffa L](#), [Genzini L](#), [Garella D](#).

Dipartimento di Scienza e Tecnologia del Farmaco, University of Turin, Turin, Italy.

giancarlo.cravotto@unito.it

Abstract

OBJECTIVE: The aim of this review is to evaluate and summarize the available scientific information on the commonest plant extracts marketed in Western countries. In view of the intense, ongoing search for new plant extracts with powerful anti-inflammatory activity, we paid particular attention to this topic. The aim is to provide broad coverage of as many potentially useful plants as possible and then to focus on those with the greatest therapeutic potential.

METHODS: Our bibliographic sources were the SciFinder databases: CAPLUS, MEDLINE, REGISTRY, CASREACT, CHEMLIST, CHEMCATS (update to October 2007). In order to assess the value of clinical trials, we focused a specific search on clinical investigations concerning nine plants with the most trial data, viz., *Althaea officinalis*, *Calendula officinalis*, *Centella asiatica*, *Echinacea purpurea*, *Passiflora incarnata*, *Punica granatum*, *Vaccinium macrocarpon*, *Vaccinium myrtillus*, *Valeriana officinalis*. This was carried out in several databases (update to June 2008): ISI Web of Knowledge(SM) (ISI WoK), SciFinder (CAPLUS, MEDLINE, REGISTRY, CASREACT, CHEMLIST, CHEMCATS) and PubMed (indexed for MEDLINE).

RESULTS: Our survey covers roughly a 1000 plants, although clinical trials have been published only for 156 plants supporting specific pharmacological activities and therapeutic applications. However, for about half of the plants, in vitro and in vivo studies provide some support for therapeutic use. For one-fifth of the plants included in our search, only phytochemical studies were found. Their properties and indications were often attributed to the presence of certain compounds, but no evidence concerning the activities of the whole extracts was presented. We found that for about 12% of the plants, currently available on the Western market, no substantial studies on their properties had been published, while there was strong evidence that 1 in 200 were toxic or allergenic, so that their use ought to be discouraged or forbidden. Nine plants had considerable evidence of therapeutic effect, viz., *A. officinalis*, *Calendula officinalis*, *Centella asiatica*, *E. purpurea*, *Passiflora incarnata*, *Punica granatum*, *Vaccinium macrocarpon*, *Vaccinium myrtillus*, *Valeriana officinalis*.

CONCLUSION: The present review provides a baseline on the level of evidence available on many herbal preparations and should be of help to those intending to research further on these topics.

PMID: 20175810 [PubMed - indexed for MEDLINE]

[J Ethnopharmacol](#). 2010 Jan 8;127(1):62-9. Epub 2009 Sep 30.

Aqueous extracts and polysaccharides from Marshmallow roots (*Althea officinalis* L.): cellular internalisation and stimulation of cell physiology of human epithelial cells in vitro.

[Deters A](#), [Zippel J](#), [Hellenbrand N](#), [Pappai D](#), [Possemeyer C](#), [Hensel A](#).

University of Münster, Institute for Pharmaceutical Biology and Phytochemistry (IPBP), Hittorfstrasse 56, D-48149 Münster, Germany.

Abstract

AIMS: Aqueous extracts from the roots of *Althea officinalis* L. (Malvaceae) are widely used for treatment of irritated mucosa. The clinical proven effects are related to the presence of bioadhesive and mucilaginous polysaccharides from the rhamnogalacturonan type, leading to the physical formation of mucin-like on top of the irritated tissues. No data are available if the extracts or the polysaccharides from these extract exert an active influence on mucosal or connective tissue cells, in order to initiated changes in cell physiology, useful for better tissue regeneration.

METHODOLOGY: In vitro investigations of aqueous *A. officinalis* extract AE and raw polysaccharides (RPS) on epithelial KB cells and primary dermal human fibroblasts (pNHF) using WST1 vitality test and BrdU proliferation ELISA. Gene expression analysis by microarray from KB cells. Internalisation studies of polysaccharides were performed by laser scanning microscopy.

RESULTS: AE (1, 10 microg/mL) had stimulating effect on cell viability and proliferation of epithelial KB cells. RPS (1, 10 microg/mL) stimulated cell vitality of epithelial cells significantly without triggering the cells into higher proliferation status. Neither AE nor RPS had any effect on fibroblasts. FITC-labeled RPS was shown to be internalised into epithelial cells, but not into fibroblasts. FITC-RPS was shown to form bioadhesive layers on the cell surface of dermal fibroblasts. Microarray analysis indicated an up-regulation of genes related to cell adhesion proteins, growth regulators, extracellular matrix, cytokine release and apoptosis.

CONCLUSION: Aqueous extracts and polysaccharides from the roots of *A. officinalis* are effective stimulators of cell physiology of epithelial cells which can prove the traditional use of Marshmallow preparations for treatment of irritated mucous membranes within tissue regeneration.

PMID: 19799989 [PubMed - indexed for MEDLINE]

[Vestn Ross Akad Med Nauk](#). 2009;(11):9-12.

[New promising natural immunocorrective agents]

[Article in Russian]

[Borsuk OS](#), [Masnaia NV](#), [Sherstoboev Elu](#), [Isaïkina NV](#), [Kalinkina GI](#).

Abstract

The influence of *Sorbus sibirica*, *Calendula officinalis* and *Althaea officinalis* extracts on the humoral immune response and nonspecific resistance of mice to immunosuppression by cyclophosphan was studied. It was shown that these extracts are not inferior to *Echinacea purpurea* tincture in terms of stimulation of humoral immune response, phagocytic and bactericidal activity of peritoneal macrophages but exceed effect of *E. purpurea* on phagocytic activity of peripheral blood neutrophils.

PMID: 20017400 [PubMed - indexed for MEDLINE]

[Phytother Res.](#) 2007 Dec;21(12):1193-9.

The detection of antibacterial actions of whole herb tinctures using luminescent *Escherichia coli*.

[Watt K](#), [Christofi N](#), [Young R](#).

Pollution Research Unit, Applied Research Centre for Health, Environment and Society (ARCHES),
Edinburgh, UK.

