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NUTRITIONAL ANALYSIS OF SOME WILD VEGETABLES IN WARDHA DISTRICT

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ABSTRACT: Wild edible plants (WEPs) are the species that are neither cultivated nor domesticated, but available from their natural habitat and used as a source of food. Wild edible plants play a major role in meeting the nutritional requirement of the rural population. The use of wild plants by human as a source of food is in practice since time immemorial. wild vegetables are the fresh and edible parts of herbaceous plants. It may include roots, stems, leaves, fruits or seed of the plants that can be eaten as raw or cooked from vegetables are a major parts of daily food intake by human with their main dishes all over the world. Wild vegetables known for their essential biochemicals and nutritional importance as they contained good amount of proteins, fats, carbohydrates, vitamins, and minerals, besides these, moisture, fiber, ash, and energy provided by individual vegetables are important for good health and prevention of disease. In Wardha region most of the villagers consumed the wild leafy vegetables as their daily diet. But factual observation is that most of the citizen's people were not interested to eat the wild vegetables as their regular diet. In this study we demonstrated the wild edible vegetables collected from the Wardha region are the highest source of vitamins and minerals.

Key words: Wild vegetables, Vidarbha region, nutritional analysis, nutritional value.

INTRODUCTION

Vegetables are the fresh and edible parts of herbaceous plants. It may include roots, stems, leaves, fruits or seeds of the plants that can be eaten as raw or cooked from vegetables are a major parts of daily food intake by human with their main dishes all over the world. It is the cheapest and most readily available source of foods that can contribute significantly to human nutrition and health. It is well known for their essential biochemicals and nutritional importance as they contained good amount of proteins, fats, carbohydrates, vitamins and minerals. Besides these, moisture, fibre, ash, and energy provided by individual vegetables are important for good health and prevention of disease. It plays an important role in the balanced diet and advised to intake more that may reduce the risk of disease like cancer, coronary heart attack, diabetes etc. the traditional wild vegetables have also some medicinal value like antibacterial and anticancer activity, which makes it a valuable addition to the diet. (Mohammed *et al*., 2015). In Wardha district most of the villagers consumed the wild leafy vegetables as their daily diet. but factual observation is that most of the citizens was / peoples were not interested to eat the wild leafy

vegetables as their regular diet. Most of the urban people were not aware about the importance of nutritional factor of wild vegetables so to overcome this problem researcher studied the nutritive analysis of some wild vegetables so that urban people can increase these wild vegetables in their diet.

The International Conference on Nutrition in 1992 proposed the development of Food Based Dietary Guidelines as one important strategy in the promotion of nutritional improvement and healthy lifestyles. The arguments were raised that people generally think of diets in terms of foods rather than nutrients and that such guidelines should preferably be built on traditional diet and food practices.(Britta M Ogle et al., 2000) wild plants have been recognized to have potential source of nutrition than conventionally eaten crops . According to food and agricultural organization (FAO) report (Leg et al., 2009), at least one billion people are thought to use wild food in their diet. Besides food and nutrition, utilization of wild foods as coping strategies during scarcity is prevalent, particularly in developing countries where food insecurity is major issue.(Leg et al., 2009) As a result in recent years a growing interest has emerged to evaluate various wild edible plants for their nutritional features. Inventory of wild food resources, ethno botanical information on its adaptability coupled with nutritional evaluation can only establish the noncultivated variety as real substitute for domesticated or cultivated species. It is therefore worthwhile to note that the incorporation of edible and semi cultivated plant resources couldbe beneficial to nutritionally marginal population especially in developingcountries where poverty and climatic changes causes havoc to the rural population.

