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To determine the concentration of ^{235}U, ^{238}U radioisotopes in snow capped seabuckthorn medicinal plant

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ABSTRACT

The juice of seabuckthorn medicinal plant were analysed to determine the concentration of ^{235}U and ^{238}U. The berry of seabuckthorn was taken from the growing area i.e. Badrinath, kedarnath, kaza, ladakh and Lahual and spiti. The uranium concentration was determined by sodium iodide detector. The results show that the ^{235}U and ^{238}U is Nil in seabuckthorn medicinal plant. After deciding the right dose, we can use this medicinal plant for the treatment of patients who is suffering from cancer, heart disease, memory loss, skin problem and many others.

KEYWORDS: *Seabuckthorn, medicinal plant, uranium concentration, sodium iodide detector*

INTRODUCTION

In ancient time, natural medicinal plants were used for the treatment of living being. Even nowadays, many type of medicinal plant are used as raw material of drugs. Medicinal plants are uncommon type of product need special reflection due to their potential impact on human health (1). People are exposed to ionising radiation from different source every day, be it natural or artificial. Artificial sources, they can be radioactive dust in atmosphere from nuclear weapon test, releases of radioactive waste etc. As per naturally Occurring, radioactive material are found in every essential of the environment; air, water, soil, food and in human. According to the international food safety authorities network, plants used as a food, commonly have ^{40}k, ^{232}th and ^{238}u and their progenies (1). This radionuclide creates uncovered risk externally due to their gamma ray emission (3). This exposure of radiation in the environment is from sources that are widely used in the industry, agriculture, medical purpose also for scientific purpose. This heavy metal can be toxic and can accumulate in soft tissue of animals, plants and even humans when they enter the body through food, water, air or skin. Heavy metal toxicity can cause a number of diseases that attack almost all vital organ functions. The exposure of this heavy element can cause a many disease. Medicinal plants have been used in numerous forms to treat the disease, across the world. Especially in developing countries, mostly people depend on non conventional medicine in their primary healthcare (2). The study of radionuclide concentration in seabuckthorn medicinal plant has great remarkable.

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Seabuckthorn is grown in the height of Himalaya Is a deciduous shrub belongs to Family of Elaeagnaceae. This species is widely distributed in Europe and Asia (4). In India, it is found in leh ladakh such as nubra, suru valleys and in Himachal Pradesh such as kaza, Lahual valleys. It grows in a low humid, wet land and Riverside at high altitude. It can survive -40 °C to + 40°C temperature. Seabuckthorn fruit are rich in vitamin A, B^1, B^2, C, E, Organic acid and amino Acid. Sea buckthorn has a very special fruit from other common fruit or berries. The most important part of sea buckthorn is its berries, from these berries juice as extracted and that is used in many ways. That is why it gained popularity in whole world. It is used as remedy in Ayurvedic and traditional Chinese medicines.

By deciding the dose of seabuckthorn medicinal plant, we can use this medicinal plant for those patients who are suffering from cancer, skin problems, heart disease, and memory loss. The concentration of heavy element is quite diverse in the environment and their effect also depends on the amount, type of element and chemical form in which it occurs. The purpose of this study is to determine the natural radionuclide present in sea buckthorn medicinal plant and assess the radiological thread associated with the use of sea buckthorn medicinal plant.

MATERIALS AND METHODS

Chemical

Nitric acid and Perchloric acid were of pure quality. These diacid are taken in the ratio of 4:1. Distilled water was used to prepare the solution of sample.

Sample collection

The berry of seabuckthorn was taken from growing area i.e. Badrinath, kedarnath, kaza, ladakh and Lahual and spiti from commercial planting. After the collection of sample in November, Barry was sun dried for 5-6 days, proceeding to analysis.

Processing of seabuckthorn juice

After removing the non healthy fruit, the healthy fruit pulp and seeds of each sample were separated and then pulp was grinded in mixer grinder and juice were strained with the help of sieve.

Sample preparation

For the digestion of sample,1 g sample of sea buckthorn Berry juice were weighted into glass beaker than a nitric acid and Perchloric acid were added in the ratio of 4:1. The sample were cooled at room temperature, the digestion process was repeated until the clear digest sample is not prepared. After that the clear digest samples is filtered with the help of filter paper and add distilled water in it.

The sample was investigated by sodium iodide detector. The most widely used scintillator Is NaI (Tl). This scintillator is used in nuclear medicine, geo physics, and nuclear physics. The iodine provides most of the stopping power in a NaI scintillator. This scintillator pulse decay time is approximately 1 microsecond and has high density and atomic number. To detect the gamma ray and x-ray this technique is used. It gives good efficiency due to high atomic number of iodine. In a radiation measurement an accurate knowledge of the detector spectral performance is required. In radiation measurement, efficiency is the most important factor. It can vary with the volume and shape of the detractor material, absorption cross section, attenuation layer and distance and position from the source to the detector.

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The information about all the sample record in table 1

SR. NO.	SAMPLE CODE	ORIGIN	HIGHT FROM SEA LEVEL (in ft)	PART USED
1	S_1	Badrinath	10,170	Fruit pulp
2	S_2	kedarnath	11,750	Fruit pulp
3	S_3	ladakh	9,800	Fruit pulp
4	S_4	kaza	11,980	Fruit pulp
5	S_5	Lahual and spiti	14,010	Fruit pulp

The activity concentration of uranium in the samples were computed using the following relation (1)

$$A_{SP}=N\ (E,\ i\ )/\ €□(E).\ Tc.\ P□(E,i).M$$

Where N (E, i) is net counts for the radionuclide i at energy E, €□(E) is the photo peak effect at energy E, T_C is the counting live time, P□(E,i) is the gamma emission probability of radionuclide i for a transition at energy E, M is the dry weight of samples.

RESULT

In collected samples, the concentration of ^{235}U and $^{238}U$was shown in Table- 2. The results show that concentration of ^{235}U and ^{238}U is Nil in sea buckthorn medicinal plant those are collected from ladakh, Lahual and spiti, kaza, kedarnath and Badrinath. These samples were determined by sodium iodide detector.

Table -2 uranium concentration in seabuckthorn medicinal plant

SR. NO.	SAMPLE CODE	^{235}U	^{238}U
1	S_1	No traces	No traces
2	S_2	No traces	No traces
3	S_3	No traces	No traces
4	S_4	No traces	No traces
5	S_5	No traces	No traces

We noted from table-2 there is no radiological health risk in using these sample determinations. This work may also provide information on medicinal to formulate guideline connected to radiological healthcare,

CONCLISION

The concentration of U^{235} and U^{238} in seabuckthorn medicinal plant is Nil. So, we can say that the radiological health hazard related with consumption of the accepted radionuclide in these samples is trivial. I will thank each one of those who helped me in this work and believe that further study is needed to collect more through data.

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