Abstract

Two whole cell *Escherichia coli* luminescent biosensors were used to determine the antibacterial actions of 16 herbal tinctures. These bioassays can detect genotoxic (strain DPD2794) and general oxidative stress (DE135) events when challenged with antibacterial substances. Many of the herbal tinctures were active against these Gram-negative bacteria, affecting their metabolism without, in some cases, arresting cell growth or causing cell death. Antibacterial activity ranged from undetectable for *Curcuma longa*, *Cinnamomum zeylanicum* and *Apium graveolens* to highly effective against both *E. coli* strains in the case of *Rosmarinus officinalis*. Some of the results were unexpected. *Althaea officinalis* affected microbial metabolism in spite of the lack of literature precedent, and *Cinnamomum zeylanicum* did not appear to be antimicrobial, as claimed in some literature. It is concluded that studies using luminescent bacterial biosensors can provide important new insights into the potency and modes of the lethal and sub-lethal antibacterial action of whole herbs, and thereby provide crucial evidence for efficacy demanded by modern science and medicine.

PMID: 17661335 [PubMed - indexed for MEDLINE]

[Fitoterapia](#). 2006 Jul;77(5):367-73. Epub 2006 May 24.

Antioxidant activity of medicinal plant polysaccharides.

[Kardosová A](#), [Machová E](#).

Institute of Chemistry, Slovak Academy of Sciences, 845 38 Bratislava, Slovakia.

Abstract

Eleven polysaccharides have been isolated from the leaves of *Arctium lappa* var. *herkules*, *Aloe barbadensis*, *Althaea officinalis* var. *robusta*, *Plantago lanceolata* var. *libor*, aerial parts and roots of *Rudbeckia fulgida* var. *sullivantii*, stems of *Mahonia aquifolium*, and peach-tree (*Prunus persica*) gum exudates. The polysaccharides were investigated for their ability to inhibit peroxidation of soyabean lecithin liposomes by OH radicals. The highest inhibition was found with glucuronoxylans of *A. officinalis* var. *robusta* and *P. lanceolata* var. *libor*, aerial parts. Their antioxidant activity accounted for approximately 69% of the activity of the reference compound alpha-tocopherol. The activity of eight polysaccharides ranged from 20 to 45%, while the fructofuranan from *P. lanceolata* var. *libor* roots was practically inactive.

PMID: 16797146 [PubMed - indexed for MEDLINE]

[Phytother Res.](#) 2003 Jun;17(6):599-604.

Antibacterial activity of medicinal plant extracts against periodontopathic bacteria.

[Iauk L](#), [Lo Bue AM](#), [Milazzo I](#), [Rapisarda A](#), [Blandino G](#).

Department of Microbiological Sciences, University of Catania, Via Androne 81, 95124 Catania, Italy.

Abstract

This study was performed to evaluate the antibacterial activity of *Althaea officinalis* L. roots, *Arnica montana* L. flowers, *Calendula officinalis* L. flowers, *Hamamelis virginiana* L. leaves, *Illicium verum* Hook. fruits and *Melissa officinalis* L. leaves, against anaerobic and facultative aerobic periodontal bacteria: *Porphyromonas gingivalis*, *Prevotella* spp., *Fusobacterium nucleatum*, *Capnocytophaga gingivalis*, *Veillonella parvula*, *Eikenella corrodens*, *Peptostreptococcus micros* and *Actinomyces odontolyticus*. The methanol extracts of *H. virginiana* and *A. montana* and, to a lesser extent, *A. officinalis* were shown to possess an inhibiting activity (MIC \leq 2048 mg/L) against many of the species tested. In comparison, *M. officinalis* and *C. officinalis* extracts had a lower inhibiting activity (MIC $>$ 2048 mg/L) against all the tested species with the exception of *Prevotella* sp. *Illicium verum* methanol extract was not very active though it had a particular good activity against *E. corrodens*. The results suggest the use of the alcohol extracts of *H. virginiana*, *A. montana* and *A. officinalis* for topical medications in periodontal prophylactics.

PMID: 12820224 [PubMed - indexed for MEDLINE]

[Planta Med.](#) 1991 Jun;57(3):284-5.

Flavonoids, Phenolic Acids and Coumarins from the Roots of *Althaea officinalis*.

[Gudej J.](#)

Department of Pharmacognosy, Institute of Technology and Chemistry of Drugs, Medical Academy of Łódź, Muszyńskiego 1, 90-151 Łódź, Poland.

Abstract

From the roots of *ALTHAEA OFFICINALIS* two flavonoid glycosides were separated. Phenolic acids and coumarins were investigated chromatographically. The structures of the compounds were established on the basis of acid hydrolysis and spectroscopic methods (UV, ¹H-NMR, ¹³C-NMR) as hypolaetin 8-glucoside and the new flavonoid sulphate - isoscutellarein 4'-methyl ether 8-glucoside-2''-SO (3)K.

PMID: 17226162 [PubMed - in process]

L-Metionina

[Med Klin \(Munich\)](#). 1997 Oct 15;92(10):574-81.

[Prevention of reinfection by L-methionine in patients with recurrent urinary tract infection]

[Article in German]

[Fünfstück R](#), [Straube E](#), [Schildbach O](#), [Tietz U](#).

Klinik für Innere Medizin IV, Friedrich-Schiller-Universität Jena.

Abstract

PROBLEM: A great variety of different antimicrobial chemotherapeutics is available for the treatment of urinary tract infections. Influencing the course of chronic diseases is a problem because recurrent diseases may result in disturbances of renal and bladder functions as well as in irreversible damages of the renal parenchyma. The present investigations are expected to clarify whether an effective prevention of reinfection in patients with chronically recurrent urinary tract infection is possible by a regular administration of L-methionine (Acimethin).

PATIENTS AND METHODS: 33 female patients were included in the examinations. Following acute disease, 23 females (aged: 47.4 +/- 13.3 years) were treated with 3 x 1 tablet of Acimethin (L-methionine) daily over a period of 26 months. Ten female patients (aged: 47.4 +/- 12.2 years) taking 1 tablet of Nevigramon (nalidixic acid) three times daily over 21.6 months served as a control group. Before starting treatment and in the middle of the therapy period control examinations were performed and following the last drug administration so as to assess the therapeutic result.

