

Evaluation of Finger Millet Herbi Dumpling for Proximate composition, Minerals and Micronutrient Content

Abstract

In India, finger millet (*Eleusine coracana*) also known as Ragi and it is comes from Graminae family. It is the widely grown in different part of India, Asia, and Africa. In India, Orissa, Jharkhand, Uttarakhand Maharashtra, Karnataka, Tamil Nadu, and Andhra Pradesh are the leading Ragi growing states. Finger millet is rich source of calcium, iron and dietary fiber and many diseases like anemia, teeth disorder etc. can be controlled by using in our regular diet and it is an ideal food for sugar patients due to its low content of sugar and slow release of glucose in the body. This study was conducted to determine the proximate composition minerals and micronutrients content of the herbi dumplings. However, it was observed that herbi dumplings were nutritionally enriched and highly acceptable.

Keywords: Ragi Flour, Herbi Dumpling, nutritional composition

Introduction

The term millet is derived from the French word “mille” which means thousand, with a handful of millet containing up to 1000 grains (Shahidi & Chandrasekara, 2013). Finger millet (*Eleusine coracana*) popularly well-known as ragi, nachni or Nagli is one of the important millets grown broadly in different regions of India and Africa ((Muktar, et.al., 2018; Majumder *et al.*, 2006). Finger millet is a drought resistant crop and used as a staple food in India as well as African countries (Devi *et al.*, 2014).

Finger millet is similar to reddish mustered and it is fast growing cereal crop that reaches at maturity level within 3 to 6 months and sometimes in only 45 days (Dida et al. 2006). Commonly, it is harvested in December and January. Finger millet is similar to protein rice (6-8%) and fat (1-2 %) and better than rice and wheat with reference to minerals and micronutrients (Kumari, P. L. and Sumathi, S. 2002; Dubey, P. and Mishra, S.). Finger millet is an

enriched of carbohydrates, proteins, minerals, sugars, starch and dietary fibre. The proximate composition of finger millet grains has been studied by many researchers (Wadikar et al., 2007). Finger millet is also a major source of micro nutrients especially of calcium and iron (Verma *et al.*, 2013). Calcium and Iron play a significant role in the human body. Deficiency of calcium can lead to muscles pain and increase the risk of fractures. Deficiency of iron can lead to Anaemia (Verma and Mishra, 2018). Therefore, Ragi plays a key role as a natural treatment for several patients who suffering from Anaemia, diabetes, muscles pain and also bone fractures. Finger millet is capable of fulfil the requirement of calcium and iron in human body (Siddiqui, *et al.*, 2015).

Utilization of Finger millet involves traditional and other processing methods such as soaking, malting, cooking, fermentation, popping and radiation (Rao and Muralikrishna, 2001). These processes are utilised to improve digestibility and nutritional quality of micronutrients and inhibitory activities of antinutrients such as phenols, phytic acids and tannins (Pawar and Dhanvijay, 2007).

Eryngium foetidum, *Rumex acetosa* and *Centella Asiatica* were used in preparation of herbi dumbling. *Eryngium foetidum* is popularly known by several local names, such as Mexican coriander, spirit weed, fit weed, cilantro and bhandhania (Duke JA., 2009). This herb is used by indigenous people of Northeast India as a kitchen food. The fresh leaves of *Eryngium foetidum* contain over 85% moisture, 3.3% protein, 0.6% fat, 6.5% carbohydrate, 1.7% ash, 0.06% phosphorus and 0.02% iron (Culantro, 1999). The nutritional value of the plants growing in Assam, India and South China has been well-known (Youkai, *et al.*, 2005).

Rumex acetosa is commonly known as ‘Sorrel’ and this perennial plant is mainly distributed in eastern Asia, Europe, and America (Kato T. and Morita Y., 1990). This herb is used in food products with medicinal properties related to its tannin content (Vasas, *et al.*, 2015). Previous studies reported that *Rumex acetosa* possessed antioxidant, anti-hypertensive, antiviral, and anticancer effects (Qamar, *etal.*, 2011; Gescher, *et al.*, 2011; Lee, *et al.*, 2005).

Centella Asiatica is popularly known as Gotu Kola, Asiatic pennywort, Indian pennywort or Spadeleaf and it comes from Apiaceae family. This herb has been used as vegetable in China, Southeast Asia, India, Sri Lanka, Oceania, and Africa from a long time period. This herb is traditionally used for the treatment of several diseases such as skin diseases, rheumatism,

inflammation, syphilis, mental illness, epilepsy, hysteria, dehydration, and diarrhea (Yu QL, *et al.*, 2006). In India, *Centella asiatica* is used as medicine for trigger the memory and for skin diseases and nerve related disorder treatment (Jamil, *et al.*, 2007), In China, it is indigenously called as Gotu kola, and over 2000 years ago, it was one of the well-known as “miracle elixirs of life”(Diwan, *et al.*, 1991).

