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A Review On Chemical Constituents And Traditional Uses Of *Oxycoccus Vaccinium*

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ABSTRACT:

Cranberries are a rich source of bioactive compounds that comprise a healthy diet. Cranberry is abundant in nutritional components and also have antioxidant properties. Both American (Vaccinium macrocarpon) and European (Vaccinium oxycoccus) cranberry species are high in polyphenols such as phenolic acids, anthocyanins, and flavonoids, and are one of the few fruits high in proanthocyanidins, which have been related to numerous health advantages. The review organises information on cranberry's chemical composition, antioxidant effect, and the beneficial impact on human health and disease prevention after cranberry consumption, specifically its effect on urinary tract inflammation in both adults and children, cardiovascular and oncology diseases, type 2 diabetes, metabolic syndrome, obesity, tooth decay and periodontitis, Helicobacter pylori bacteria in the stomach, and other diseases. More research is needed to investigate cranberry proteome profiling, polyphenol interaction and synergy with other biologically active components from natural ingredients[1].

Introduction:

Cranberry is a small round red fruit that grows on low bushes**,** it belongs to the subgenus *Oxycoccus* of the genus *Vaccinium* and can be found in the form of evergreen dwarf shrubs or trailing vines [2]. Cranberry contains a high concentration of nutritious components as well as numerous bioactive substances with antioxidant capabilities. Both American and European cranberry species contain a diverse range of phytochemicals. These are phenolic acids, anthocyanins, flavones, flavonoids, and organic acids. Cranberry is one of the few fruits that is high in proanthocyanidins, which inhibit adherence of *Escherichia coli* to the urinary tract [3,4,5,6,7]. The content of phenolic compounds in the cranberries is influenced by aspects such as cultivator, agriculture practices, geographical area, weather conditions, ripeness, harvesting time, and storage settings. The greatest quantity of total phenols is accrued at the beginning of berry ripening [4]. The cultivars grown in colder weather are characterized by higher amounts of phenolics than the same cultivars grown in a

mild climate [4]. Consuming cranberries can prevent tooth decay and gum disease, inhibit urinary tract infections, reduce inflammation in the body, maintain a healthy digestion system, and decrease cholesterol levels [3,5,6,7].

The ripe fruit of the cranberry is used as food and medicine. Cranberry can also be used to prevent some health problems as a fruit, juice, or seed extract. It shows anti-oxidant property as well as substantial flavonoid content and phenolic acids Cranberry is a natural drug that can be used to treat unwanted bacteria in urinary tract. The pure cranberry extract is used to prepare proanthocyanidin, an herbal drug. The pure cranberry extract is used to prepare proanthocyanidin, an herbal drug. In a recent study it was found that Americans consume 400 million pounds of Cranberries per year. Some recent studies have concluded that Cranberry has beneficial effect and some risk factors of metabolic syndrome components. A hetereogenous mixture or pure compound is isolated from cranberry for the safety and efficacy of the use of cranberry products in order to understand the pharmacokinetic properties [8]. Cranberry juice contains 100% of Vitamin C for the daily requirement of the human body contributing to the potential benefits of the fruit. It is consumed as various products such as frozen fruit, pulp, industrialized juice, jams, sauce, cereal bars and capsules [9]. Cranberry powders and extracts are used in dietary supplements and also in food products. This review concludes that phytochemical composition of cranberry fruits has the potential in promoting cardiovascular health and urinary tract infections [10]. The 'large cranberry' or 'American cranberry' (*Vaccinium macrocarpon Aits*) has been focused by many researchers in gut microbial transformation of polyphenols which reveals the link between cranberry consumption and potential health benefits [11].

This study summarises recent scientific research on the health advantages of cranberries due to their phytochemical and antioxidant activities. This evaluation can assist market cranberries as functional foods for customers who want to preserve their health and reduce their risk of disease naturally.

KEYWORDS: Cranberry, UTIs, PCOD, Anti-Cancer.

BOTANICAL NAME [12].

Kingdom: plantae

Order: Ericales

Family: Ericaceae

Genus: *Vaccinium*

Subgenus: *Oxycoccus*

Species: *Vaccinium macrocarpon*

Chemical Constituents:

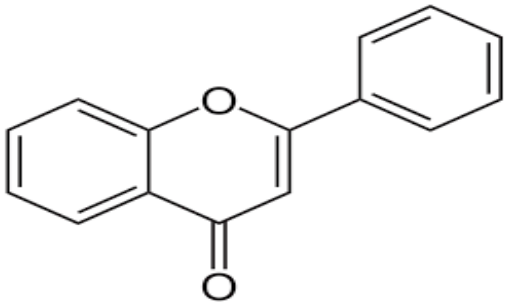
Cranberries' nutritional makeup varies based on cultivar, climate, growing conditions, maturity/ripeness stage, harvest time, and storage conditions. The citric acid content of small cranberries is 1.8–2.6% and they have a titrable acidity range of 2.1–4.90[13]. The main chemical constituents of cranberry are flavonols, flavonoids, polyphenols and anthocyanins.

Nutritional value: The nutritional value of raw cranberries as given as below [14].