RESULTS: No acute infection occurred during L-methionine treatment. All parameters of inflammation (leucocyte count, C-reactive protein, blood sedimentation rate, alpha 2-globulin concentration) were in the normal range; no impairment of renal function was observed. Although L-methionine, i.e. nalidixic acid, did not yield any significant changes in the range of bacteria, the adherence of uropathogenic microorganisms to the cells of the urinary tract was reduced. Before L-methionine treatment, the average load of the uroepithelial cells was 95.9 +/- 73.6 bacteria per cell. When the observation period was completed, 51.2 +/- 56.4 bacteria per cell were registered ($p < 0.03$). During nalidixic acid treatment, the rate of adherence was reduced from 74.0 +/- 88.4 to 34.4 +/- 37.8 bacteria per cell ($p < 0.25$). During L-methionine treatment, no *Escherichia coli* strains that are able to produce hemolysin or to form aerobactine were found. Among agents adhering to uroepithelial cells, however, an increase in their ability to produce mannose-resistant hemagglutination was conspicuous.

CONCLUSION: L-methionine is suitable to prevent reinfection with chronic urinary tract infection. The therapeutic result is essentially due to its influence on bacterial cytoadherence. In contrast to the established recommendations concerning the prevention of reinfection by the use of antibiotics and sulphonamides selecting resistant strains during long-term treatment, nothing is known about the development of resistance to L-methionine.

PMID: 9446004 [PubMed - indexed for MEDLINE]

[Dtsch Tierarztl Wochenschr.](#) 1993 May;100(5):198-203

Struvite stone dietetics: 1. Effect of different feed rations on the urine pH value of cats]

[Article in German]

[Kienzle E](#), [Schuhknecht A](#).

Institut für Tierernährung, Tierärztlichen Hochschule Hannover.

Abstract

In this investigation the base excess of cat foods (sum of alkalogenic compounds calcium, magnesium, sodium and potassium minus sum of acidifying compounds phosphorus, chloride, methionine and cysteine; base excess in mmol/kg dry matter = $Ca^2+Mg^2+Na+K-(met(-)+cys)^2-P^2-Cl$) as a method of predicting the influence of food on the urinary pH was tested. The base excess and the effect on urinary pH (feeding experiment with 4 to 6 adult cats per trial) was determined in 10 commercial cat foods (3 moist, 3 dry type foods, 4 struvite diets) as well as the influence of several additives (CaCl₂, CaCO₃, Ca-lactate, CaHPO₄, phosphoric acid in 2 doses, NH₄Cl, ascorbic acid). After the intake of commercial cat foods the mean urine pH ranged between 6.58 and 7.89, after the intake of struvite diets it ranged between 6.36 and 7.57. The addition of Ca-carbonate or -lactate led to a significant increase of urine pH, Ca-phosphate and ascorbic acid had no effect, while Ca-Chloride, phosphoric acid and ammonium chloride led to a decrease. There was a highly significant correlation between the base excess in the food (x; mmol/kg dry matter) and the mean urine pH (y; $y = 6.72 + 0.0021 x$; $r = 0.96^{**}$).

PMID: 8319549 [PubMed - indexed for MEDLINE]

Lactobacillus acidophilus

[Clin Microbiol Rev.](#) 1990 Oct;3(4):335-44.

Is there a role for lactobacilli in prevention of urogenital and intestinal infections?

[Reid G](#), [Bruce AW](#), [McGroarty JA](#), [Cheng KJ](#), [Costerton JW](#).

Department of Surgery, University of Toronto, Toronto General Hospital, Ontario, Canada.

Abstract

This review describes the importance of microbial adhesion in the ecology of the urogenital and intestinal tracts and the influence of host and microbial factors in bacterial interference. In a recent revival of interest in bacterial interference, lactobacillus administration has been studied as a means of treating and preventing disease. Although evidence is conflicting, *Lactobacillus acidophilus* appears to be involved in beneficial antagonistic and cooperative reactions that interfere with establishment of pathogens in the gastrointestinal tract. The mechanisms of action are believed to involve competitive exclusion and production of inhibitory substances, including bacteriocins. These characteristics, as well as demonstrated adherence abilities in vitro, led to selection of certain *Lactobacillus* strains for clinical studies of cystitis. Weekly intravaginal *Lactobacillus* therapy reduced the recurrence rate of uncomplicated lower urinary tract infections in women. Use of *Lactobacillus* strains resistant to Nonoxynol-9, a spermicide that kills members of the protective normal vaginal flora, may have potential for use in women with recurrent cystitis using this contraceptive agent. In veterinary studies, bacterial interference by administration of probiotics has also been beneficial in disease prevention in animals. Carefully selected bacterial mixtures integrate with the gastrointestinal flora of the animals and can confer disease resistance and improve physiological function. Additional human and animal trials are needed to determine the practical, long-term usefulness of bacterial interference as a protective mechanism against infectious diseases.

PMID: 2224835 [PubMed - indexed for MEDLINE]

[Microbes Infect.](#) 2002 Mar;4(3):319-24.

Use of Lactobacillus to prevent infection by pathogenic bacteria.

[Reid G](#), [Burton J](#).

Canadian Research and Development Centre for Probiotics, Lawson Health Research Institute, and Department of Microbiology and Immunology at the University of Western Ontario, 268 Grosvenor Street, London, Ontario, N6A 4V2, Canada. gregor@uwo.ca

Abstract

This review focuses on the use and potential of Lactobacillus to prevent infections of the urogenital and intestinal tracts. The presence and dominance of Lactobacillus in the vagina is associated with a reduced risk of bacterial vaginosis and urinary tract infections. The mechanisms appear to involve anti-adhesion factors, by-products such as hydrogen peroxide and bacteriocins lethal to pathogens, and perhaps immune modulation or signaling effects. The instillation of Lactobacillus GR-1 and B-54 or RC-14 strains into the vagina has been shown to reduce the risk of urinary tract infections, and improve the maintenance of a normal flora. Ingestion of these strains into the gut has also been shown to modify the vaginal flora to a more healthy state. In addition, these strains inhibit the growth of intestinal, as well as urogenital pathogens, colonize the gut and protect against infections as shown in mice. Other probiotic strains, such as Lactobacillus GG, have been shown to prevent and treat gastroenteritis caused by rotavirus and bacteria. Given that lactobacilli are not the dominant commensals in a gut which comprises around 10¹⁰ organisms, much work is still needed to define the mechanisms whereby GR-1, RC-14, GG and other strains contribute to health restoration and maintenance. Such critically important studies will require the medical science community to show a willingness to turn away from pharmaceutical remedies as the only solution to health and disease.

