

NUTRITIONAL COMPOSITION OF DRIED CURRY LEAF POWDER (*Murraya koenigii*)

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ABSTRACT

Medicinal plants have long been documented with multiple health benefits and scaling down the risk associated with non-communicable diseases. Curry leaves (*Murraya Koenigii*) have a long history of being used as a flavoring agent in many of South Indian recipes. Documented studies claim the leaves to be a rich source of various nutrients. However, there is a dearth of research data on the nutrient composition of the leaves in dried form. Sun and shade dried curry leaves collected from Alwar city; a district in Rajasthan State, India were analyzed for its proximate, vitamin and mineral composition. The proximate analysis exhibited the dried leaves to contain very less amount of moisture (5.86%), fat (2.43%) and protein (3.81%). The carbohydrate content of the leaves was very good (60.24 gm/100 gm), with moderate amount of ash (9.68 gm/100gm) and fibre (5.22 gm/100gm). The content of vitamin A was very high (100989 IU) but that for other vitamins (B, C and E) was very low in the dehydrated form. The mineral content showed the presence of calcium, magnesium, sodium, potassium and zinc. The β -sitosterol content of the leaves was estimated to be 0.43 mg/gram of dried powder. The results thus indicate the leaves to be a good source of nutrients essential for the maintenance of health and wellness and can be a good supplement for cardiovascular disease, diabetes, obesity and osteoporosis and hence can be incorporated in routine diet.

KEYWORDS: Curry leaves, *Murraya koenigii*, Nutrient composition, Medicinal plants

INTRODUCTION

The Indian subcontinent has been blessed with an array of medicinal plants, with promising nutritive value. *Murraya koenigii* (*M. koenigii*) (L) Spreng belonging to family Rutaceae and commonly known as “curry leaves” has been presented in review literature as “The Ultimate Cure” for multifarious diseases. The fresh leaves are reported to have a high nutritional value and are extremely rich in antioxidant vitamins, minerals, carbazole alkaloids, polyphenols, tannins and saponins [1]. These leaves finds ample use in the south Indian recipes but their role in north Indian kitchens is so much fringed that it is just used as merely a flavoring agent, and usually discarded before eating, leaving all of the nutrition in it unutilized. Promotion of curry leaves in a form exhibiting maximum consumption is the need of the hour. Dried powder form provides a dual benefit of ease of use and longer keeping quality of the product. There is an insufficiency of review literature on the nutrient content of the leaf in the dried state. Hence, the present study was planned to determine the proximate, vitamin and mineral composition and the β -sitosterol content of dried curry leaf powder prepared from the plant grown in Alwar city, Rajasthan India.

METHODOLOGY

A huge bunch of Fresh curry leaves were collected from Alwar city, a district in the state of Rajasthan, India in the month of January. The leaves were identified and authenticated by an Associate professor in the relevant field. The leaves were sorted to remove the damaged and spoilt parts. They were then washed and rinsed several times in clean water, to remove all the dust and dirt adhered to it. Once done, these were dried initially for 2-6 hours on rooftop in sun and then shade dried in a well ventilated room for the next 2-4 days or till done. When the leaves were completely dried, these were grounded in a mixer to be converted to a fine powder. The sample, thus prepared was analyzed for proximate composition of moisture, ash, protein, fat and crude fiber content. The parameters

investigated were determined using standard biochemical methods [2]. The mineral content was determined using AAS, vitamins by HPLC and β -sitosterol was analyzed by HPTLC method.

RESULTS AND DISCUSSION

Natural medicinal plants significantly add more value to the nutritional needs of humankind, in that they supply certain bioactive components, which are lacking in the routine diets and thus can be claimed for multifarious health benefits, including a reduction in various degenerative diseases. The results of nutrient analysis of the sun and shade dried curry leaf powder are presented in Table 1, 2 and 3.

