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Evaluation of the Antioxidant Activity of a Leaf Extract of *Cranberry (Vaccinium macrocarpon)*

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ABSTRACT

Introduction: Cranberry (V*accinium Macrocarpon*) is one of the extremely accessible conventionally used herbal plants with various biological activities. However, actions of Cranberry on antioxidant properties and chemically investigated for its phytoconstituents in the current studied. Therefore, the scope of the current exploration is to screen the antioxidant effects of leaf extracts.

Materials and Methods: The antioxidant activity (in vitro) was assessed with UV Spectroscopic. Hydrogen peroxide (free radical) scavenging methods were employed to check the in vitro antioxidant property.

Result: Plant methanol, Ether and Distilled water extract had a substantial impact on the hydrogen peroxide radical activity of scavenging and less effects than the standard radical activity and the bioactive compound like flavanoids, tannins and glycosides were shown to be positive.

Conclusion: These findings suggested that the plant leaves are comprised of significant antioxidant properties. It could be a promising source for the existence of antioxidant properties and other therapeutic agents.

Keywords- *Cranberry,* Antioxidant activity, Hydrogen peroxide radical, Phytoconstituents.

I. INTRODUCTION

Herbal Medicinal plants are globally valuable sources of herbal products with the fulcrum of complementary and alternative medicine which in recant time is increasingly gaining widespread popularity all over the world and grandually steaming towards integration into the mainstream healthcare system (1,2). Herbal medicine includes herb, herbal material, herbal preparation and finished herbal product that contain as active ingredient parts of plants or otherparts materials, or combination and are use especially for healthcare (3). The herbal plants and other natural object have radical impact on culture and civilization of man. Science the beginning of civilization, human being has reverence plants and such plants are conserved as agenetic resource and used in cooking food, fibers, fodder, fertilizer, febrifuge, fuel etc (4,5).

In advancement of science, it is seen that herbs are the blessings of nature having many important pharmacological characteristics and properties (6). Al present, herbs are not only main components of our food, but majority of population is taking these herbs as medicine of different forms (7). Literature of every religion and civilization emphasizes on the use of herbsin food as herbs are pharmacologically important. As nothing is useless in this world, so every part of plants, herbs and shrubs are important in one or more than one senses (8,9). Many studies have shown the adverse effects of synthetic medicines. It has seen that if

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synthetic medicines are used for a long period of time, then it will affect the body and cause some permanent disorders. So, it is the time need that pharmaceutical industry think about herbal medicines again and promote the usage of herbal medicines. There is only few plants or herbs which do not show any beneficial activity. Although there are many plants which possess several activities like antifungal, antiviral, antimicrobial, anthelmintic, anticancer, antidiabetic and antipyretic. Now,herbs and plants are become the source of ailments and treatment for several diseases and disorders (10,11). These natural products have the potency to treat dangerous diseases like cancer (12).

Fig 1: Cranberry plant

Proanthocyanidins, Anthocyanins, Hyperoside, Ursolic acid, and Corosolic acid (13) and many phytochemicals are proved important biological activities compounds Natural products are proved to be less toxic so synthetic medicines should be replaced by these natural products. Natural products are proved to be cost effective drugs. It is seen that natural products have minimum side effects and are easily available (12).

Cranberry is a term derived from the contraction of "crane berry." This name is derived from the nickname of the bilberry flower, which, when it withers, is similar in appearance to the head and neck of the sand crane (14). The cranberry is part of the Ericaceae family and naturally grows in acidic swamps full of peat moss in humid forests (15). There are other relatives of thecranberry family (European cranberry – *V. Oxycoccus* that share some of the cranberry's basic components, but the research evidence for a role in prevention is limited (16,17).

The chemical constituents responsible for their taste are the iridoid glycosides. The Anthocyanidins and Proanthocyanidins are tannins stable polyphenol found only in VacciniumMarcocarpon and function as a natural plant defence system against microbes (18). Common preparations with cranberries include fresh, whole berries, gelatinized products, juices (19). Cranberry juice, predominantly in the form of a juice cocktail drink with approximately 25% cranberry juice, has been the traditional choice of most women seeking to prevent UTIs (20).

II. MATERIALS AND METHODS

Authentication:

Leaves of *cranberry* were gathered from vikashnagar poundha, phulsani road near swimming pool (Dehradun Uttarakhand, india) and certified by a botanist called botanical survey of india by northern regional centre,192, kaulagarh road P.O, -KDMIPE Dehradun -248195, Uttarakhand, india.

Extraction:

Freshly dried and powdered leaf of cranberry material (50 gm) was macerated in methanol, distilled water and ether for 48-72 hrs and successively fractionated with different solvents to get methanol extract, ether extract and Distilled water extract. The resulted solvent extracts were concentrated filter and were stored in cold conditions for further investigations [21].