PMID: 11909742 [PubMed - indexed for MEDLINE]

[Am J Clin Nutr.](#) 2001 Feb;73(2 Suppl):437S-443S.

Probiotic agents to protect the urogenital tract against infection.

[Reid G.](#)

Lawson Research Institute and the Department of Microbiology and Immunology, the University of Western Ontario, Canada. gregor@julian.uwo.ca

Abstract

The urogenital microflora of a healthy woman comprises approximately 50 species of organisms, which differ in composition according to reproductive stages and exposure to several factors, including antibiotics and spermicides. Infections are very common with > 300 million cases of urinary tract infections, bacterial vaginosis, and yeast vaginitis worldwide per annum. At the time of infection in the bladder and vagina, the urogenital flora is often dominated by the infecting pathogens, in contrast with healthy phases when indigenous organisms dominate. Premenopausal women have a flora of mostly lactobacilli, and certain properties of these strains, including adhesive ability and production of acids, bacteriocins, hydrogen peroxide, and biosurfactants, appear important in conferring protection to the host. Efforts to artificially restore an unbalanced flora with the use of probiotics have met with mixed results but research aimed at selecting scientifically based strains could well provide a reliable alternative treatment and preventive regimen to antibiotics in the future.

PMID: 11157354 [PubMed - indexed for MEDLINE]

[Clin Ther.](#) 2008 Mar;30(3):453-68.

Use of Lactobacillus probiotics for bacterial genitourinary infections in women: a review.

[Barrons R, Tassone D.](#)

Wingate University School of Pharmacy, Wingate, North Carolina 28174, USA. rbarrons@wingate.edu

Abstract

BACKGROUND: Lactobacilli are the dominant bacteria of the vaginal flora and possess antimicrobial properties that regulate other urogenital microbiota. Incomplete cure and recurrence of genitourinary infections lead to a shift in the local flora from a predominance of lactobacilli to coliform uropathogens. Use of Lactobacillus-containing probiotics to restore commensal vaginal flora has been proposed for the treatment and prophylaxis of bacterial urogenital infections.

OBJECTIVE: This review summarizes randomized controlled trials that have assessed the therapeutic efficacy and tolerability of lactobacilli in bacterial vaginosis (BV) and urinary tract infection (UTI).

METHODS: Relevant randomized controlled trials published in English were identified through a search of MEDLINE (through November 2007), ClinicalTrials.gov, and the Cochrane Database (second quarter 2007). The search terms included probiotics, Lactobacillus, lactobacilli, urinary, urogenic, bacterial vaginosis, vaginal, colonization, bacteremia, sepsis, pathogenic, taxonomy, diagnosis, and infections.

RESULTS: Eleven randomized controlled trials were identified that investigated the effects of lactobacilli in the treatment and prophylaxis of bacterial urogenital infections. In the 2 studies that reported a beneficial effect for probiotics in the treatment of BV, cure rates for lactobacilli at 30 days were 60% ($P=0.004$) and 88% ($P<0.005$), more than double the effect of controls. One trial reported a 35% reduction in recurrent episodes of BV compared with placebo ($P=0.004$). Among the 4 trials involving treatment of UTI, 1 reported a 73% reduction in episodes of recurrent UTI compared with the previous year ($P=0.001$). Seven studies found no therapeutic effect of lactobacilli in the treatment or prophylaxis of BV or UTI. Only 2 of the identified trials attempted to validate the probiotic dosing strategy by obtaining quantitative evidence of local colonization with lactobacilli and had sufficient power to detect treatment effects, and only 1 trial addressed the stability of the probiotic product at the end of the study.

CONCLUSIONS: Despite enhanced cure rates in some studies, concerns about product stability and limited documentation of strain-specific effects prevent recommendations for the use of Lactobacillus-containing probiotics in the treatment of BV. The results of studies of lactobacilli for the prophylaxis of UTI remain inconclusive as a result of small sample sizes and use of unvalidated dosing strategies.

PMID: 18405785 [PubMed - indexed for MEDLINE]

[Consult Pharm.](#) 2006 May;21(5):400-9.

Urinary tract infections in extended care facilities: preventive management strategies.

[Regal RE](#), [Pham CQ](#), [Bostwick TR](#).

Adult Internal Medicine and Infectious Diseases, University of Michigan Hospitals and College of Pharmacy, Ann Arbor, 48109-0008, USA. reregal@umich.edu

Abstract

OBJECTIVE: To provide health care professionals with an overview of interventions that may be done to reduce the incidence of urinary tract infections (UTIs) in elderly patients, especially those residing in extended care facilities.

DATA SOURCES: A Medline search of the English literature was performed from 1980 to January 2006 to find literature relevant to urinary tract prophylaxis. Further references were hand-searched from relevant sources.

STUDY SELECTION: When assessing the effectiveness of various clinical interventions for reducing the incidence of UTIs in the elderly, preference was given to more recent, double-blind, placebo-controlled randomized studies, but studies of less robust design also were included in the discussions when the former were lacking.

DATA EXTRACTION: Where possible, recent publications were favored over older studies. References were all reviewed by the authors and chosen to present key citations.

DATA SYNTHESIS: Data selection was prioritized to address specific subtopics.

CONCLUSION: Though still frequent in occurrence and quite costly in terms of morbidity, mortality, and cost to the health care system, numerous measures may be taken to ameliorate the incidence of UTIs in elderly, institutionalized residents. First and foremost, establishing and adhering to good infection-control practices by health care givers and minimizing the use of indwelling catheters are essential. Adequate staffing and training are germane to this effort. Reasonably well-designed clinical studies also give credence to the use of topical estrogens and lactobacillus "probiotics" for female subgroups and cranberry juice for a wider array of patients. Vitamin C is of no proven benefit. With regard to antibiotics, with the relative paucity of data available for this patient population, concerns for resistance proliferation must be balanced against perceived gains in UTI reduction.

PMID: 16824004 [PubMed - indexed for MEDLINE]

Vitamina C

[J Vet Med A Physiol Pathol Clin Med.](#) 2006 Sep;53(7):379-82.

Urinary tract infections due to *Mycoplasma canis* in dogs.

[Ulgen M](#), [Cetin C](#), [Sentürk S](#), [Ozel AE](#), [Ozdemir U](#).