Hence, proximate and nutrient analysis of wild edible plants plays a crucial role in assessing their nutritional significance. (Led et al., 2009)

Wild leafy vegetables, which are usually ignored by people in the developed nations, are subsistence agriculture in developed countries especially in the food insecure region. Indigenous people in remote areas are endowed with deep knowledge concerning the use of these wild species as a food especially during period of drought, famine and civil unrest. The knowledge on this wild species could be considered as the most important determinant as to whether an individual or family could maintain nutritional well-being become malnourishment, or succumb. Besides, wild vegetables have an important socioeconomic impact through their use in medicines, foods, fibers and cultural ceremonies.(Flyman and Afolayan,2006)

Compositional analysis of the fresh and dehydrated GLV(Green leafy vegetables) were analysed for the following components to study the effect of dehydration. Moisture, ether extractives and ash (minerals) were estimated by standard methods (AOAC 2000) Ascorbic acid was estimated by the visual titration method of reduction of 2, 6—dicholorophenol-indophenol dye. In recent decades, a resurgence of interest has focused on wild plant species for their possible nutritional and medicinal values to broaden the diversity of human diet (Flyman and Afolayan, 2007; Afolayan and Jimoh, 2009). This is because people today are more concern about the effects of modern agricultural technology and marketing, which only cultivated plant types that have high productivity and consequently caused massive lost of biodiversity. On the other hand, increasing research on underutilized vegetables in different regions showed that most of these wild greens

have great nutritional values and antioxidant properties, which are comparable to those commercially cultivated vegetables (Afolayan and Jimoh, 2009; Glew *et al.,* 2005; Maisuthisakul*et al.*, 2007). Glew *et al.* (2005) reported that three usually consumed edible wild plants by the indigenous people in Niger (West Africa's Sahara region) have great influence on the nutritional status of local people due to their proportions of essential amino acids favorably adhering to the World Health Organization (WHO). In Malaysia and most of the developing countries, a wide range of wild edible native plants are used by indigenous people as part of their daily diets or as traditional medicines. For example, Tutan (Solanum nigrum L.) which is used to kill intestinal worms and reducehigh blood pressure. In addition, nutritional composition study on the indigenous fruits and vegetables in Sarawak also showed that most local fruits are high in protein and potassium, while the nutritional value of indigenous vegetables are comparable to those commercialized species (Voon and Kueh, 1999).

The present study explores the nutritional status of seven wild edible vegetables i.e.*Amaranthus tricolor, Hibiscus sabdariffa,Boerhaviaerecta, Trianthemaportulacastrum, Digera muricata, Amaranthus spinosus, Corchorus olitorius etc.* reportedly consumed by the peoples of Wardha district by profiling their biochemical attributes i.e protein, vitamins and mineral elements.

Material and Methods:

The present study based on Nutritional analysis of some wild vegetables available/ consumed in Wardha District.

(A) Selection of wild vegetables:

Exprimental samples were chosen after interacting with the project guide and some farmers, according to the no. of farmers wild leafy vegetables are found in wardha district such as *Portulaca oleracea , Celosia argentea, Cassia tora , Chenopodium album,* etc . but in the project period we get only 7 type of wild leafy vegetables in sample ample amount and this *wild vegetables are Corchorus olitorius , Amaranthus tricolor, Hibiscus sabdariffa , Boerhaviaerecta, Trianthemaportulacastrum, Digera muricata, Amaranthus spinosus* etc. Identification of plantsabove plants was cited in the agriculture field of Ramkrishna Bajaj college of Agriculture, Pipri, Wardha and villages Gopuri ,Alodi region of Wardha farmers of 4 villages identified the plant with their local names locally identified species were collected in triplet for identification and herbarium. First all the vegetables identified from the flora of Maharashtra (1996, 2002) and updated the latest information from www.plantlist.org. Collected plant specimens labelled. The herbarium was kept in newspapers for drying. thereafter ,they were treated with solution of 0.1% mercuric chloride in ethanol to disinfect such dried and disinfected specimens were mounted on the herbarium sheets of standard size 11.5X 16.5 inches .