Name	**Amount**	**Name**	**Amount**
Water	87g	Vitamin E	1.3 mg
Energy	46 kcal	Vitamin K	5 µg
Carbohydrates	12 g	Vitamin A	3 µg
Sugars	4.3 g	Vitamin A	63 IU
Dietary fibres	3.6 g	Calcium	8 mg
Fat	0.1 g	Iron	0.23 mg
Protein	0.5 g	Magnesium	6 mg
Thiamine (B_1)	0.012 mg	Manganese	0.27 mg
Riboflavin (B_2)	0.02 mg	Phosphorous	11 mg
Niacin (B_3)	0.101 mg	Potassium	80 mg
Vitamin B_6	0.057 mg	Zinc	0.09 mg
Vitamin C	14 mg	Selenium	0.1µg
Folate B_9	1µg	Copper	0.06 mg
Pantothenic acid (B_5)	0.295 mg	Sodium	2 mg

Flavnoids:

Flavonoids represents a large group of phenolic compounds which is found in plants and these are synthesized from shikimic acid and acetate mevalonate pathways. They are essential in plant defense and are strong antioxidants and are regarded as the most important natural pigments which is widely distributed in fruits and vegetables [15].

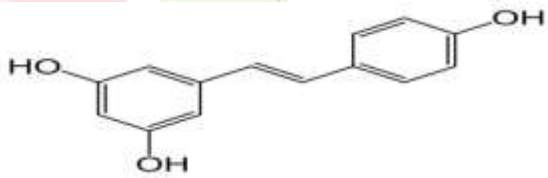


Flavonols:

Flavonols are regarded as a class of flavonoids, they are the natural pigments which contains ketone group and have a double bond between C2 and C3 and a carbonyl at C4. Flavonols are copous in cranberries [16,17]. Flavonols in cranberries are mainly present in glycosides of quercetin, myricetin and also in kaempferol but to some extent [18]. In Poland, the flavonols content was present in six cultivars was grown with a range of 643 to 1088 mg/100g dm [19].

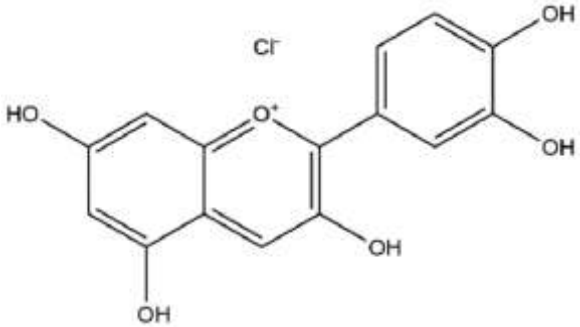
Polyphenols:

Polyphenols are the micronutrients that naturally occur in plants. They are included in many supplements. The primary types of polyphenols are phenolic acids, flavonoids, stilbenes, and lignans. Cranberry had the highest total phenolics among the 20 commonly consumed fruits in the American diet when free and bound polyphenols were analysed [20].



Anthocyanin

They are natural water-soluble pigments which give cranberries in reddish color. The content of Anthocyanin in the small berry was 6 to 10 times higher in the external layer of the berry skin compared to that of in the pulp [21,22].



Therapeutic Uses [23].

Cranberries are the phytonutrients which are rich in flavonoids that protects and prevents many diseases. Health benefits of Cranberry has been widely used for treating various ailments such as:

1) PCOS
2) Cancer
3) Anti tumor effects
4) UTIs
5) Cardiovascular diseases
6) Prevents tooth decay
7) Lung Inflammation
8) Prevents Kidney Stones
9) Scurvy
10) Stomach & diabetes disorders

Prevention of Urinary Tract Infections

UTIs are one of the most prevalent bacterial infections, particularly among women. They are most commonly caused by the intestinal bacterium Escherichia coli (E. coli), which clings to the inner surface of your bladder and urinary system. Cranberries contain special phytonutrients called A-type proanthocyanidins or condensed tannins. Cranberries contain A-type proanthocyanidins, which prevent E. coli from sticking to the bladder and urinary tract lining. This makes them a viable preventive measure against UTIs. In reality, cranberries are one of the richest sources of proanthocyanidins, particularly the A-type. Several human studies have found that drinking cranberry juice or taking cranberry supplements may reduce the risk of UTIs in both children and adults. Systematic reviews and meta-analysis support these findings, especially for women with recurrent UTIs.

Improved heart health:

Regular use of cranberry juice may lessen your risk of heart disease by boosting "good" HDL cholesterol, lowering inflammation, and preventing cholesterol oxidation.

Protection against stomach ulcers:

Certain components in cranberry juice can help remove H. pylori bacterial infections in the stomach, lowering your chance of developing ulcers.

Better blood sugar control:

Several studies have revealed that cranberry juice can considerably lower blood sugar levels in diabetics.

Cancer protection:

Test-tube and animal research have revealed that cranberry components may protect against cancer and reduce tumour growth.

Healthier teeth and gums: The same cranberry compounds that prevent bacteria from attaching to the urinary tract also prevent bacteria from overgrowing in your mouth, thus reducing cavities and gum disease.

Increased immunity: Several small studies have found that compounds in cranberry juice can boost immunity and reduce symptoms of the flu [24,25].

Conclusion:

In this review article, we studied about the potential health benefits of Cranberries due to their rich anti-oxidant properties which helps combat oxidative stress and reduce inflammation. They contain various chemical constituents such as flavonoids, flavones, polyphenols and anthocyanins which contribute to their therapeutic uses. Cranberries are known to treat urinary tract health, PCOD (Polycystic Ovarian Disease) and provide anti-inflammatory and anti-cancer effects.

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