Department of Microbiology, Faculty of Veterinary Medicine, Uludag University, Bursa, Turkey.

ulgenm@uludag.edu.tr

Abstract

Urine samples were obtained from 100 dogs with symptoms of lower urinary tract disease by cystocentesis and were examined for mycoplasmas. Urinalysis, haematological and biochemical analyses were also performed. Bacteria were isolated from urine in 41 of 100 dogs; *Mycoplasma canis* was isolated from four of 100 (4%) urine samples and three were pure culture. Selective mycoplasma media were used for isolation. In growth inhibition test, propagation of the four *M. canis* isolates was inhibited by their specific hyperimmune sera and there was no cross reactivity between isolates and hyperimmune sera of other mycoplasmas. Dogs in which *M. canis* was isolated were azotemic. All dogs were treated with enrofloxacin, furosemide, and supportive therapy (fluid therapy, ascorbic acid). In all animals, clinical improvements were observed after treatment.

PMID: 16922838 [PubMed - indexed for MEDLINE]

Taraxacum dens leonis

[J Altern Complement Med.](#) 2009 Aug;15(8):929-34.

The diuretic effect in human subjects of an extract of *Taraxacum officinale folium* over a single day.

[Clare BA](#), [Conroy RS](#), [Spelman K](#).

Department of Herbal Medicine, Tai Sophia Institute, Laurel, MD 20723, USA.

Abstract

BACKGROUND: *Taraxacum officinale* (L.) Weber (Asteraceae) has been extensively employed as a diuretic in traditional folk medicine and in modern phytotherapy in Europe, Asia, and the Americas without prior clinical trial substantiation.

OBJECTIVES: In this pilot study, a high-quality fresh leaf hydroethanolic extract of the medicinal plant *T. officinale* (dandelion) was ingested by volunteers to investigate whether an increased urinary frequency and volume would result.

DESIGN: Volume of urinary output and fluid intake were recorded by subjects. Baseline values for urinary frequency and excretion ratio (urination volume:fluid intake) were established 2 days prior to dandelion dosing (8 mL TID) and monitored throughout a 1-day dosing period and 24 hours postdosing.

RESULTS: For the entire population (n = 17) there was a significant ($p < 0.05$) increase in the frequency of urination in the 5-hour period after the first dose. There was also a significant ($p < 0.001$) increase in the excretion ratio in the 5-hour period after the second dose of extract. The third dose failed to change any of the measured parameters.

CONCLUSIONS: Based on these first human data, *T. officinale* ethanolic extract shows promise as a diuretic in humans. Further studies are needed to establish the value of this herb for induction of diuresis in human subjects.

PMID: 19678785 [PubMed - indexed for MEDLINE]

Zea mays

[Ceska Slov Farm.](#) 2007 Apr;56(2):85-9.

[An orientational examination of the effects of extracts from mixtures of herbal drugs on selected renal functions]

[Article in Czech]

[Masteiková R](#), [Klimas R](#), [Samura BB](#), [Savickas A](#), [Samura BA](#), [Belajj SI](#), [Samura IB](#), [Rabisková M](#), [Chalupová Z](#), [Bernatoniene J](#).

Veterinární a farmaceutická univerzita Brno, Farmaceutická fakulta, Ustav technologie léků.
masteikovar@vfu.cz

Abstract

The paper aimed to determine the effects of mixtures of selected medicinal plants on some physiological renal functions, i.e. excretion of urine and electrolytes and changes in the quantity of prostaglandins E2 (PGE2) and kallikrein-kinins in rat blood plasma after water and salt load. The following medicinal plants were selected for the examination: downy birch (*Betula pubescens* EHRH.), everlasting flower (*Helichrysum arenarium* L. MOENCH.), hawthorn (*Crataegus oxyacantha* L.), woodland strawberry (*Fragaria vesca* L.), sweet corn (*Zea mays* L.), German chamomile (*Matricaria recutita* L.), and field horsetail (*Equisetum arvense* L.). Herbal drugs were used to compose 6 mixtures. Extracts from these mixtures were administered to Wistar strain males and their effects were compared with the effects of an administered suspension of hydrochlorothiazide, an extract from field horsetail herb alone, and a control group of animals which was not administered any preparation. The greatest diuretic effect was found in a mixture composed of birch leaves (*Betulae folium*), hawthorn berries (*Crataegi fructus*), strawberry leaves (*Fragariae folium*), corn silk (*Maydis stigmata*), chamomile flowers (*Matricariae flos*), and horsetail herb (*Equiseti herba*). Its effect was greater by 47% and 34% than the effect of a horsetail herb extract and a hydrochlorothiazide suspension ($p < 0.05$), respectively. The extract from this mixture also increased the quantity of prostaglandins E2 and kallikrein-kinins in rat blood plasma in water and salt load.

PMID: 17619305 [PubMed - indexed for MEDLINE]

[Phytomedicine](#). 2005 May;12(5):363-9.

Zea mays L. extracts modify glomerular function and potassium urinary excretion in conscious rats.

[Velazquez DV](#), [Xavier HS](#), [Batista JE](#), [de Castro-Chaves C](#).

Departamento de Fisiologia e Farmacologia-UFPE, s/n Cidade Universitária, Recife, PE, Brasil.