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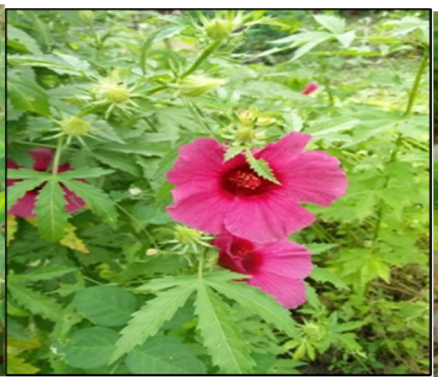
Amaranthus tricolor
(Chinease spinach)



Hibiscus sabdariffa
(Roselle)

Digera muricata
(False Amaranth)

Trianthema portulacastrum
Giant pigweed

Amaranthus spinosus

Boerhavia erecta

Corchorus olitorius

(B) Collection of plant sample for nutritional analysis:

As leaves were consumed by villagers so disinfected fresh leaves were collected during the month of November and December.

a) Determination of dry matter / moisture : First weight the petri plate than weight the 10 gm of samples again weight the petri plate with sample leaves were chopped in equal size samples were kept in hot air oven for 3 to 4 hours in 30 to 40 ^{0}C for drying . The moisture content was calculated by using the formula:

$$\text{Moisture (\%)} = \frac{\text{Weight of fresh sample} - \text{weight of dried sample}}{\text{Weight of sample}} \times 100$$

b) Determination of Ash: 1 gm of oven dried sample was taken in the silica crucible, kept silica crucible in the muffle furnace and raised the temperature slowly upto 500^0C at constant temperature for 2-3hours till white ash obtained .the obtained white ash moist with 2-3 drop of HCl and again kept crucible from furnace and cool it in desiccators and weight it.

The percent ash was calculated by using the given formula

Ash (%) = weight of sample after ash X 1OO
Weight of sample

A) **Determination of Vitamin A**: A quantity,1 gram, of the sample was weighted and macerated with 20 mls of n-hexane in a test tube for 10 minutes after that 3mls of the upper hexane extract was transferred into a dry test tube in duplicates and evaporated to dryness. After that , 0.2ml of acetic anhydride chloroform reagent was added in that dry test tube and 2mls of 50% trichloroacetic acid (TCA)in chloroform was also added .the absorbance was taken 620 nm.

B) **Determination of Vitamin C (Ascorbic acid):** About 0.5g of the sample was weighed, macerated with 10mls of 0.4% oxalic acid in a test tube for 10 minutes, centrifuged for 5 minutes and the solution filtered. 1ml of the filtrate was transferred into a dry test tube in duplicates, 9mls of 2,6 dichlorophenol indophenol was added and absorbance was taken at 520nm.

Mineral Analysis : The minerals in the leafy vegetables were analyzed from solution obtained when 100 mg of the samples were digested with 20mls of 5N concentrated hydrochloride. The mixtures were placed on a water bath and evaporated almost to dryness. The solution was cooled and filtered into 100ml standard flask and diluted to volume with distilled water. Atomic absorption spectrophotometer was used to analyse the minerals such as Mg, Mn, etc. separately after acid digestion of the sample, as described in the official method of the Association of Official Analytical Chemists.

RESULT AND DISCUSSION

The nutritional analysis of wild leafy vegetables which are studied in Wardha district , I observe that the seven wild vegetable that are included in my project i.e. *Corchorus olitorius, Amaranthus tricolor, Hibiscus sabdariffa , Boerhaviaerecta, Trianthemaportulacastrum, Digera muricata, Amaranthus spinosus*. they all are reach with the high amount of vitamins, and micronutrients these wild vegetables is evaluated for the nutritional value i.e. Dry matter, Ash content , Vitamin A, Vitamin C , and mineral like magnesium(Mg) and Manganese(Mn).

1) Evaluation of nutritional value of all seven wild leafy vegetables :

The nutritional analysis of wild vegetables is represented by the percent of Dry matter as follows*: Digeria muricata* is 99.19% ,*Hibiscus sabdariffa is 99.12%, Corchorus olitorius is 99.19, Amaranthus tricolor is 99.11% , Amaranthus spinosus is 99.20%, Trianthemaportulacastrum is 99.07% , Boerhavia erecta* is 99.20%.

