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Detection of heavy metals and micronutrients from vaccinium macrocarpon and piper cubeba

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Abstract

Many plants in this world are an important source to provide health facilities. Due to curing properties, these plants are used as medicines to cure different ailments. There are many plants, animals, and human bodies which contain micronutrients and heavy metals. These are chemical elements having a density five times greater than water and specific gravity of 390f. As an important phytochemical constituent of plants, heavy metals play role in different chemical reactions. Micronutrients are nutritive components that are needed by plants in different quantities and they are also necessary for their growth. These plants show different needs for different micronutrients and the most important required nutrients for plants include manganese, iron, molybdenum, boron, zinc, chloride, boron, copper, and nickel. Besides plants, micronutrients are also an essential component of the diet of all organisms for the maintenance of homeostasis participating in metabolism, growth, and cellular functions. These mineral micronutrients make them essential by being redox-active elements participating as catalytically active co-factors in enzymes, enzymes activating and providing structural stability to protein. On the other hand, in case of the excessive level of these micronutrients, all these properties become reversed which led to reactive oxygen species formation which is toxic for cells. The plants' effects are connected with the existence of heavy metals and micronutrients. Therefore, there is a vital need the identification the presence of micronutrients and heavy metals in plants used as medicines. Thus, the aim of to present study is to investigate and evaluate the presence of micronutrients and heavy metals in two selected different plants Vaccinium macrocarpon and Piper cubeba that are widely used as the best remedy for the treatment of various diseases including joints pain, rheumatoid arthritis, inflammation, thyroid disease, diabetes, renal problem, hypercholesterolemia and many more. For this purpose, the plants were collected from different regions for sample preparation. After the preparation of the sample, the plant material was analyzed for the detection of heavy metals and micronutrients by nuclear ingestion spectrometry. Digestion procedures, nitric acid procedures, and repeated nitric acid procedures were used for the analysis of the sample. According to the results of the analysis, the concentration of heavy metals present in Vaccinium macrocarpon is followed by the sequence zinc> cadmium> iron> manganese> copper> lead> Nickel while the concentration in Piper cubeba of these heavy metals is in the sequence of zinc> cadmium> iron> copper> lead> Nickel> manganese.

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Introduction

A man struggles with his existence to discover the optimal treatment for the alleviation of diseases and discomfort through different approaches. People are using plants as medicine since the prehistoric age. Plants have many therapeutic effects so collecting plants as a means of therapy can be traced back only as far as recorded documents of their likeness. The therapeutic activities of plants are one of a kind and explicit to specific plant species or then again gatherings, reliable with the idea that the blends of optional metabolites in a specific plant are frequently systematically particular. There are mostly three significant gatherings of auxiliary metabolites, in particular terpenes, phenolics, and Nand S-containing mixes. The renaissance of phytomedicine in the cutting-edge pharmaceutical industry requires concentration in the fields of photochemistry and pharmacognosy. The metabolic building could demonstrate helpful for altering or improving the union of significant remedial specialists present in restorative plants (Robertson, 2018).

From now on, the world changes its bottom line with herbal products. The same number of microorganisms and various chronic diseases become insensitive to various technical drugs. Subsequently, Ms can be used as an option compared to manufactured drugs due to their synergistic impact in treating irresistible diseases. In various countries, tilt has been increasing toward the use of natural medicine to maintain primary health care. In India, Ayurveda medicine is mostly used for the treatment of disease and has expanded in such a way that the government of India has established a separate department under the ministry of health and care to promote the natural way and sources. The objective of this is to detect the heavy metals and micronutrients from Vaccinium macrocarpon and Piper cubeba.

Materials and methods

Exploratory clinical preliminary focuses in this examination. This work is completed with an analysis of heavy metals and micronutrients present in two therapeutic plants: Vaccinium macrocarpon and Piper cubeba. This review was of polyherbal detailing [1].

Plan of work

For this current review, therapeutic plants were gathered and, in the wake of crushing ethanolic extracts were ready for systematical affirmation and distinguish from the research center. Plant material ethanolic separate was utilized for test readiness. Later example, a readiness plant material was utilized to explore weighty metals and macronutrients.

Collection of plant material

Plant materials and concentrates have a determination of heavy metals and micronutrients. Establishes gather from the convenience store and natural clinic, Sargodha.

Selection of plants for determination of heavy metals and micronutrients

These plants used conventional medications broadly utilize these plants. These plants have been chosen to screen their weighty metals in light of their nearby use. The subtleties of these plants are recorded below in Table 1.

Table 1: Chosen restorative plants for determination of heavy metals and micronutrients.

Botanical name	Local name	Family	Parts used
Vaccinium macrocarpon	Karonda	Ericaceae	Fruit
Piper cubeba	Kabab chini	Piperaceae	Whole

Grinding

In an electric grinder, the selected plants were crushed into a fine powder.

Ethanolic extract preparation

Soaking in ethanol

The powdered type of plant was absorbed in ethanol in jars covered with aluminum foil to keep it away from pollution. 200 g of the powdered sample was taken trailed by absorbing ethanol. The sample was blended every day for seven days so that the ethanolic substance of the plant could overflow out [1].