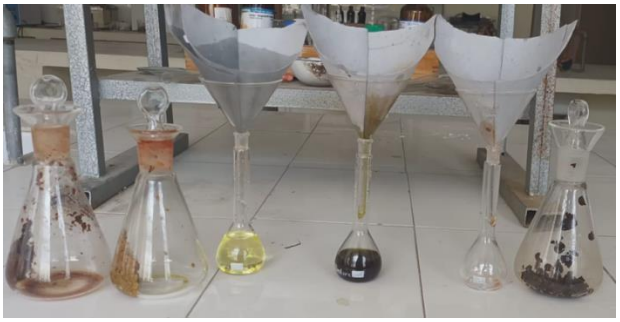

Fig (2): Preparation of sample

Chemical:

Acetic anhydride, Conc sulphuric acid, Chloroform, Ferric chloride, NaoH, Sodium nitropurside and Glacial acetic acid.

Hydrogen peroxide scavenging assay [22]:

Chemicals: Hydrogen peroxide, phosphate buffer (pH 7.4), Gallic acid and extract.

Apparatus: Spectrophotometer and pH" meter.

Preparation of standard solution:

Required quantity of Gallic acid was dissolved in to give (10, 20, 30, 40, 50) g/ml.

Preparation of Hydrogen peroxide solution [23]:

Required quantity of Hydrogen peroxide is dissolved in phosphate buffer to give 100mM solution with Ph 7.4.

Preparation of sample solution [24]:

Required quantity of sample was dissolved in Phosphate buffer to give (100, 200, 400, 600, 800, 1000) g/ml.

Procedure:

- Take 2mL of hydrogen peroxide solution and add 1mL of normal Gallic acid at different concentrations to it.

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- 2mL of hydrogen peroxide solution is obtained, and 1 mL of various quantities of extract is added to it.Incubate the above-prepared solutions for 10 minutes.
- Phosphate buffer was used as a blank and the absorbance was measured at 230nm.

III. RESULT

Phytochemical analysis:

Phytochemical analysis was investigated to assess the occurrence of various phytochemicals. Various qualitative tests were employed to find out the presence of glycosides, tannins, saponins, alkaloids, flavonoids, etc" Occurence of the total soluble flavonoid and phenolic content of dried extract was specified in mg respectively.

Table 1: Phytochemical profile of cranberry (Vaccinium Macrocarpon) leaf extract

S.no	Test	Distilled water	Methanol	Ether
1	Alkaloids	+	+	+
2	Flavonoids	+	+	+
3	Saponins	-	+	-
4	Tannins	-	-	+
5	Steroids	-	-	-
6	Glycosides	+	-	+
7	Amino acid	-	+	-

In vitro antioxidant activity:

As the methanolic leaf extract of *Cranberry (Vaccinium Macrocarpon)* was expressed potential in vitro antioxidant potentiality with the aid of Hydrogen peroxide Scavenging assay.

Hydrogen peroxide scavenging activity:-

Although hydrogen peroxide is not a particularly reactive substance, it can be harmful to cells when it produces the hydroxyl radical. As a result, removing the hydrogen peroxide radical is critical for food system safety. The capacity of extraction to scavenge was tested in the experiment. Table 2, And shows the comparison standard Gallic acid exhibited extremely high radical scavenging activity (97.85 percent).

Table 2: For Gallic acid

S.no	Concentration µg/ml	Absorbance	%Scavenging
	Control		
1	50	0.758	37.58
2	100	0.386	67.21
3	150	0.285	82.57
4	200	0.986	91.65
5	250	0.025	97.85

Table 3: For Leaf Extract

S.no	Test solution Concentration µg/ml	Absorbance	%Scavenging
1	50	0.955	24.89
2	100	0.205	83.05
3	150	0.198	88.89
4	200	0.165	88.98
5	250	0.135	91.85

IV. DISCUSSION

The phenolic compounds are present as per phytochemical tests. The pervasive constituents of many herbal plants have tremendously added for research interest, because of their beneficial properties as antioxidants. Thus it is advisable to search plants with polyphenolic, flavonoid content, and antioxidant activity [25]:' Natural antioxidants are an excellent source obtained from plants and their primary function is safety towards Oxidative stress of free radicals [26]." Progress of reactive Oxygen species plays a vital role in oxidative stress [27], in literature review revealed that it can be minimized by few plant agents like quercetin and gallic acid, and also they have been effectively works in various free radical induced diseases [28].

V. CONCLUSION

The results revealed that the distilled water, methanolic and ether leaf extract had significant antioxidant activity, which was higher than the aqueous extract but lower than the standard. It also has hydrogen peroxide scavenging properties. It was determined that this research would lead to the discovery of a valuable chemical that might be utilised to develop new, different, and more powerful natural antioxidant medicines. More research is needed to discover the biologically active chemicals and assess their efficacy against free radical that linked to a variety of human illnesse

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