In this study, the herbi dumpling can be defined as a final product obtained by ragi flour, corn flour sugar, Dehydrated Carrot powder, dehydrated pea powder, Eryngium foetidum powder, Rumex acetosa powder, Centella Asiatica powder, and salt (Taynath, 2018). Herbi dumpling preparations should be analyzed the proximate composition, minerals, micronutrients and the influence of processing on the nutritional functionality. Hence, the information generated in the present investigation will be useful for their certification as quality food for consumers. The rising demands of users for healthy and nutritious food have encouraged the researchers to develop value added food products (Tiwari, A. and Mishra, S., 2018; Mishra, V. and Mishra, S. 2020). Hence, this study focuses on preparation of herbi dumpling as a final product using ragi flour, corn flour, dehydrated Carrot powder, dehydrated pea powder, Eryngium foetidum powder, Rumex acetosa powder, Centella Asiatica powder, and salt (Taynath, 2018). Herbi dumpling preparations should be analyzed for proximate composition Minerals and micronutrients for their certification as quality food for consumers.

Material and Method

The present investigation was carried out in the Department of Food Science and Nutrition, School for Home Science, Babasaheb Bhimrao Ambedkar University, A Central University, Lucknow, Uttar Pradesh, India. The proximate analyses were carried out in triplicates and the results obtained were the average values. The estimation of the various food parameters in herbi dumplings was carried out using the methods of AOAC (1990). Protein was determined as Kjeldahl nitrogen x 6.25. Carbohydrate (nitrogen-free extract) contents were calculated by the difference method.

Preparation of Herbi Dumplings

Tools: Dehydrator, Mixer and grinder, Weighing machine, Measuring spoon, Steam box, Gas stove and Packaging bags.

Collection of Ingredients: The herbs *Eryngium foetidum*, *Rumex acetosa*, *Centella Asiatica* leaf collected from market located in Guwahati. Ragi flour, corn flour, carrot and peas are purchased from market in Lucknow.

Preparation of leaf powder of herbs: Collect fresh *Eryngium foetidum*, *Rumex acetosa*, *Centella Asiatica* leaves, processed to remove dirt and another field damaged portion. The clean and fresh leaves dried in dehydrator at 35°C for 8 hours. Collect all dried leaves were ground into powder in a grinder.

Preparation of Herbi Dumplings : Collect all the ingredients and mixed it. Add water and knead into soft dough and divide the dough into equal portion and roll out each portion into a round and filled with grind vegetables. Heat a steamer and steamed each herbi dumplings on a slow flame for 10 to 15 minutes.

Table.1. Ingredients of herbi dumplings

S.No.	Ingredients	Amount (in gm)
1.	Ragi flour (Finger millets)	200 gm
2.	Corn flour	200 gm
3.	Dehydrated Carrot powder	20 gm
4.	Dehydrated pea powder	20 gm
5.	<i>Eryngium foetidum</i> powder	10 gm
6.	<i>Rumex acetosa</i> powder	20 gm
7.	<i>Centella Asiatica</i> powder	20 gm
8.	Salt	According to taste