Filtration

To filtrate the doused plant material, a muslin fabric was followed by filtration with Whatman filter paper No.3. This led to the detachment of ethanolic concentrates from the chosen plants [2].

Evaporation of ethanolic crude extract

The filtered material was exposed to vanish on rotatory evaporator Laborota 4000 proficient (Heidolph) whole dissolvable was dissipated while the rough ethanolic remove was held [3].

Collection of crude ethanolic extracts

The unprocessed ethanolic extract was collected after evaporation in autoclaved falcon tubes and kept at a temperature of 20°C in the laboratory [4].

Preparation of different doses

To check the selected plants' inhibitory centralization, we prepared three doses with the concentrations of 5 ppm/ml, 25 ppm/ml, 50 ppm/ml, and standard 5 ppm, 25 ppm, and 50 ppm [5].

Preparation of polyherbal formulation

The methanolic concentrates of each plant had been taken independently in equivalent sum and blended to set up the Polyherbal formulation (PHF) [6].

Chemical required

- Nitric Acid [7]
- HCl
- Sulfuric acid
- Refined water

Instruments/apparatus used

The following instruments were used in the investigation (Table 2) [8].

Table 2: Instruments/apparatus used.

Absorption atomic spectrophotometry novA	Analytik Jena Germany
Rotatory evaporator	Laborota 4000 efficient (Heidolph), Germany
Conical flask	Pyrex, England
Electronic balance	USA
Measuring slander	Germany
Incubator	BINDER, USA
Oven	USA
Thermometer	China
Test tubes	China
Filter paper	Whatman Ltd. England
Neubar	Chamber

Phytochemical screening

Phytochemical constituents (weighty metals and macronutrients) were explored through after techniques.

Glassware

All dishes were cleaned with a chemical procedure; washed with refined water, and housed for at any rate 24 hours in a 10% HNO_3 acid stripping. Upon removal from the acid residues, the residue was flushed on different occasions with two overlays of refined water and allowed to air dry in an acid-washed authority. Exactly when dry, openings of the dish sets were fixed with Parafilm to avoid corrupting during accumulation [9].

Sample preparation

The plant material was used for the assessment to choose heavy metals and micronutrients by atomic ingestion spectrophotometry [10]. Two-gram tests were measured, encompassing two layers of checking the paper, and dried for 24 hours at 65°C. Upon ejection from the drying grill, tests were set in a desiccator for 20 minutes by then reviewed to 0.0001-g precision.

Steps involved in sample preparation:

- The preparation of the flask.
- The preparation of the sample.
- The digestion of the sample.
- The dilution of the sample.
- The filtration of the sample.

Flask preparation

As a matter of first importance, it cleaned the digest flagon appropriately to eliminate the pollution and afterward socked the glass product in 10% HNO3 for 12 hours. Later that washed carafe with deionized water and dry on the stove for 10 minutes [11].

Sample preparation

For test planning, two appropriately cleaned jars were taken and marked as jar 1 and flagon 2. Later We took a weight of 2 gm of the test, moved the example to jar 1, and added 20 ml of nitric acid and 10 ml of 70% perchloric acid in the two shrapnel [12].

Sample digestion

Give the jar access exhaust hood to process the example in encompassing temperature for 24 hours. Following 12 hours, an earthy-colored tone appeared in the flagon containing test because of the example assimilation. Shook the jar and after that positioned it on the warming shelf of the digester and warmed it at 120°C. Earthy-colored red exhaust is shaped due to HNO_3 in the two flagons [13].

Sample dilution

Later 30 minutes after the assimilation exhaust when 5-10 ml of stomach-related juice in the carafe, was added to deionized water to weaken the sample for the test [14].

Sample filtration

For test filtration, washed the fennel with deionized water. Whatman channel paper was utilized for filtration. Collapsed the Whatman channel paper and set it on fennel, poured the modest quantity of test on the channel paper, and again added 30 ml of deionized water to weaken the content of the separated arrangement [15].

Digestion procedure

Ten stoved dried plant materials tests (2 g each) and two acid solutions were handled using all of the 10 ml to 20 ml of twofold refined water (enough to through and through soak the model) and 10 ml of concentrated pure HNO_3 to the container and spot it on the hot plate [16].

Nitric acid procedure

The nitric acid methodology has been as of late depicted by [17]. The framework included setting the splashed example and 20 ml of concentrated pure HNO_3 in a 125 ml Erlenmeyer container, covering the container opening with a little watch glass, and refluxing the reaction combination at 80°C for a period of 3.5 hours. To complete the osmosis approach, any unoxidized acid was then allowed to set off by taking out the watch glass for an hour. We maintained the temperature through a warmed shaker to ensure agreeable blending.

Repeated nitric acid procedure

This strategy used was vague, taking everything together concerning that depicted by (Middleton and Stuckey) along with the temperature at which the handling was finished. The model, 10 mL of twofold refined water, and 10 mL of concentrated very pure HNO_3 were placed in a 1 L holder for this technique. The blend was dispersed to dryness on a hot plate set to keep up 125°C. Later the holder was cooled, 10 mL of concentrated HNO_3 was added to the development, and the blend was again scattered to dryness. This technique was reiterated until simply a white development remained; the development was then separated into 10 mL of concentrated purity 95% HNO_3 [18].

