PharmacologyOnLine December 30, 2012
Archives • 2012 • vol.3 • 194 - 198

Evaluation experience of territorial pharmacy to decrease the risk of recurrent cystitis through the use of Cranberry (*Vaccinium macrocarpon*)

A.Melillo[1], R.Russomanno[2], C.Melillo[3]
[1]Pharmacist
[2]The I level Pharmacist Pharmacy Russomanno Caposele (AV, Italy)
[3]Professional nurse
*anto.melillo@libero.it

Abstract

E. coli is a gram negative bacterium that causes nuisance conditions triggers urinary tract infections difficult to eradicate with common antibiotics. A study on the effectiveness of antibiotics to *E. coli* demonstrates that they are losing efficacy against the bacterium that becomes increasingly difficult to eradicate. The literature already haevidenziato properties in Cranberry American deactivate *E. coli* with as many theories about the mechanism of action. The work was to evaluate and select a limited group of people the real benefits and the dose selected so that we had a remission of symptoms of relapse and especially due to the bacterium.

Introduction

The cranberry is a native American fruit. Its native range extends in temperate climate zones from the East Coast to the Central U. S. and Canada and from Southern Canada in the north to the Appalachians in the south.

There are two major species of cranberry: the American cranberry (*Vaccinium macrocarpon*) and the European cranberry (*V. oxycoccos*). The European cranberry fruit is smaller (0.6–1.2 cm) and only half the size of the American fruit. The American cranberry, which is frequently cultivated, is a member of the Ericaceae family, evergreens, creeping shrubs native to the cool, temperate, acidic soils and peat wetlands of Northeastern United States and southern Canada. Latvia, Belarus, Azerbaijan, and Ukraine are other cranberry-producing countries in Europe, with Turkey just beginning cranberry cultivation. The United States and Canada together account for more than 90% of the world's production (1)

The plant is a low-growing, trailing, woody vine with a perennial habit. Cranberries produce stems or runners from one to six feet long. During the growing season, the leaves are dark green and glossy, turning reddish-brown during the dormant season. The vines form a thick mat over the surface of a cultivated bed. Short vertical upright branches, known as uprights, form from the buds along the runners. The uprights have a vertical (non-trailing) growth habit and form the terminal buds that contain the flower buds. Most of the fruit is formed from the flowers on the uprights, with some berries arising from flowers on the runner ends.

Native distribution of cranberry in North America. As a wetland-adapted plant, cranberries are tolerant of flooded soils. However, during the active growing season (generally from March through October), good drainage in the soil is essential to proper root growth and function. During that part of the season, commercial cranberry bogs are managed with drained soil and are not flooded for extended periods as a rule. Flooding is mainly confined to winter protection, harvest, and several specialized pest-control floods.

In addition to Massachusetts, cranberries are grown commercially in Wisconsin, New Jersey, Washington, Oregon, and Maine, with some acres in Michigan, Connecticut, Rhode Island, New Hampshire, and New York. Cranberries are also grown in several Canadian provinces (British Columbia, Quebec, and the Maritimes) The trigger for this process is changing daylength. The buds continue to develop throughout the rest of the summer and fall, with floral buds being formed within the terminal bud. By August, the initial stages of the flower bud can be found and visible changes in the buds continue until at least some time in October. Bud development almost certainly continues later into the year in milder growing areas. Eventually the flower buds become dormant until the following spring.

The signal to enter dormancy is most likely a combination of low temperatures and short days. The dormant state lasts until the plant has been exposed to sufficient 'chilling hours' - hours of temperatures

between 32°F and 45°F to complete the dormant cycle. In common with other perennial fruit crops, the cranberry plants must accumulate a critical number of chilling units in order to break dormancy in the spring and initiate flowering for the new season.

Once the terminal bud begins to grow, it must be protected from sub-freezing temperatures.

This is accomplished by running the sprinkler irrigation system to provide protection on cold nights. During June, the uprights continue to increase in length (new leaves formed) and the first flowers open.