Abstract

Diuretic and uricosuric properties have traditionally been attributed to corn silk, stigma/style of *Zea mays* L. Although the diuretic effect was confirmed, studies of the plant's effects on renal function or solute excretion were lacking. Thus, we studied the effects of corn silk aqueous extract on the urinary excretion of water, Na⁺, K⁺, and uric acid. Glomerular and proximal tubular function and Na⁺ tubular handling were also studied. Conscious, unrestrained adult male rats were housed in individual metabolic cages (IMC) with continuous urine collection for 5 and 3 h, following two protocols. The effects of 25, 50, 200, 350, and 500 mg/kg body wt. corn silk extract on urine volume plus Na⁺ and K⁺ excretions were studied in water-loaded conscious rats (2.5 ml/100 g body wt.) in the IMC for 5 h (Protocol 1). Kaliuresis was observed with doses of 350 (100.42 ± 22.32-120.28 ± 19.70 microEq/5 h/100 g body wt.; n = 13) and 500 mg/kg body wt. (94.97 ± 29.30-134.32 ± 39.98 microEq/5h/100 g body wt.; n = 12; p<0.01), and the latter dose resulted in diuresis as well (1.98 ± 0.44-2.41 ± 0.41 ml/5 h/100 g body wt.; n = 12; p<0.05). The effects of a 500 mg/kg body wt. dose of corn silk extract on urine volume, Na⁺, K⁺ and uric acid excretions, and glomerular and proximal tubular function, were measured respectively by creatinine (Cler) and Li⁺ (CILi) clearances and Na⁺ tubular handling, in water-loaded rats (5 ml/100 g body wt.) in the IMC for 3 h (Protocol 2). C_{lcr} (294.6 ± 73.2, n = 12, to 241.7 ± 48.0 microl/ min/100 g body wt.; n = 13; p<0.05) and the Na⁺ filtered load (41.9 ± 10.3, n = 12, to 34.3 ± .8, n = 13, p<0.05) decreased and C_{lLi} and Na⁺ excretion were unchanged, while K⁺ excretion (0.1044 ± 0.0458, n=12, to 0.2289 ± 0.0583 microEq/min/100 body wt.; n = 13; p<0.001) increased. For Na⁺ tubular handling, the fractional proximal tubular reabsorption (91.5 ± 3.5, n = 12, to 87.5 ± 3.4%; n = 13; p<0.01) decreased, and both fractional distal reabsorptions--I and II--increased (96.5 ± 1.5, n = 12, to 97.8 ± 0.9%; n = 13; p<0.01; and 8.2 ± 3.5, n = 12, to 12.2 ± 3.4%, n = 13, p<0.01, respectively). To summarize, in water-loaded conscious rats (2.5 ml/100 body wt.), corn silk aqueous extract is diuretic at a dose of 500 mg/kg body wt. and kaliuretic at doses of 350 and 500 mg/kg body wt. In water-loaded conscious rats (5.0 ml/100 g body wt.), corn silk aqueous extract is kaliuretic at a dose of 500 mg/kg body wt., but glomerular filtration and filtered load decrease without affecting proximal tubular function, Na⁺, or uric acid excretion.

PMID: 15957371 [PubMed - indexed for MEDLINE]

[J Ethnopharmacol.](#) 2003 Apr;85(2-3):257-60.

Tribulus terrestris: preliminary study of its diuretic and contractile effects and comparison with Zea mays.

[Al-Ali M](#), [Wahbi S](#), [Twajj H](#), [Al-Badr A](#).

Department of Urology, St. Bartholomew's, The Royal London & Homerton University Hospitals, 224B East End Road, East Finchley, N2 8AX, London, UK. alalimun@hotmail.com

Abstract

OBJECTIVES: Tribulus terrestris L. (Zygophyllaceae) which is called Al-Gutub (in Iraqi dialect) or Quti;ba (in classical Arabic medicine), and Zea mays were both used alone or in combination by Iraqi herbalists to propel urinary stones. We studied the aqueous extract of the leaves and fruits of T. terrestris and the hair of Z. mays, to determine their diuretic activity and the contractile effect of T. terrestris.

METHODS: The aqueous extract was filtered and the solvent was evaporated to produce a dry crude extract. The dry extract was then dissolved in physiological saline to make the required concentrations. Wistar male rats were used for the diuresis test and strips of isolated Guinea pig ileum were used for the contractility test.

RESULTS: The aqueous extract of T. terrestris, in oral dose of 5g/kg elicited a positive diuresis, which was slightly more than that of furosemide. Z. mays aqueous extract did not result in significant diuresis when given alone in oral dose of 5g/kg, while combination of Z. mays and T. terrestris extracts produced the same extent of diuresis as that produced by T. terrestris alone. Na(+), K(+) and Cl(+) concentrations in the urine had also much increased. In addition to its diuretic activity T. terrestris had evoked a contractile activity on Guinea pig ileum.

CONCLUSION: T. terrestris has long been used empirically to propel urinary stones. The diuretic and contractile effects of T. terrestris indicate that it has the potential of propelling urinary stones and merits further pharmacological studies.

PMID: 12639749 [PubMed - indexed for MEDLINE]

[J Ethnopharmacol](#). 1992 Jun;36(3):225-31.

Studies on the individual and combined diuretic effects of four Vietnamese traditional herbal remedies (Zea mays, Imperata cylindrica, Plantago major and Orthosiphon stamineus).

[Doan DD](#), [Nguyen NH](#), [Doan HK](#), [Nguyen TL](#), [Phan TS](#), [van Dau N](#), [Grabe M](#), [Johansson R](#), [Lindgren G](#), [Stjernström NE](#).

Vietnam-Sweden Hospital of Uong Bi, Vietnam.

Abstract

Herbal remedies are widely used in Vietnam alongside modern drugs. We assessed the diuretic effect of four traditional Vietnamese herbal remedies from Zea mays, Imperata cylindrica, Plantago major and Orthosiphon stamineus, all claimed to produce an increase of diuresis. No influence was recorded for the 12- and 24-h urine output or on the sodium excretion for any of the drugs when tested under standardized conditions in a placebo controlled double-blind crossover model. The present study indicates the need for critical review of the present recommendations regarding therapy with plant materials in countries relying on empiric traditions.

PMID: 1434681 [PubMed - indexed for MEDLINE]

Phyllanthus niruri

[Braz J Med Biol Res.](#) 1984;17(3-4):313-21.

Antispasmodic effects of an alkaloid extracted from *Phyllanthus sellowianus*: a comparative study with papaverine.

[Calixto JB](#), [Yunes RA](#), [Neto AS](#), [Valle RM](#), [Rae GA](#).

Abstract

Infusions of *Phyllanthus sellowianus* or *P. niruri* (Euphorbiaceae) are a popular remedy in Brazil for kidney and bladder stones. This study describes the isolation of an alkaloid from *P. sellowianus*, denoted ALK-1, and compares its antispasmodic activity with that of papaverine on isolated strips of guinea pig ileum and rat uterus, and rat aorta rings. ALK-1 and papaverine promoted a dose-dependent flattening of the dose-response curves obtained to acetylcholine and histamine on ileum strips and of the dose-response curves to acetylcholine and oxytocin on uterine strips. A non-competitive antagonism of noradrenaline-induced contractions by the *P. sellowianus* alkaloid was also demonstrated on aortic rings. Whereas the antispasmodic potency (pD_2 values) of papaverine did not depend on the muscle preparation and agonist used, ALK-1 exhibited a greater potency on the ileum strips than on the uterine or aortic preparations. Because of this selective antispasmodic action on the ileum, ALK-1 was equipotent to papaverine on this tissue, but was about 10-fold less potent than papaverine on uterine smooth-muscle. The dose-response curves to $CaCl_2$ obtained for potassium-depolarized uterine strips were shifted to the right by both antispasmodics. Similar pA_2 values with slopes not differing from unity -1.0 were obtained from Schild plots of the data, suggesting that competitive antagonism of calcium entry into the cell is a mechanism of action common to both alkaloids. The presence of at least one potent antispasmodic alkaloid in *P. sellowianus* justifies the popular use of infusions of this plant. Smooth muscle relaxation within the urinary or biliary tract probably facilitates the expulsion of kidney or bladder calculi.