Sample preparation for atomic absorption analysis

Later every retention, to reduce channel paper adsorption of minor parts from the handled model, one drop of 6 N very pure HCl was added per 20 mL of test game plan before filtration. Acid flushed Whatman No. 2 paper. All models and acid solutions were diluted to 100 mL with twofold refined water. We spilled diluted assays (Figure 1) into acid-washed polyethylene bottles until the examination and there continue the atomic absorption analysis [19].

Figure 1: Aplasia of the right hemiface with deviation of the chin towards the resected side.

Analysis of micronutrients and metal ions

Later the dissolvable extraction, 1 g of dissolvable solution, was processed with 10 ml of sulphuric acid [20]. Later the filtration, by utilizing a volumetric flagon, the volume was made up to 100 ml. The metal particles and micronutrients were distinguished by utilizing Atomic Absorption Spectrometer.

Figure 2: Examination for the identification of Heavy Metals.

Trace element determinations

The concentrations of Cu, Fe, Cd, Mn, Ni, Pb, and Zn in the process were analyzed utilizing a novAA400P nuclear ingestion spectrophotometer outfitted with a novAA400P [21].

Determination of zinc

Preparation of zinc standard calibration solution

In 10 ml con. hydrochloric, 0.4390 gm of $ZnSO_4 \cdot 7H_2O$ was dissolved, and volume was made up to 100 milliliters by utilizing a volumetric cup with refined water [22]. This is 1000 ppm of zinc, 0.2 ppm, 0.4 ppm, 0.6 ppm, 0.8 ppm $ZnSO_4 \cdot 7H_2O$ were prepared by 4 milliliters, 6 milliliters, and 8 milliliters of zinc 10-milliliter solution and diluting it to 100 milliliters. AAS 201/203 is improved with zinc empty cathode light and checked with 0.8 ppm answer for producing at least 0.6 nanometer absorbance.

Calculate zinc content

We calculated zinc content using formula (1).

Zn % = (ppm) X 100 X 100 X 100 X 100 X 100 X 10^{-6} (1)

5 10 10 1.0

Determination of iron

Preparation of iron standard calibration solution

In 10 ml con. HCl, 0.7021 gm of ferrous ammonium sulfate was separated, and volume was transferred to 100 ml using a volumetric carafe with refined water. This is 1000 ppm of iron [23].

Later, for obtaining 100 ml of solution, using a volumetric flask 10 ml from the above notice course of action was taken and was debilitated with refined water. This is 100 ppm of Fe. 2 ml of 100 ppm iron course of action was added with 2 ml of concentrated hydrochloric acid and contained 100 milliliters to get 2 ppm of the iron plan. 4 ml, 6 ml, 8 ml, and 10 milliliters of iron of 100 ppm we added 2 milliliters of concentrated hydrochloric acid and composed 100 ml with refined water to get 4 ppm, 6 ppm, 8 ppm, and 10 ppm plan separately. The AAS 201/203 was calibrated with iron light and checked with 10 ppm of iron response to produce the least 0.5-nanometer absorbance.

Calculate iron content

Iron was calculated using formula (2)

% Iron = (ppm) X 100 X 100 X 100 X 100 X 10^{-6} (2)

10 10 1.0

Is the heaviness of the example in the solution 'A'.

Determination of copper

Preparation of standard calibration solutions

0.3927 gm of $CuSO_4 \cdot 5H_2O$ we gauged and diluted in 5 ml of concentrated hydrochloric acid. A volumetric jar was weakened to 100 ml with refined water. This was a 1000 ppm copper arrangement [24]. 10 ml of this arrangement is weakened to 100 milliliters with refined water to get 1 ppm copper arrangement. Additionally, 2, 3, 4, and 5 ml of the 100 ppm solution is weakened to 100 milliliters in volumetric cups to get 2 ppm, 4 ppm, and 5 ppm copper arrangements. The AAS 201/203 is advanced with copper empty cathode light and checked with five parts per million copper answers for producing at least 0.6-nanometer absorbance.

Calculate Copper Content

Cu% = (ppm) X 100 X 100 X 100 X 100 X 10^{-6} (3)

10 10 1.0

(1.0 is the heaviness of the example in arrangement A)

Determination of chromium

Preparation of chromium standard calibration solutions

2.8290 gm of potassium dichromate ($K_2Cr_2O_7$) is disintegrated in refined water and fermented with 2 ml of concentrated nitric acid and contented the volume to 1000 milliliters in a volumetric flagon. This was 1000 ppm chromium. 2 ml of 10 ppm arrangement we prepared in a volumetric cup and weakened to 100 ml to obtain 0.2 ppm chromium solution. 0.4 ppm, 0.6 ppm, and 0.8 ppm chromium arrangements were obtained from 4, 6, and 8 ml of chromium 10 ppm and weakened to 100 milliliters. AAS 201/203 is improved with chromium empty cathode light, and 0.5 ppm of chromium assays were checked to create at least 0.6 nanometer absorbance. The absorbance for 0.2 ppm, 0.4 ppm, 0.6 ppm, and 0.8 ppm arrangements are recorded, and afterward, the absorbance for the example arrangement was checked [24].