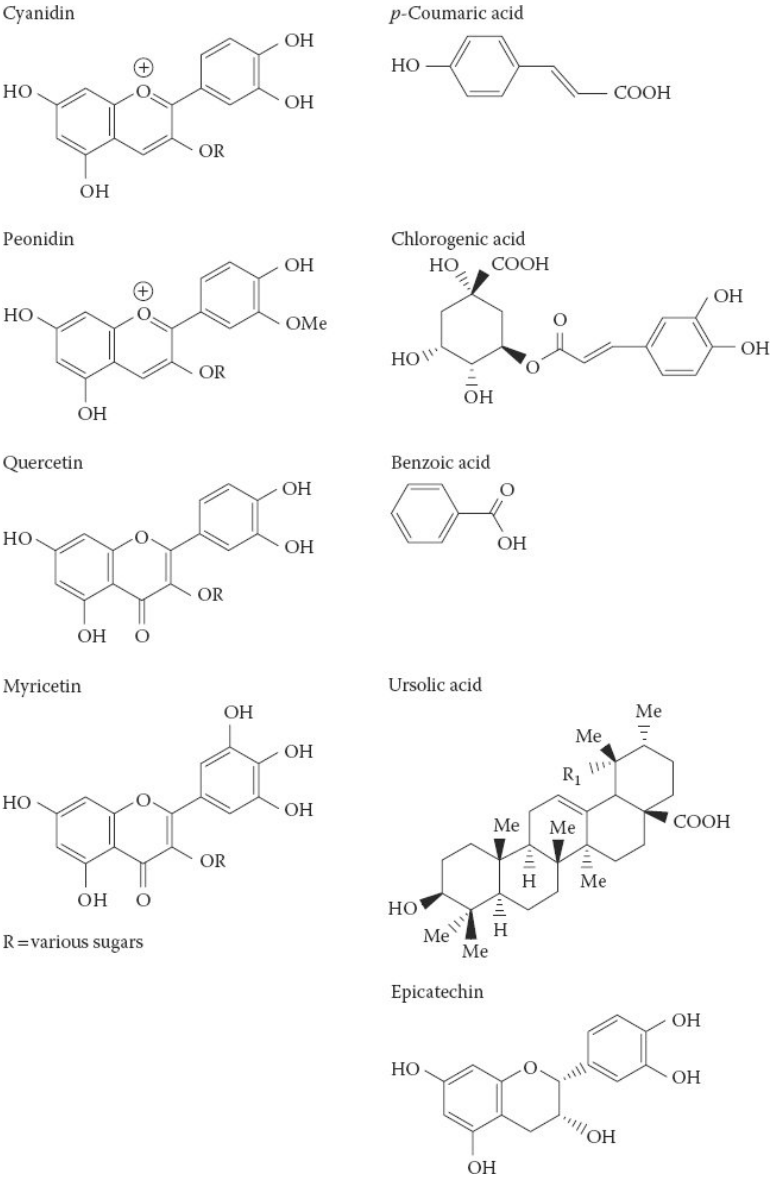
By late June, most flowers are open and the cranberry bogs resemble a pink carpet. From late June to early July, bees pollinate the cranberry flowers and tiny fruit form (fruit set). From this point until harvest, the growth cycle overlaps the beginning of a new cycle for the following year.

During the first three weeks following fruit set, the fruit acquire most of their mineral components.

From that point through harvest, fruit grow by the accumulation of carbohydrates (sugars and starch produced through photosynthesis) and water. Irrigation is often necessary during this period. By September, the fruit begin to develop their characteristic red color through the production of anthocyanin pigments. Full fruit maturity occurs approximately 80 days after full bloom. Cranberry harvest in Massachusetts extends from mid-September through October and is at its height in mid-October.

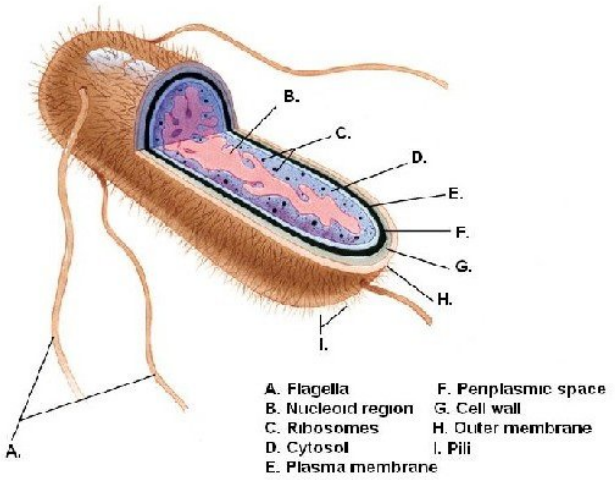
The main chemical compounds of American Cranberry are flavonoids, anthocyanins, (3-O-galactoside and 3-O-arabinoside of cyanidin and peodinina), the protoantocianidine (type A) and catechins; carbohydrates are also present, in particular fructose, organic acids (malic acid, oxalic acid, citric acid and benzoic acid) tannins and vitamin C.