PMID: 6529614 [PubMed - indexed for MEDLINE]

[J Endourol.](#) 2009 Mar;23(3):387-93.

Medical expulsive therapy as an adjunct to improve shockwave lithotripsy outcomes: a systematic review and meta-analysis.

[Schuler TD](#), [Shahani R](#), [Honey RJ](#), [Pace KT](#).

St. Michael's Hospital, Toronto, Ontario, Canada. ts9@ualberta.ca

Comment in: [J Endourol.](#) 2009 Aug;23(8):1365-6.

Abstract

BACKGROUND AND PURPOSE: Modern shockwave lithotripsy (SWL) is associated with inferior results compared with the original Dornier HM3. To enhance SWL outcomes, improved patient selection based on radiographic features and modulation of shockwave delivery rate have been used. A growing body of evidence demonstrates the positive effect of medical expulsive therapy (MET) to improve spontaneous passage of urinary calculi. The purpose of this review is to tabulate the current available data that examine the addition of MET to SWL to enhance outcomes.

MATERIALS AND METHODS: MEDLINE was searched with a strategy developed in conjunction with a medical librarian. Trials were included if patients were randomized to receive either a medical expulsive agent or placebo or standard therapy after SWL. Study quality was assessed according to the Cochrane Renal Group criteria. The data were analyzed using RevMan meta-analysis software. Subgroup analysis was performed with respect to MET agent used, stone size, and duration of follow-up.

RESULTS: Four randomized trials were identified. MET agents varied, with two trials using tamsulosin, one using nifedipine, and a single trial using Phyllanthus niruri extract. Two trials included patients with renal calculi, one had patients with ureteral calculi, and the fourth included patients with both ureteral and renal calculi. The pool results of the four trials included 212 patients who received MET and 206 who received placebo. The absolute risk difference of a successful outcome after SWL with the addition of MET was significantly superior to control at 17% (95% confidence interval [CI] 9%-24%); means six patients need to be treated with MET to prevent a single unsuccessful SWL of six (95% CI 4-11). The effect of MET post-SWL was even more pronounced for stones larger than 10 mm with an absolute risk difference of 26% (95% CI, 9%-43%).

CONCLUSIONS: MET post-SWL results in a significant increase in successful treatment outcomes. Further powered, randomized studies are encouraged.

PMID: 19245302 [PubMed - indexed for MEDLINE]

[J Ethnopharmacol.](#) 2009 Jul 15;124(2):233-9. Epub 2009 May 3.

Mechanisms of antihyperuricemic effect of Phyllanthus niruri and its lignan constituents.

[Murugaiyah V, Chan KL.](#)

School of Pharmaceutical Sciences, Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia.

Abstract

ETHNOPHARMACOLOGICAL RELEVANCE: Phyllanthus niruri Linn. (Euphorbiaceae) is used as folk medicine in South America to treat excess uric acid. Our initial study showed that the methanol extract of Phyllanthus niruri and its lignans were able to reverse the plasma uric acid of hyperuricemic animals.

AIM OF THE STUDY: The study was undertaken to investigate the mechanisms of antihyperuricemic effect of Phyllanthus niruri and its lignan constituents.

MATERIAL AND METHODS: The mechanisms were investigated using xanthine oxidase assay and uricosuric studies in potassium oxonate- and uric acid-induced hyperuricemic rats.

RESULTS: Phyllanthus niruri methanol extract exhibited in vitro xanthine oxidase inhibition with an IC₅₀ of 39.39 microg/mL and a moderate in vivo xanthine oxidase inhibitory activity. However, the lignans display poor xanthine oxidase inhibition in vitro and a relatively weak in vivo inhibitory activity at 10mg/kg. On the other hand, intraperitoneal treatment with Phyllanthus niruri methanol extract showed 1.69 folds increase in urinary uric acid excretion when compared to the hyperuricemic control animals. Likewise, the lignans, phyllanthin, hypophyllanthin and phylltetralin exhibited up to 2.51 and 11.0 folds higher in urinary uric acid excretion and clearance, respectively. The co-administration of pyrazinamide with phyllanthin exhibited a significant suppression of phyllanthin's uricosuric activity resembling that of pyrazinamide with benzbromarone.

CONCLUSIONS: The present study showed that the antihyperuricemic effect of Phyllanthus niruri methanol extract may be mainly due to its uricosuric action and partly through xanthine oxidase inhibition, whereas the antihyperuricemic effect of the lignans was attributed to their uricosuric action.

PMID: 19397979 [PubMed - indexed for MEDLINE]

[Urol Res.](#) 2006 Dec;34(6):351-7.

Effect of extract of *Phyllanthus niruri* on crystal deposition in experimental urolithiasis.

[Barros ME](#), [Lima R](#), [Mercuri LP](#), [Matos JR](#), [Schor N](#), [Boim MA](#).

Department of Medicine, Renal Division, Federal University of São Paulo, São Paulo, SP, Brazil.

Abstract

Phyllanthus niruri (Pn) is a plant that has been shown to interfere in the growth and aggregation of calcium oxalate (CaOx) crystals. In the present study we evaluated the effect of Pn on the preformed calculus induced by introduction of a CaOx seed into the bladder of male Wistar rats. Pn treatment (5 mg/ rat/day) was initiated immediately or 30 days after CaOx seeding and thus in the presence of a preformed calculus. Animals were sacrificed 50 or 70 days after surgery. The resulting calculi were weighed and analyzed by X-ray diffraction, stereomicroscopy and scanning electronic microscopy. Precocious Pn treatment reduced the number (75%, $P < 0.05$) and the weight (65%, $P < 0.05$) of calculi that frequently exhibited a matrix-like material on its surface, compared to the untreated CaOx group. In contrast, Pn treatment in the presence of a preformed calculus did not prevent further calculus growth; rather, it caused an impressive modification in its appearance and texture. Calculi from Pn-treated animals had a smoother, homogeneous surface compared to the spicule shape of calculi found in the untreated CaOx group. XRD analysis revealed the precipitation of struvite crystals over the CaOx seed and Pn did not change the crystalline composition of the calculi. This suggests that Pn interfered with the arrangement of the precipitating crystals, probably by modifying the crystal-crystal and/or crystal-matrix interactions. Results suggest that Pn may have a therapeutic potential, since it was able to modify the shape and texture of calculi to a smoother and probably more fragile form, which could contribute to elimination and/or dissolution of calculi.