Calculate Chromium Content

The chromium fraction we calculated using equation (4)

Cr% = (ppm) X 100 X 100 X 100 X 100 X 100 X 10^{-6} (4)

10 10 10 1.0

Determination of lead

Arrangement of lead standard calibration solution

1.5982 g of lead nitrate arrangement is disintegrated in ten ml of concentrated nitric acid and formed 100 milliliters with refined water in a volumetric cup. This was 1000 ppm of lead arrangement. 0.2 ppm, 0.4 ppm, 0.6 ppm, and 0.8 ppm lead arrangements we prepared by applying 4, 6, and 8 milliliters of lead 10 ppm and weakening it to 100 ml. AAS 201/203 is streamlined with lead empty cathode light and checked with 0.8 ppm answers for producing at least 0.6 nm absorbance [25].

Calculate lead content

The lead content we calculated using equation (5)

Pb% = (ppm) X 100 X 100 X 100 X 100 X 100 X 10^{-6} (5)

5 10 10 1.0

Determination of nickel

Arrangement of nickel standard calibration solution

In 10 ml of concentrated hydrochloric acid, 0.44576 g of Ni sulfate was separated and composed into 100 ml with refined water in a volumetric cup. This was 1000 ml of nickel. 0.2 ppm, 0.4 ppm 0.6 ppm, and 0.8 ppm, nickel plans we prepared by taking 4 milliliters, 6 milliliters, and 8 milliliters of nickel 10 ppm and diluting it to 100 milliliters. AAS 201/203 was smoothed out with nickel void cathode light and checked with 0.8 ppm, reply for producing 0.6-nanometer absorbance [26].

Calculate nickel content

The lead content we calculated using equation (6)

Nickel % = (ppm) X 100 X 100 X 100 X 100 X 100 X 10^{-6} (6)

5 10 10 1.0

Results and discussion

Perturbations about community security are raised worldwide when medicinal plants contain a high ratio of heavy metals above the allowable limit. High concentration of heavy metals results in both acute and chronic toxicity in living organisms and this toxicity mainly occurs in a dose-dependent manner. The main threat of heavy metals toxicity is the carcinogenic effects that result from the production of nitrogen and reactive oxygen species. For solving the problem and making safety, finding the presence and quantity of heavy metals in medicinal plants is crucial.

The plant materials were collected from Sargodha University and extracts were obtained in the high-tech lab of the university.

To do this, plant material we dried in the shade, ground into a fine powder with the use of a grinder, and then extracted with methanol. Purified it using filter paper, evaporated it using a rotary evaporator, and finally froze, and dried it to eliminate the effects of the solvent. Plants' methanolic and ethanolic extracts were prepared and used to test the in vitro biological activities against different diseases. The digestion method, nitric acid method, repeated nitric acid method, and analysis of essential components present in the plants we performed by atomic absorption spectrophotometer.

Here we presented the analysis of this research which was carried out by using Analytica Nova 400P, an Atomic Absorption Spectrophotometer.

Phytochemical analysis

In terms of community and individual health, medicinal plants are important. Due to the presence of certain chemical compounds known as bioactive metabolites including saponins, alkaloids, flavonoids, tannins, and steroids that produce a definite biological effect on the human body, several plant species are employed for therapeutic purposes. Due to the presence of various heavy metals and micronutrients that have distinct biological effects on the human body, two plant species are utilized as medicines. Qualitative detection of phytoconstituents from methanolic extract of selected medicinal plant is shown in Table 3. Results represent the presence of heavy metals and micronutrients.

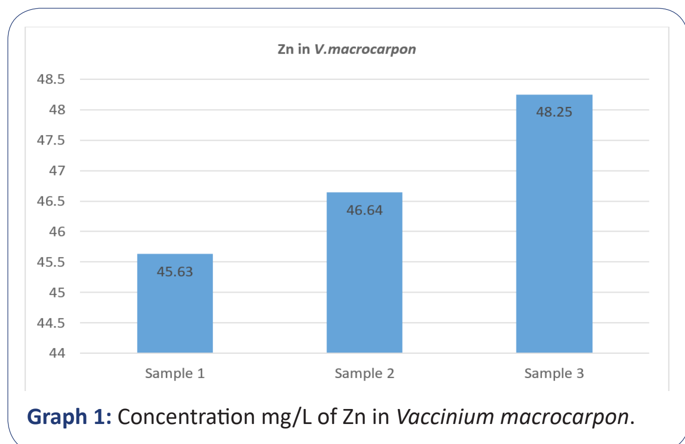
Table 1: Concentration of heavy metals in Vaccinium macrocarpon and Piper cubeba.