A body of scientific evidence has accumulated to support the use of cranberry in the maintenance of urinary tract health. Studies started appearing in the 1980s demonstrating the ability of cranberry juice to prevent adherence of *E. coli* bacteria to uroepithelial cells and other eukaryotic cells (2). As type 1-fimbriated bacteria were susceptible to the fructose in citrus fruit juices as well, the effect on type P-fimbriated *E. coli* was observed to be specific to cranberry (3) and other *Vaccinium*. During the mid-1990s, a clinical study conducted by (4) on the female residents of a long-term care facility found a significant decrease in bacteria in the urine after 1



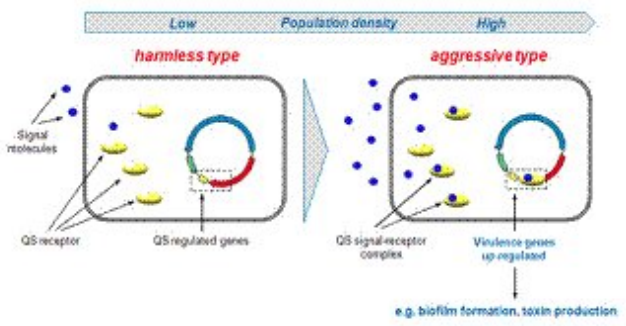
month of cranberry juice consumption. Since then, at least 15 clinical trials have evaluated the prophylactic effects of cranberry against urinary infections in a variety of populations. These studies are the subject of several detailed review articles (5).

For many years, scientists and health practitioners believed that the antibacterial effects of cranberry juice were due to acidification of urine by hippuric acid produced by the metabolism of the quinic acid in cranberries (6). However, this claim was never substantiated. Studies correlating urinary pH with cranberry juice consumption show either no significant change in urine acidity or only a slight reduction in pH, which is insufficient to cause a bacteriostatic effect (7)



E. coli is a gram negative bacterium that triggers becomes pathogenic conditions leading to important clinical consequences, and in severe cases even fatal disease elapsed for the host. Urinary tract infection by *E. coli* are now a large-scale problem that is affecting also been industrialized world have an efficient health care system, one of them is Italy, where there is a strong resistance to specific antibiotics resulting in *E. coli*, in the overwhelming majority of cases, to a temporary resolution of the symptoms associated with the disease but not definitive.

Recent studies showed a resistance of E coli to antibiotics due to quorum sensing (QS), which allows them to measure the density of colonization and consequently change their virulence by changing their gene expression that allows them to stimulate the formation of biofilm (EPS) that organizes and protects them from common antibiotics. The objective of the study is to monitor anamnestic individualized through the pharmacy channel that shows the effectiveness of Cranberry (*Vaccinium macrocarpon*) as a pesticide that can significantly reduce relapses associated with the bacterium in question.



