

Nutrient Analysis of Indian Gooseberry Seeds

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Abstract- Global fruit consumption is increasing significantly worldwide due to its disease prevention and health benefits due to the presence of nutrients and other bioactive compounds needed for human well-being. Fruit processing waste is highly perishable and seasonal and is a problem for pollution monitoring agencies. In some fruits, seeds make up about 20% of the total weight. This study aims to investigate the nutritional composition of Indian goose fruit seeds. The seeds of Indian gooseberry seeds were extracted and analyzed for their Macro and micronutrient content. The results showed that the estimated ash and moisture content per 100 gm was 3.76% and 7.16% respectively. The estimated amount of carbohydrate content was 17.07 g, Protein 9.25 g, fat 5.45 g, and fiber content 3.18 g, respectively. Calcium and iron content was moderate at about 23mg/100gm and 7.73mg /100gm of the seed powder; whereas the seeds had higher amounts of phosphorus with an average value of 388.4mg/100gm. The selected sample proved to have a high content of potassium of 310mg/100gm. Therefore, it means that 20 g of Indian goose fruit seed powder will meet a quarter of the potassium requirement. The sodium content was found to be 4.25mg/100gm, which is quite a moderate amount compared to other fruit seeds. Current study results show that seeds can be good health supplements and food ingredients if used and handled properly. Indian gooseberry seeds is nutritionally valuable based on their nutrients.

Index terms: Fruit Processing, Health Supplements, Indian gooseberry seeds, Nutrients

I.INTRODUCTION

Fruits provide quick ways to provide an adequate supply of vitamins, minerals, and fiber to people living in tropical areas. Many fruits and vegetables have a low energy level and it is recommended to control weight. In some cases, fruit contains about

85% water, fat, and protein in very small amounts, a good portion of the available carbohydrates such as cellulose, starch in small amounts, vitamins, and sugars [2]. Fruits are rich in vitamins, minerals, fiber, phytochemicals, and antioxidants in the branches, seeds, and peels [3]. In addition, many fruits are used to make beverages, such as fruit juice or alcoholic beverages such as wine, brandy, or vinegar. The fiber content of fruits and vegetables has been reported to have beneficial effects on blood cholesterol and is helpful in preventing intestinal infections. It has also been reported that people who eat a diet rich in fruits and vegetables have very low levels of many cancers [4].

A nutritionist has suggested that eating at least five servings of fruits and vegetables a day can help people maintain good health throughout their lives, protect them from heart disease and cancer, Type 11 diabetes, kidney stones and reduce stroke. Fruits are also useful as a nutritional supplement and are recommended worldwide as processed food [5]. However, some fruits are also known to have anti-nutrient properties such as phytates and tannins, which can reduce nutrient bioavailability, if present in high concentrations [6]. About 15% of the world's diseases are the result of malnutrition and malnutrition. However, not eating enough fruit can lead to serious health conditions such as vitamin deficiencies, serious illnesses (such as cancer, and heart disease), digestive problems, and weight gain [7]. There is therefore a need to do more research on the nutritional qualities of the fruit in order to incorporate the right fruit seeds into our daily diet.

The use of Indian gooseberry in Indian communities is very widespread. This is due to the discovery of Indian gooseberry fruit in India. Many people eat Indian gooseberries because of their flavor,

prescription medicinal and healthy foods, and their cheap availability in the region. Obviously, the most commonly used part of the Indian gooseberry is always the edible part i.e. the soft part, the layer between the skin and the seeds. Part of the fruit is usually not eaten due to its bad taste, little knowledge of its medicinal/nutritional value, and difficult processing. Therefore, different people never choose Indian gooseberry seeds mainly because they are not informed about the nutrients in the seed component. The study aimed to establish a basis for the formation of nutrients in the seed component and thus proposes the optimal exploitation of Indian gooseberry seeds. The main objective of the current study is to analyze the nutrient content of Indian gooseberry seeds.

II. MATERIALS AND METHODS

2.1. Selection of area

In Tamil Nadu, Indian gooseberries are commonly available in the local fruit markets as well as from departmental stores to small groceries. The investigator had easy access to a nearby vegetable market and was also interested in studying the nutritional composition of the gooseberry seed powder commonly available in the Indian region.

2.2. Collection of Indian gooseberry seeds

The investigator freshly collected the fruit samples from a local vendor at the vegetable market, Ramanathapuram. The fruits were consumed and deseeded. The seeds were collected and kept separately in a dry container for further processing.

2.3. Development of dry gooseberry seeds powder

The fruit seeds were collected, washed in tap water, rinsed in sterile distilled water, and dried for 5 days at 100 C. The dried fruit seeds were blended to powder with a clean mortar and pestle and stored in airtight glass containers kept in a laboratory cupboard until required for further analysis.



Figure-I-Development of Indian goose berry seeds powder

2.4. Proximate analysis of the nutrient content of Indian gooseberry seed powder

In order to estimate the micro and macronutrients such as moisture, ash, carbohydrates, protein, fat, and crude fiber of Indian gooseberry seeds powder, AOAC procedures are followed. Ash solution is prepared and used for estimating the mineral content such as calcium, iron, phosphorus, potassium, and sodium by using standard Procedure.