Analytica Nova 400P, Atomic Absorption Spectrophotometer				
sr.no	Results	Sample type	Vaccinium macrocarpon	Piper cubeba
1	Zn.213	Sample 1	45.63 mg/L	50.36 mg/L
		Sample 2	46.64 mg/L	46.89 mg/L
		Sample 3	48.25 mg/L	47.05 mg/L
2	Fe.248	Sample 1	36.07 mg/L	-21.34 mg/L
		Sample 2	31.78 mg/L	-19.82 mg/L
		Sample 3	29.55 mg/L	-25.35 mg/L
3	cu.34	Sample 1	7.92 mg/L	-0.95 mg/L
		Sample 2	8.94 mg/L	-2.72 mg/L
		Sample 3	9.66 mg/L	-3.37 mg/L
4	Cd.228	Sample 1	65.05 mg/L	1.73 mg/L
		Sample 2	70.11 mg/L	-4.36 mg/L
		Sample 3	90.82 mg/L	3.35 mg/L
5	Mn.279	Sample	-0.351 mg/L	-0.341 mg/L
		Sample 2	-0.338 mg/L	-0.340 mg/L
		Sample 3	-0.329 mg/L	-0.340 mg/L
6	Pb.217	Sample 1	21.58 mg/L	1.73 mg/L
		Sample 2	20.98 mg/L	-0.97 mg/L
		Sample 3	17.81 mg/L	5.06 mg/L
7	Ni.232	Sample 1	0.007 mg/L	-0.101 mg/L
		Sample 2	0.009 mg/L	-0.101 mg/L
		Sample 3	0.011 mg/L	-0.100 mg/L

Table 3 demonstrates the standard values of heavy metals and micronutrients when compared these values of all 3 samples prepared for investigation and detection of heavy metals and micronutrients (Zn, Fe, Cu, Cd, Mn, Pb and Ni) from both plants Vaccinium macrocarpon and Piper cubeba.

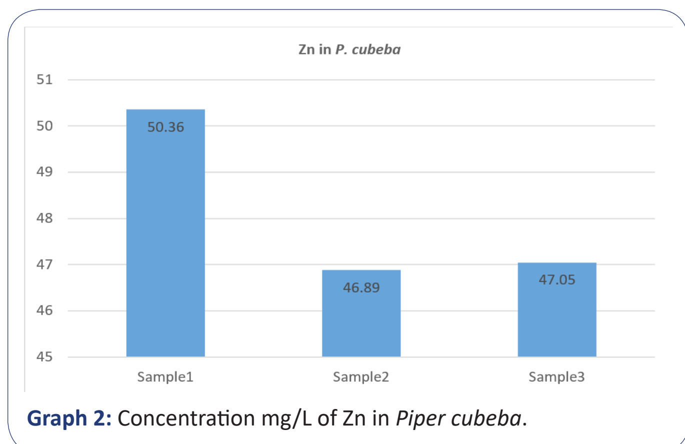
The heavy metals and micronutrients analysis

Zinc:



Graph 1: Concentration mg/L of Zn in *Vaccinium macrocarpon*.

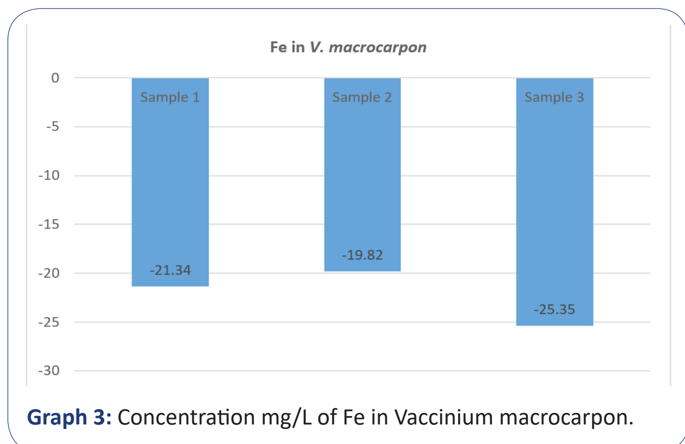
Demonstrated the value of Zn present in Vaccinium macrocarpon. In all samples, the values of zinc were within the safe limit.



Graph 2: Concentration mg/L of Zn in *Piper cubeba*.

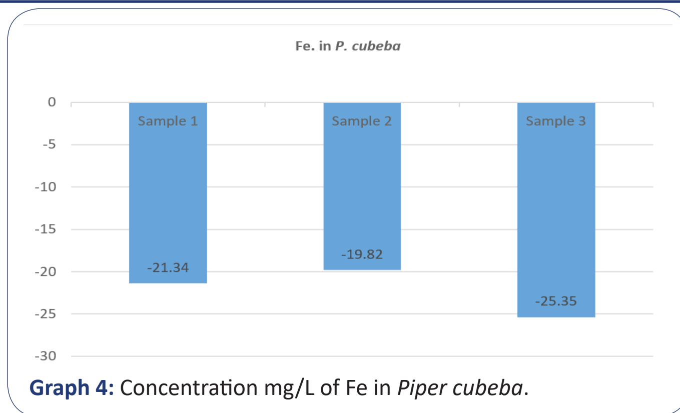
Demonstrated the value of Zn present in *Piper cubeba*. In all samples, the values of zinc were within the safe limit.

Iron



Graph 3: Concentration mg/L of Fe in Vaccinium macrocarpon.