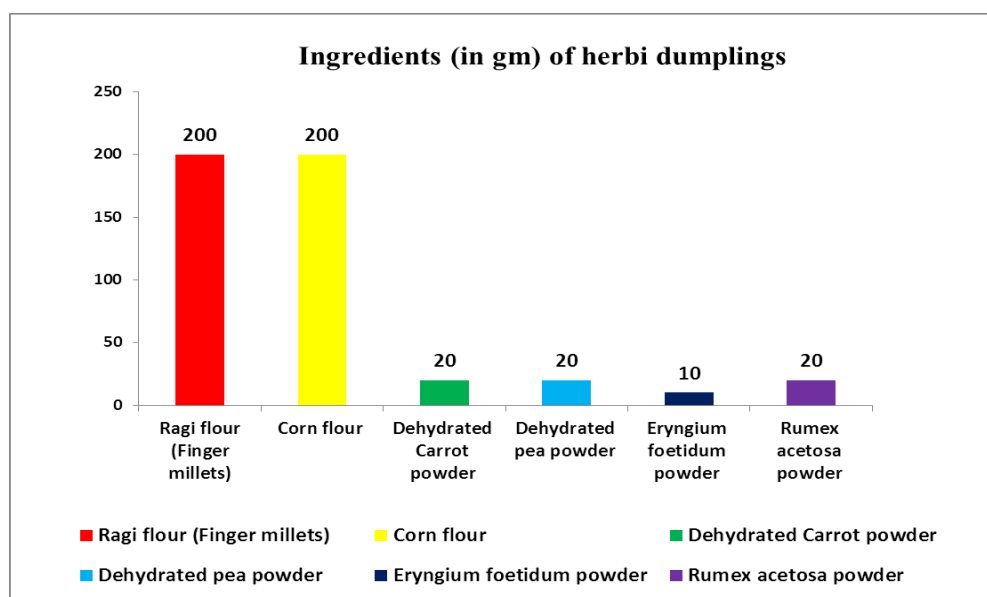


Figure.1. Ingredients of herbi dumplings

Packaging: Food packaging is the most important and reliable process is necessary for food containment. This is the common method to safely control and protect the food against physical, chemical, biological and environmental factors. Aseptic packaging was used for the packaging of final product of herbi dumbling in the form of flour. It is a well-accepted packaging method for the preservation of liquid and particulate foods. It is a type of thermal sterilization. It is a method in which commercially sterilized food product is placed in a sterilized packet and seal under aseptic environment. It is highly recommended for the preservation of fruit juices, tomato paste and food products. Paper and plastic are commonly used in aseptic packaging. Apart from this, foil wrap, plastic bags, metal cans & bottles, and various metal containers are used in aseptic packaging.

Result and Discussion

Proximate Composition

The result and discussion of the study are based on quality and sensory evaluation of herbi dumplings. Table 2 presents proximate composition of the herbi dumplings. The moisture content of herbi dumpling is 7.99 % and it can be stored for long time without spoilage. The value of 3.11 in herbi dumpling is considered appropriate, because it aids absorption of glucose, poison, fat and also increase fecal sample. The crude lipid content obtained for herbi dumplings was 1.12 %. Ash content of 2.49 % was obtained as a result for herbi dumpling. Crude fibre in food is an indication of the level of non-digestible carbohydrate and lignin. The crude protein of herbi dumpling is 11.32%. The carbohydrate content of herbi dumpling was 79.44%. The productt is a good source of carbohydrate. The caloric value of herbi dumpling was 354.54 kcal/g. An average person requires 2000-3000 kcal per day (Jones et al., 1985). Herbi dumpling as a food fulfills the caloric requirement of the body.

Table.2 Proximate Composition of Herbi Dumbling

S. No.	Component	Value
1.	Moisture	7.99%
2.	Crude Fibre	3.11%
3.	Crude Fat	1.12%
4.	Ash	2.49%
5.	Crude Protein	11.32%
6.	Carbohydrates	79.44%
7.	Energy (Kcal.)	354.54(Kcal.)