2) Ash content of the wild vegetables: The nutritional analysis of wild vegetables is represented by ash content as follows: *Corchorus olitorius is 9.6%, Amaranthus tricolor is 15.9%, Hibiscus sabdariffa is 12%, Boerhavia erecta is 13.7% ,Trianthemaportulacastrum is 18.2 % , Digeria muricata is 29% , Amaranthus spinosus is 14.7 %.*

2) **The evaluation of vitamin A** :- The nutritional analysis of wild vegetables is represented by Vitamin A as follows *Digera muricata is 4+1.350, Hibiscus sabdariffa is 4+0.704, Amaranthus tricolor is 4+0.338, Corchorus olitorius is 4+0.471, Trianthemaportulacastrum is 4+0.830, Amaranthus spinosus is 4+1.003, Boerhavia erecta is 4+1.242.*

3) **The evaluation of vitamin C** :- The nutritional analysis of wild vegetables is represented by Vitamin C as follows *Digera muricata is 4+2.340, Hibiscus sabdariffa is 4+4.00, Amaranthus tricolor is 4+3.733, Corchorus olitorius is 4+4.00, Trianthemaportulacastrum is4+0.830, Amaranthus spinosus is 4+2.323, Boerhavia erecta is 4+3.631.*

4) Evaluation of Mineral Magnesium (Mg):- In this study we evaluate two minerals i.e. Magnesium (Mg) and Manganese (Mn) but due to covid 19 pandamic (lockdown) we cannot able to evaluate other content like Calcium, potassium and protein analysis. The analysis of magnesium had done and it comes +4 in all in first observation, further analysis was not get possible because of (covid 19 lockdown unable to take the duplicate reading.)

5) **Evaluation of Mineral Manganese (Mn):-** The nutritional analysis of wild vegetables is represented by mineral i.e. Manganese(Mn) as follows *Digera muricata is+0.834, Hibiscus sabdariffa is 0.00, Amaranthus tricolor is-0.015, Corchorus olitorius is +0.004, Trianthemaportulacastrum is +0.094, Amaranthus spinosus is+0.095, Boerhavia erecta is+0.068.*

Observation Table:

Vegetables Name	Dry Matter	Ash Content	Vitamin A	Vitamin C	Magnesium (Mg)	Manganese (Mn)
Digera Muricata	99.19%	29%	4±1.350	4±2.340	+4	+0.834
Hibiscus Sabdariffa	99.12%	12%	4±0.704	4±4.00	+4	+0.00
Amaranthus Tricolor	99.11%	15.90%	4±0.338	4±3.733	+4	-0.015
Corchorus Olitorius	99.19%	9.60%	4±0.471	4±4.00	+4	+0.00 4
TrianthemaPortulacustrum	99.07%	18.20%	4±0.830	4±0.830	+4	+0.094
Anarabtgys Spinosus	99.20%	14.70%	4±1.003	4±2.323	+4	+0.095
BoehaviaErecta	99.20%	13.70%	4±1.242	4±3.631	+4	+0.068

The nutritional analysis of the wild vegetables i.e. *Digera muricata,Hibisus sabdariffa, A. tricolor , A. spinosus , Trianthemaportulacastrum , Boerhavia erecta , Corchorus olitorius* this wild leafy vegetable were evaluated for the Dry matter, vitamin A , vitamin C, and minerals like magnesium and manganese. Result found regarding these contents has been discussed in following heads.

1) The comparison of seven wild vegetable with each other by Dry matter content:- The values of dry matter are *Corchorus olitorius is 99.19%, A. tricolor is 99.11%, Hibiscus sabdariffa is 99.12, Boerhavia erecta is 99.20 %, trianthemaportulacastrum is 99.07 , Digera muricata is 99.19 , A. spinosus is 99.20%.* According this observation the highest value of dry matter is 99.20% which is contain by *Boerhavia erecta*, and second is A. spinosus is 99.20% .and the lowest value is *trianthemaportulacastrum* is 99.07%.