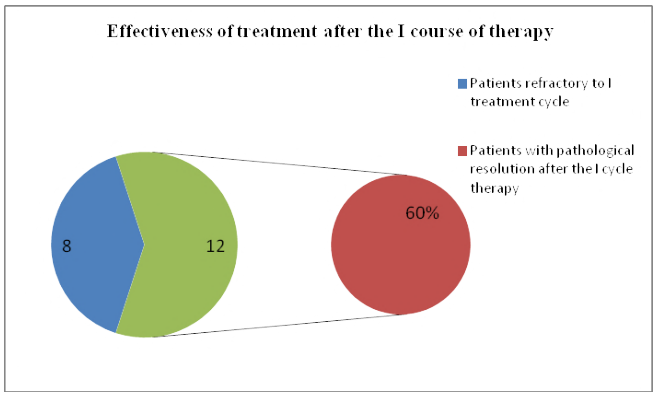
Method

The monitoring was carried out in territorial belonging ASL Pharmacy 201 District of Sant'Angelo dei Lombardi and has involved 20 patients, including 19 females and 1 male subject previously treated with antibiotics used in the protocol for the treatment of urinary tract infection by *E. coli* as the Nitrofurantoin, the Fosfomycin, Ciprofloxacin and Levofloxacin which after a few months have shown the symptoms again. The medical history of the patients was done considering the essential parameters in the monitoring carried out, such as gender, age, nationality, lifestyle and habits. We proceeded through the characterization and evolution of the disease, defining the age of first clinical event, the trigger conditions (sexuality, menstruation, menopause), the mode of drug treatment and the number of events in a year . The analysis was carried out in several phases in which patients after following medical therapy with antibiotics prescribed, the same shall be returned after referring to a distance of about ± 3 months the same symptoms. From here were treated with Cranberry in doses equal to 600mg/die divided into 300 mg administered every 12 hours for a treatment that has lasted 50

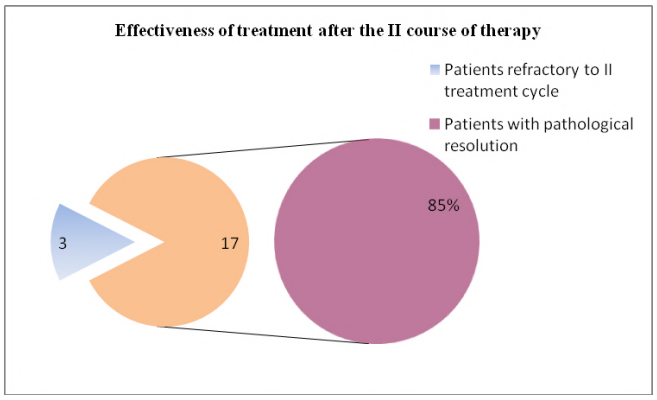
consecutive days after which it is suspended. Effects in patients with bacterial colonies most conspicuous (8 patients), however, have had to approximately 5 months of the suspension new relapses and in these cases we proceeded by performing the therapeutic cycle twice in the year thereby obtaining a resolution of the symptoms that has risen to 85%.

Results / Discussion / Conclusion

This study shows the therapeutic effectiveness of Cranberry towards *E. coli* both overt also shows how the dosage selected is crucial in the therapeutic treatment. The results obtained show that at



therapeutic doses with Cranberry with duration of 50 days and dose equal to 300 mg administered every 12 hours reduced by 60% (12 patients) the risk of exacerbations from *E. coli* compared to the classic drug used in common practice avoiding so exposure to any antibiotic that sensitize risking more bacterial strains exacerbations and complications that can lead to fatal outcomes. In subjects more resistant to a single course of therapy with Cranberry, 40% of the total treated, it was observed that are served at least 2 cycles of therapy in the year to have so the increase of resolutions pathological until obtaining the 85 % (17 patients). It is pointed out, with this, that perform two cycles per year of Cranberry allows to obtain an increase in the subjects treated of pathological outcomes positive that pass from 60% to 85%.



Bibliographical references

1. Zhao Y, editor. Boca Raton, FL: CRC Press; Berry Fruit: Value-Added Products for Health Promotion. 2007;
2. Sobota A.E. Inhibition of bacterial adherence by cranberry juice: Potential use for the treatment of urinary tract infections. J Urol. 1984;131:1013–6. 1984; Ofek I, Goldhar J, Zafriri D, Lis H, Adar R, Sharon N. Anti-Escherichia adhesion activity of cranberry and blueberry juices. N Eng J Med. 1991;324:1599. 1989; Ofek et al. 1991;
3. Zafriri et al. 1989;
4. Avorn J, Monane M, Gurwitz J.H, Glynn R.J, Choodnovskiy I, Lipsitz L.A. Reduction ofbacteriuria and pyuria after ingestion of cranberry juice. J Am Med Assoc. 1994;271:751–4. (1994);
5. Howell A.B, Reed J.D, Krueger C.G, Winterbottom R, Cunningham D.G, Leahy M. A-type cran-berry proanthocyanidins and uropathogenic bacterial anti-adhesion activity. Phytochem. 2005;66:2281–912002; Jepson and Craig 2007; Guay 2009);
6. Blatherwick N.R. The specific role of foods in relation to the composition of the urine. Arch Intern Med. 1914;14:409–50. 1914; Bodel, Cotran, and Kass 1959);