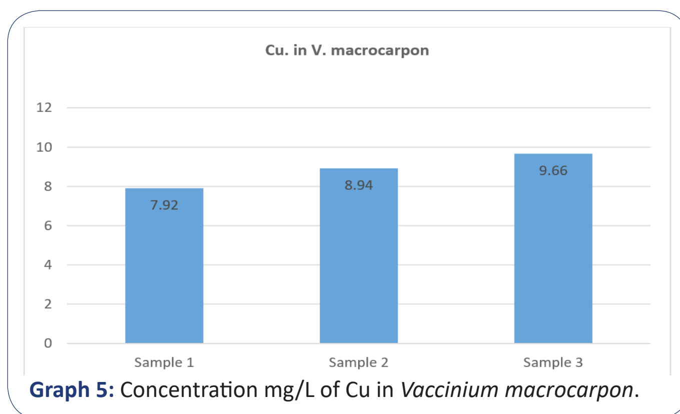
Demonstrated the value of Fe present in Vaccinium macrocarpon. In all samples, the values of iron were within the safe limit.



Graph 4: Concentration mg/L of Fe in *Piper cubeba*.

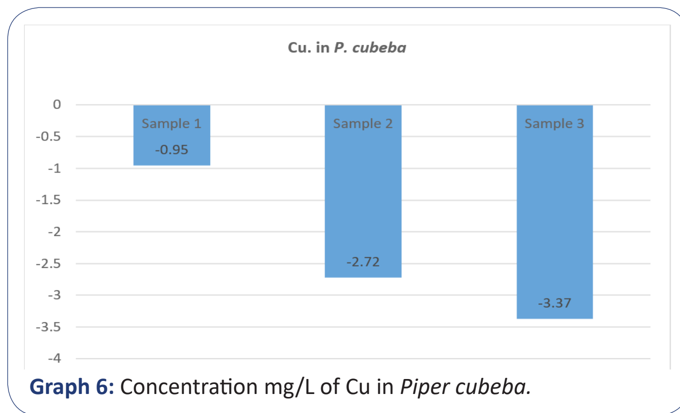
Demonstrated the value of Fe present in Piper cubeba. In all samples, the values of iron were within the safe limit.

Copper



Graph 5: Concentration mg/L of Cu in *Vaccinium macrocarpon*.

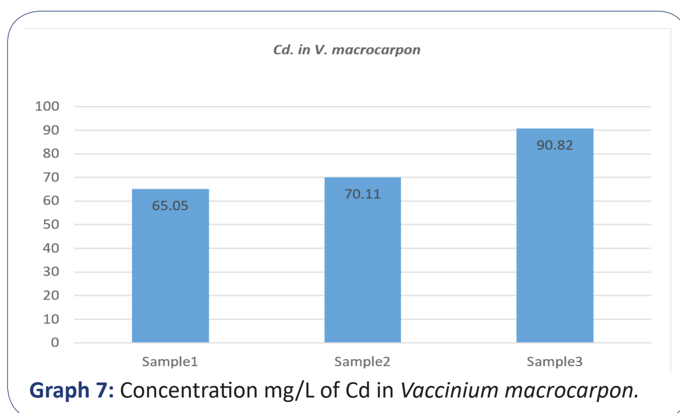
Demonstrated the value of Cu present in *Vaccinium macrocarpon*. In all samples, the values of Cu were within the safe limit.



Graph 6: Concentration mg/L of Cu in *Piper cubeba.*

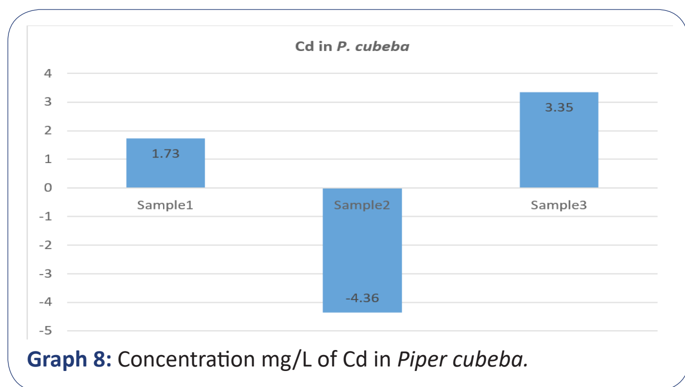
Demonstrated the value of Cu present in *Piper cubeba*. In all samples, the values of Cu were within the safe limit.

Cadmium



Graph 7: Concentration mg/L of Cd in *Vaccinium macrocarpon.*

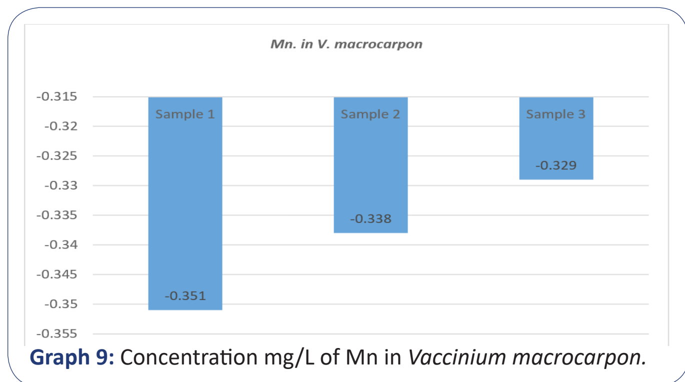
Demonstrated the value of Cd present in *Vaccinium macrocarpon*. In all samples, the values of Cd outranged the safe limit.