PMID: 16896689 [PubMed - indexed for MEDLINE]

[Urol Res.](#) 2004 Oct;32(5):362-6. Epub 2004 Jun 19.

Phyllanthus niruri normalizes elevated urinary calcium levels in calcium stone forming (CSF) patients.

[Nishiura JL](#), [Campos AH](#), [Boim MA](#), [Heilberg IP](#), [Schor N](#).

Nephrology Division, Universidade Federal de São Paulo, Escola Paulista de Medicina, Rua Botucatu, 740 Vila Clementino, São Paulo, SP 04023-900 04023-900 , Brazil.

Abstract

Phyllanthus niruri is a plant used for years in Brazil to treat urinary calculi. We prospectively evaluated the effect of P. niruri intake on 24 h urinary biochemical parameters in an attempt to assess its in vivo effect in calcium stone forming (CSF) patients. A total of 69 CSF patients (39 males and 30 females, 38+/-8 years old) were randomized to take either P. niruri (n=33) (450 mg capsules, td) or placebo (n=36) for 3 months. Blood calcium, uric acid, citrate, magnesium, oxalate, sodium and potassium were determined at baseline and at the end of the study. A subset analysis was made in patients classified according to the presence of metabolic abnormalities (hypercalciuria, hyperuricosuria, hyperoxaluria, hypocitraturia and hypomagnesiuria). Overall, there were no significant differences in the mean values of urinary parameters between the urine samples before and after P. niruri intake, except for a slight reduction in mean urinary magnesium after P. niruri, which was within the normal range. However, in the subset analysis, we observed that P. niruri induced a significant reduction in the mean urinary calcium in hypercalciuric patients (4.8+/-1.0 vs 3.4+/-1.1 mg/kg/24 h, P<0.05). In this short-term follow-up, no significant differences in calculi voiding and/or pain relief between the groups taking P. niruri or the placebo were detected. Our data suggest that P. niruri intake reduces urinary calcium based on the analysis of a subset of patients presenting with hypercalciuria. Larger trials including primary hypercalciuric stone formers should be performed in order to confirm these findings and to determine the possible clinical consequences of urinary calcium reduction during P. niruri administration.

PMID: 15221244 [PubMed - indexed for MEDLINE]

[BJU Int.](#) 2002 Jun;89(9):829-34.

The effect of Phyllanthus niruri on urinary inhibitors of calcium oxalate crystallization and other factors associated with renal stone formation.

[Freitas AM](#), [Schor N](#), [Boim MA](#).

Nephrology Division, Universidade Federal de São Paulo, Escola Paulista de Medicina, São Paulo, Brazil.

Abstract

OBJECTIVE: To evaluate the effect of an aqueous extract of *Phyllanthus niruri* (Pn), a plant used in folk medicine to treat lithiasis, on the urinary excretion of endogenous inhibitors of lithogenesis, citrate, magnesium and glycosaminoglycans (GAGs).

MATERIALS AND METHODS: The effect of chronic (42 days) administration of Pn (1.25 mg/mL/day, orally) was evaluated in a rat model of urolithiasis induced by the introduction of a calcium oxalate (CaOx) seed into the bladder of adult male Wistar rats. The animals were divided into four groups: a sham control (16 rats); a control+Pn (six); CaOx+water instead of Pn (14); and CaOx+Pn (22). Plasma and urine were collected after 42 days of treatment for biochemical analysis and the determination of urinary excretion of citrate, magnesium and GAGs. The animals were then killed and the calculi analysed.

RESULTS: The creatinine clearance or urinary and plasma concentrations of Na⁺, K⁺, Ca²⁺, oxalate, phosphate and uric acid were unaffected by Pn or the induction of lithiasis. Treatment with Pn strongly inhibited the growth of the matrix calculus and reduced the number of stone satellites compared with the group receiving water. The calculi were eliminated or dissolved in some treated animals (three of 22). The urinary excretion of citrate and magnesium was unaffected by Pn treatment. However, the mean (sd) urinary concentration of GAGs was significantly lower in rats treated with CaOx+Pn, at 5.64 (0.86) mg/g creatinine, than when treated with CaOx + water, at 11.78 (2.21) mg/g creatinine. In contrast, the content of GAGs in the calculi was higher in the CaOx + Pn rats, at 48.0 (10.4) g/g calculus, than in the CaOx + water group, at 16.6 (9.6) g/g calculus.

CONCLUSION: These results show that Pn has an inhibitory effect on crystal growth, which is independent of changes in the urinary excretion of citrate and Mg, but might be related to the higher incorporation of GAGs into the calculi.

PMID: 12010223 [PubMed - indexed for MEDLINE]

[Nephron](#). 1999;81(4):393-7.

Phyllanthus niruri inhibits calcium oxalate endocytosis by renal tubular cells: its role in urolithiasis.

[Campos AH](#), [Schor N](#).

Nephrology Division, Department of Medicine, Universidade Federal de São Paulo, Brazil.

Abstract

We investigated the in vitro effect of an aqueous extract of *Phyllanthus niruri* L. on a model of CaOx crystal endocytosis by Madin-Darby canine kidney cells. The extract exhibited a potent and effective non-concentration-dependent inhibitory effect on the CaOx crystal internalization. This response was present even at very high (pathologic) CaOx concentrations and no *P. niruri* L.-induced toxic effect could be detected. Biochemical analysis of culture media containing *P. niruri* L. did not provide any clues for the elucidation of the cellular pathways affected by this natural product. Although further studies are necessary for a better understanding of the role of *P. niruri* L. in urolithiasis, our findings show that this natural product could be an attractive alternative for the treatment of urinary stones.

PMID: 10095174 [PubMed - indexed for MEDLINE]