TABLE I METHODS FOLLOWED FOR THE ESTIMATION OF MACRO AND MICRO NUTRIENTS OF INDIAN GOOSEBERRY SEEDS

MACRO NUTRIENTS	METHODS
Ash (percent)	AOAC Method – 2000
Moisture (percent)	AOAC method – 2000
Carbohydrate (gm)	Anthrone method -2001
Protein (gm)	Lowry et al – 2001
Total fat (gm)	Freeman et al – 1957
Fiber (gm)	AOAC method – 2000
MICRO NUTRIENTS	METHOD
Calcium	Hawk et al – 1957
Iron	Wong – 1928
Phosphorous	Fiske et al – 1925
Potassium	Venkatesh et al – 2011
Sodium	Sharma et al – 2013

III. RESULTS & DISCUSSION

3.1. Nutritional quality of the selected nutrient seed powder

The seeds of the Indian gooseberry possess equally high beneficial qualities in comparison with the fruit. The seeds contain high amounts of macro and micronutrients and also being one of the richest sources of phytochemicals, they are highly recommended for therapeutically benefits and in the prevention of many ailments. The seeds can also be incorporated into many healthy food products to increase the overall nutritional value.

TABLE II ESTIMATED MACRO NUTRIENT OF THE INDIAN GOOSEBERRY SEED POWDER

S.NO	Nutrients	Amount / 100gm
1.	Ash (percent / 100gm)	3.76
2.	Moisture (percent / 100gm)	7.16
3.	Carbohydrate (gm)	17.07
4.	Protein (gm)	9.25
5.	Total fat (gm)	5.45
6.	Fiber (gm)	3.18

Table II shows the nutrient composition of the selected Indian gooseberry seed powder. The estimated amount of ash and moisture per 100gm was 3.76% and 7.16% respectively. The estimated amount of carbohydrate content was 17.07gm, the protein was 9.25gm, fat content was 5.45 gm and fibre content was 3.18 gm respectively. Carbohydrates and proteins are the highly essential nutrients for the human body and they are the main energy source, providing fuel for the central nervous system and for all the other organs. Proteins are required for the development, tissue repair/ regeneration and reconstruction of the body and they are responsible for the synthesis of antibodies, blood cells, hormones and enzymes (7).

Fat content was higher in seed powder of Emblica when compared with other fruit seeds with a mean value of 5.8%. Tetradecanoic acid was a common component in both seed and seed coat and this acid possesses antioxidative properties, anti-inflammatory and antiarthritic properties (8,9).The seed powder was also found to have a good amount of dietary fibre of 3.42%. It is known through some clinical trials that intake of dietary fibre has a positive effect in the control of diabetes and body weight (10) .

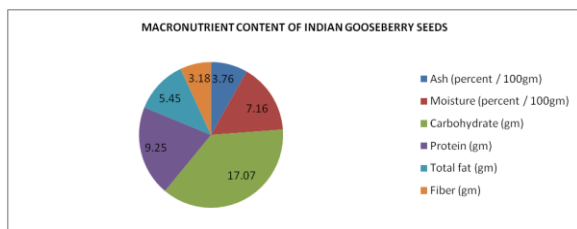


TABLE II ESTIMATED MICRO NUTRIENT OF THE INDIAN GOOSEBERRY SEED POWDER

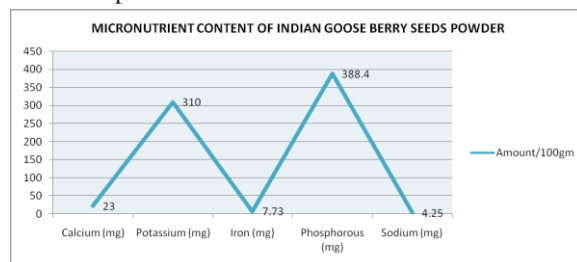
S.no	Micro nutrients	Amount/100gm
1.	Calcium (mg)	23
2.	Potassium (mg)	310.0
3.	Iron (mg)	7.73
4.	Phosphorous (mg)	388.4
5.	Sodium (mg)	4.25

The above table III showed that Minerals are said to be inorganic nutrients that may be present as single atoms or in singlet form according to Palmer, 2001. The calcium content was moderate at about 23mg/100gm of the seed powder, whereas the seeds

possessed higher amounts of phosphorus with a mean value of 388.4mg/100gm.

The iron was found to be 7.73gm/ 100gm of the seed powder. Amla seeds powder had a good amount of iron. Iron can bind a variety of ligands including cyanide, carbon monoxide, oxygen binding proteins such as hemoglobin, myoglobin and cytochrome oxidase, etc(11)

The selected sample proved the potassium content was a high content of 310mg/100gm and also potassium is the most abundant intracellular cation which is known to activate various enzymes which are involved in catalyzing the transfer of phosphoryl groups or elimination reactions (12). According to RDA, 2000mg of potassium is required (13,14). It thus implies that 20g of Indian gooseberry seed powder will satisfy one –fourth requirement of potassium. Sodium content was found to be 4.25mg/100gm which is a quite moderate amount when compared to other fruit seeds.



IV.CONCLUSION

The seeds of the Indian gooseberry were analyzed to obtain moisture, ash, protein lipids, carbohydrates, and fiber. It is found that gooseberry seeds can be considered a good source of macro and micronutrients (seeds in particular), lipid, carbohydrate (seeds in particular), protein (seeds in particular), fiber, and moisture, which benefit human health. Therefore, people can use these seeds to supplement their diet. Importantly, this study supported the use and benefits of various nutritional and therapeutic benefits of this fruit seed on the basis of an analysis of its nutrients. Further research could be done to study the benefits that gooseberry seeds may also have in the cosmetics industry. In this day and age where many degenerative diseases are present, people are trying to return to natural remedies to avoid the side effects of allopathic medicines. In this view, the research conducted can

be beneficial in preventing many degenerative diseases. The use of gooseberry seeds is virtually invisible to the public although it is rich in many bioactive compounds

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