Graph 8: Concentration mg/L of Cd in *Piper cubeba.*

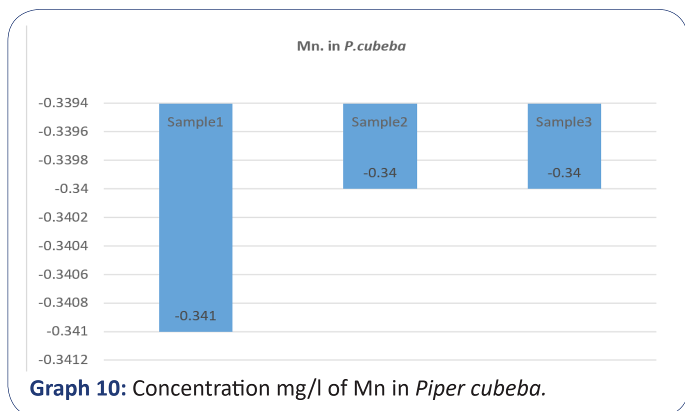
It demonstrated the value of Cd present in *Piper cubeba*. In all samples, the values of Cd were over the safe limit.

Manganese



Graph 9: Concentration mg/L of Mn in *Vaccinium macrocarpon.*

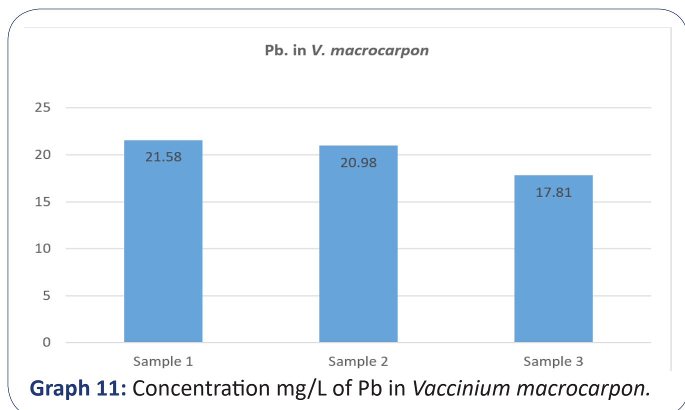
Graph 9 demonstrated the value of Mn present in *Vaccinium macrocarpon*. In all samples, the values of Mn were within the safe limit.



Graph 10: Concentration mg/l of Mn in *Piper cubeba.*

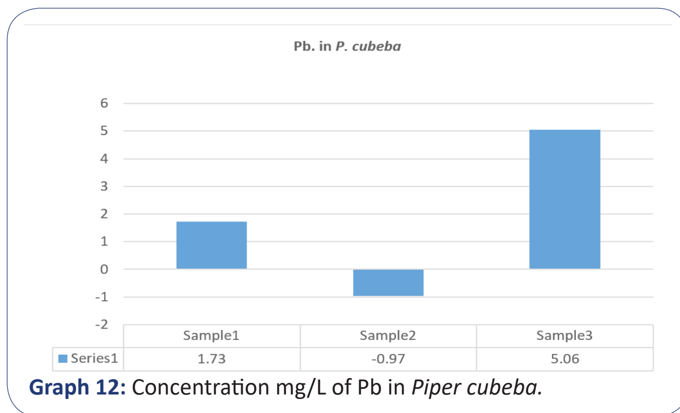
Graph 10 presented the value of Mn present in Piper cubeba. In all samples, the values of Mn were within the safe limit.

Lead



Graph 11: Concentration mg/L of Pb in *Vaccinium macrocarpon.*

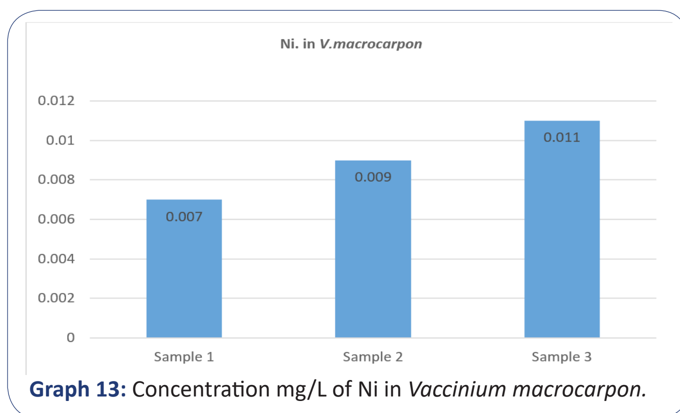
Graph 11 demonstrated the value of Pb present in *Vaccinium macrocarpon*. In all samples, the values of Pb were within the safe limit.