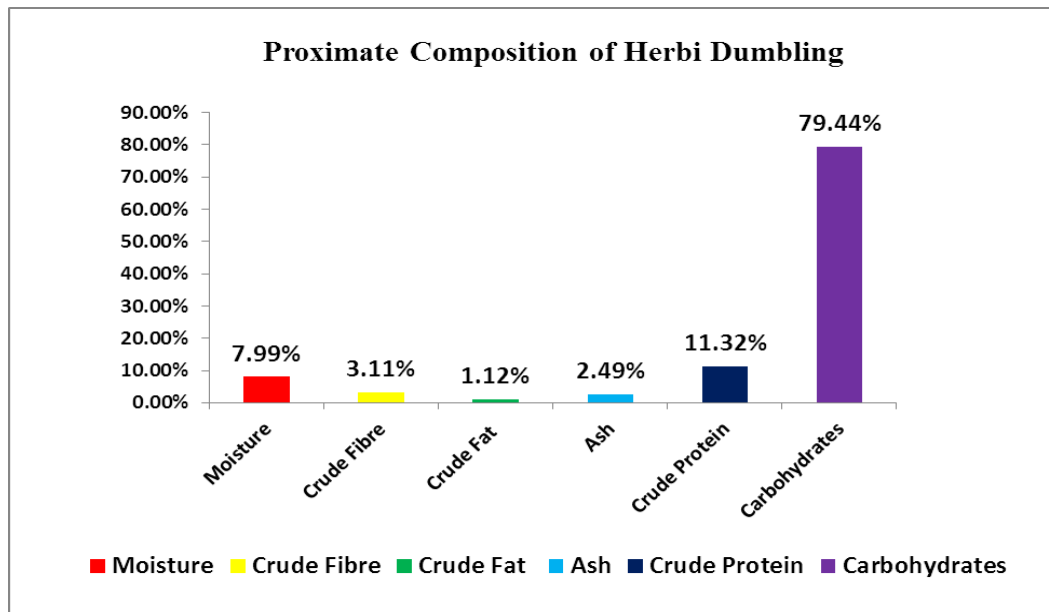


Figure.2. Micro Nutrients of Herbi Dumbling

Table 3 presents the result of minerals and micro nutrients of herbi dumpling in mg/kg dry matter. The sodium content was 5.89 mg/g. The potassium content was 8.19 mg/g. The value obtained for calcium was 6.19 mg/g. The iron content was 1.09 mg/g. The manganese content was 0.52mg/g and copper content was 0.10 mg/g.

Table 3 Macro Minerals and Micro Nutrients of Herbi Dumbling

S. No.	Macro Minerals and Micro Nutrients	Concentration mg/g
1.	Sodium	5.89
2.	Potassium	8.19
3.	Calcium	6.19
4.	Iron	1.09
5.	Manganese	0.52
6.	Copper	0.10

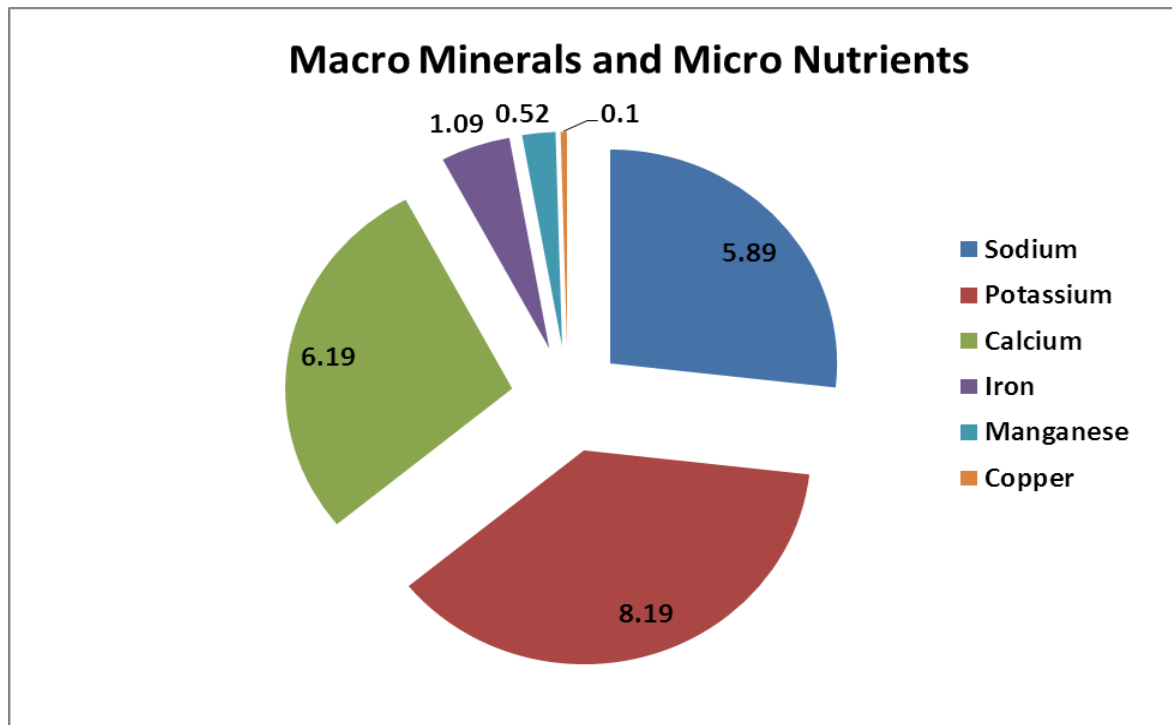


Figure.3. Macro Minerals and Micro Nutrients of Herbi Dumplings

Conclusion

In the present investigation attempts have been made to study of finger millet herbi dumpling for proximate composition minerals and micronutrients content. The result of the study shows that the incorporation of ragi flour is found to be most acceptable to obtain herbi dumplings with improved nutritional value and health benefits. In present study the efforts are made towards the nourishment of herbi dumplings with ragi flour can be more beneficial for several disease such as anaemia, diabetes, brittle bones, osteoporosis and also increase bone strength.

Recommendation

1. This product can be useful for diabetes and obese patients as well as growing children.
2. The herbi dumplings cheap in cost and easy to prepare so it can be used daily to fulfill the requirements of nutrients.

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