2) The comparison of seven wild vegetables with each other by Vitamin A content:- The nutritional analysis of wild vegetables is represented by Vitamin A as follows *Digera muricata is 4+1.350, Hibiscus sabdariffa is 4+0.704, Amaranthus tricolor* is 4+0.338, *Corchorus olitorius* is 4+0.471, *Trianthemaportulacastrum* is 4+0.830, *Amaranthus spinosus* is 4+1.003, *Bohraviaerecta* is 4+1.242. According to this observation the highest value of Vitamin A is in *Digera muricata* which is 4+1.350 and the lowest value of vitamin A is *A. tricolor* is 4+0.338.

3) The comparison of seven wild vegetable with each other by Vitamin C content :- The nutritional analysis of wild vegetables is represented by Vitamin C as follows *Digera muricata* is 4+2.340, *Hibiscus sabdariffa* is 4+4.00, *Amaranthus tricolor isCorchorus olitorius is 4+4.00 and lowest value is in Trianthemaportulacastrum is 4+0.830. 21*

5) The comparison between the mineral i.e. Manganese (Mn):-

The nutritional analysis of wild vegetables is represented by mineral i.e. Manganese(Mn) as follows *Digera muricata is+0.834, Hibiscus sabdariffa is 0.00, Amaranthus tricolor is 0.015, Corchorus olitorius is +0.004, Trianthemaportulacastrum is +0.094, Amaranthus spinosus is+0.095, Boerhavia erecta* is+0.068. According to this observation the highest value of Manganese is in *Digera muricata* is +0.834 and the lowest value is in *Hibiscus sabdariffa* were the manganese is totally absent.

6) The comparison between mineral i.e. Magnesium (Mg):- The analysis of magnesium contains all the seven wild leafy vegetables is same value i.e. +4.

The data obtained in the present investigation have been discussed under the topic "**Nutritional analysis of some wild vegetables of Wardha district**", the investigated plants is *Corchorusolitorious, Amaranthus tricolor, Hibiscus sabdariffa, Bohraviaerecta, Trianthemaportulacastrum, Digeriamuricata, Amaranthusspinosus*. etc. it is mostly consumed in Wardha district as a wild leafy vegetables . The value reported by J.Ndlovu and A.J. Afolayan in nutritional analysis *of Corchorusolitorius* L. i.e. Ash, Magnesium content of 105.20+1.0, 0.560+0.02, (Tapan seal and Kausikchaudhuri, 2016).All these related studies, shows the Ash value is higher than that of current finding (Achikanu, *et al*., (2013). Studied wild vegetables and evaluated vitamin A, vitamin C, mineral like Mg, Mn the current result shows the higher the value of vitamin C in Hibiscus sabdariffa and *Trianthemaportulacastrum,* and lower the value of Mg and Mn. Rekhasinha*et al,* (2018) investigated micronutrient content of wild edible plant of Jharkhand . the contains is moisture, ash, and vitamin C. contains 77.62+0.47 ,13.44+0.03 ,76.54+2.57 .the current result shows that lower the value ash, and vitamin C. It may be due to this investigation from Jharkhand and current finding from Wardha district of Maharashtra so, climatic conditions are different therefore, and the result shows variability.

CONCLUSION

➢ In this study we demonstrated the wild edible vegetables collected from the Wardha district are the highest sources of vitamins and minerals.

➢Peoples believe that these seven wild leafy vegetables could be used for nutritional purpose of human being or peoples in urban area due to their good nutritional qualities and adequate protection may be obtained against disease arising from malnutrition.

➢The experimental finding also revealed that these wild leafy vegetables plants are good source of nutrients for tribal population and also well comparable with various commercial vegetables.

➢ The result highlighted significance of wild vegetables plants as a cheap source of nutrient for the rural poor.

➢ The results suggest that these famine foods can be used as a good source of food to alleviate hunger and malnutrition.

➢The natural attribute of these underutilized vegetables such as higher resistance against disease, these vegetables are more adaptive to harsh environment and grown less intensively which enables them to be considered as new food crops in order to broaden the diversity of human diet.

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