Graph 12: Concentration mg/L of Pb in *Piper cubeba.*

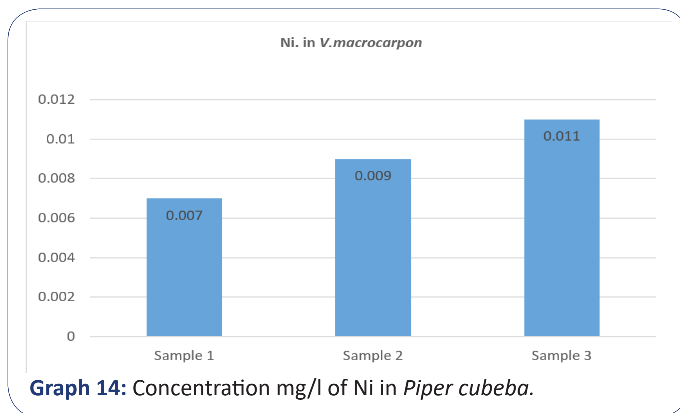
Graph 12 showed the value of Pb present in Piper cubeba. In all samples, the values of Pb were within the safe limit.

Nickel



Graph 13: Concentration mg/L of Ni in *Vaccinium macrocarpon.*

Graph 13 illustrated the value of Ni present in *Vaccinium macrocarpon.* In all samples, the values of Ni were within the safe limit.



Graph 14: Concentration mg/l of Ni in *Piper cubeba.*

Graph 15 demonstrated the value of Ni present in Piper cubeba. In all samples, the values of Ni were within a safe limit.

The three pillars of human well-being, security, and quality are internationally recognized administrative requirements and values. However, there are enormous differences between countries in terms of the requirements for ensuring security and the type of plant-based products [27]. A few standards have been successfully established globally for medicinal plants and allied natural products that are on display, such as the US Pharmacopeia (USP), Italian Pharmacopeia (FUI), and European Pharmacopeia (Ph. Eur.). Additionally, there are legal frameworks at the public and local levels aimed to regulate the nature of plant-based products [28]. Before 1988, only 14

WHO Member States had regulations about natural medicine products; nevertheless, by 2003, 53 Member States (or 37%) had such regulations [29]. 49% of those without laws or regulations said that such rules were being developed at the moment. Some countries, such as Canada, China, Malaysia, Singapore, and Thailand, have developed their public regulations to ensure acceptable levels of heavy metals in medicinal plants and plant-based products [30].

According to the information from the World Health Organization, the level of individuals utilizing therapeutic plants is from 70% to 80% [31]. Natural crude materials including leaves, oil, spices, rhizomes, and roots can be wellsprings of unfortunate harmful parts, including hefty metals. The most extreme qualities for weighty metals in therapeutic plants oral admission controlled by the WHO are as per the following: under 10 mg Pb/kg and 0.3 mg Cd/kg. Micronutrients and heavy metal concentration in medicinal plants used in traditional medicine were discussed widely by per World Health Organization in 2002 [32].

Many experimental studies have been conducted to determine the presence and micronutrient concentration detection and heavy metals. Both developing and developed countries have shown a high concentration of toxic metals in the plant-based products available to people [33].

In a study level of heavy metals in Asian traditional herbal products purchased in the United States was detected and it was revealed by China and Vietnam that most of these products contain a significant level of heavy metals which is almost 74% greater than the guideline recommended for public health [34]. In Brazil, the standard quality control of these items is regularly implemented, and their quality, adequacy, and security are hazy. The outcomes show the requirement for orderly control of harmful hefty metals in plants utilized as drugs.

In the experimental study conducted by [35], It was demonstrated that arsenic, cadmium, lead, mercury, and nickel were found in different brands of skin care products including creams, lipsticks, and lip-sparkles. The result of the study revealed that the harmful metals were present in low amounts. The ceaseless utilization of corrective items tainted with such substantial metals may anyway cause moderate arrival of these metals into the human body and cause hurtful impacts to the purchasers over the long run. Broad utilization of such items ought to stay away from. The side effects related to mercury harming people who utilized a Mexican marvel cream containing mercurous chloride have been accounted for in people living in Texas close to the Mexico line. A few instances of poisonings attributable to the utilization of skin creams containing mercury have been accounted for previously, Hg-containing skin-easing up creams are still ordinarily utilized in many non-industrial nations.

Conclusion and recommendations

Cranberries are nutritious, visually appealing fruits with aromas and nutritional content that serve a purpose. One of only three American fruits, they are. Over the past ten years, the public's interest in North American cranberries (Vaccinium macrocarpon) has increased due to reports of the fruit's potential health benefits related to the various phytochemicals The cranberry's ability to prevent numerous illnesses and infections, including UTI diseases and childhood problems, is due to the presence of these plant compounds.

Global public safety is at risk due to therapeutic plants containing excessive levels of heavy metals above the allowable limit. It is crucial to find the concentration of heavy metals in medicinal plants used to treat various ailments to solve this issue and make safety mandatory. In this review two medicinal plants Vaccinium macrocarpon and Piper cubeba were analyzed for the detection of heavy metals and macronutrients. We understand more clearly due to the findings of the study of heavy metals, including cadmium, lead, and mercury, and their effects on human health. It appears from this study that some micronutrients are present in plants and that their levels impact the body. Plant development is impeded by the presence of heavy metals and their effects. There must be further such studies for the evaluation of medicinal plants for the detection of heavy metals.

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