Table 1: Proximate composition of dried Curry leaf powder

Nutrient (Test parameter)	Observed Value
Moisture (gm/100gm)	5.86
Total Ash (gm/100gm)	9.68
Crude Fibre (gm/100gm)	5.22
Total Fat (gm/100gm)	2.43
Total Protein (gm/100gm)	3.81
Total Carbohydrate (gm/100gm)	60.24

The proximate values reveal low moisture content of the dried plant leaves, thus ensuring a better keeping quality and longer shelf life. The leaves were presented with a fair amount of carbohydrate (60.24 gm/100 gm) making it a good source of the nutrient. The protein content of the leaf however, was found to be low (3.81 gm/100 gm). A loss in the protein content of sun dried leafy vegetable has been previously demonstrated [3]. A fair amount of fibre content of the leaves makes it an ideal ingredient for diet in diabetic and heart patients. The total fat content was also found to be appreciably low which makes it a potential supplement not only for weight loss, but would also benefit individuals with diabetes and cardiovascular diseases that are suggested low fat diets. Recent studies [4-5], however display somewhat variable results in terms of the tested variables in the present study. However, a similarity was found in the crude fibre content of dried curry leaves with the study by Igara et al [4]. Also the total protein content as analyzed by Uraku and Nwankwo was very much in line with our results [5]. Rest of the proximate nutrients failed to concord. Since, the mentioned studies were conducted in Nigeria, differences in the results are apparent.

Table 2: Vitamin content of dried Curry leaf powder

Nutrient (Test parameter)	Observed Value
β -Carotene (IU/100gm)	100989.18 IU
Vitamin C (mg/100gm)	0.1
Vitamin E (mg/100gm)	0.05
Vitamin B ₁ (mg/100gm)	0.5
Vitamin B ₂ (mg/100gm)	0.5
Vitamin B ₃ (mg/100gm)	0.5

Table 2 displays the vitamin content of the dried leaf powder. Overall the figures display a low amount of vitamin B, C and E with the exception of β -Carotene content which was quite high. The presence of these vitamins in the plant leaf indicates its nutritional and medicinal values.

Table 3: Mineral content of dried Curry leaf powder

Nutrient (Test parameter)	Observed Value
Zinc (mg/100gm)	2.432
Sodium (mg/100gm)	47.81
Potassium (mg/100gm)	1235.88
Calcium (mg/100gm)	2218.22
Magnesium (mg/100gm)	568.03

The mineral content of the dried curry leaf powder documented calcium to be present in significant amount (2218 mg), followed by potassium (1235 mg) and magnesium (568 mg) [Table 3]. The high content of calcium makes these leaves a strong candidate to be used as a calcium supplement, particularly for women in the post menopausal stage. The leaves can also be claimed to support osmotic balance and bone formation. A study conducted in South India [6], reported a varied amount of mineral content in dried *Murraya koenigii* powder from five different places in north Karnataka. The maximum reported mineral was calcium (68.18-75.97 mg/L), followed by potassium (16.27-17.57 mg/L) and magnesium (6.8-7.32 mg/L). The high content of calcium detected in curry leaves in the present study might be due to a very high content of calcium in water supplied in Alwar city, which indirectly gets into the soil through watering. Also, a fair amount of zinc in the leaves as detected in our results enhances the role of leaves as an immune booster, particularly in the present times when the whole humanity is at the stake of COVID 19.

The leaves of curry plant have been claimed to contain various phytosterols including β -sitosterol [7]. Laboratory analysis of β -sitosterol in both the dried and fresh leaf sample was also carried out and the results of the analysis are presented in Table 4.

Table 4: β -sitosterol content of fresh and dried Curry leaf powder

β -sitosterol (Test parameter)	Result (mg/gm)
Fresh leaves	0.27 mg/gm
Dried powder	0.43 mg/gm

The results regarding the estimation of β -sitosterol indicated 0.43 mg of β -sitosterol in the dried leaf powder, which was almost double the amount present in fresh forms. The test results though are not in confirmation with that given recently in IFCT-2017 data for fresh leaves [1]. Indian research studies on β -sitosterol composition of dried curry leaf powder are however, lacking. Incorporating phytosterols in the diet, to lower the serum levels of various lipids is not a new concept [8]. The third guidelines of NCEP, recommends incorporating around 2 gm/day of plant sterol into the diet of individuals with abnormal lipids [9]. Plants sterol consumption of about 2 gm/day has been shown to reduce LDL-C by 5-15% [10]. These compounds can reduce intestinal uptake of dietary cholesterol, thereby reducing plasma cholesterol levels [11].

Data regarding the nutrient content of dried curry leaf powder in India are very limited. The results of the present study can serve as a nutritional data base for further researchers in the same direction. Variation in the concentration of nutrients from one geographical region to other [6] and from one season to another [12] have been demonstrated in previous researches. Claims regarding the effect of climatic factors in bringing about a variation in the medicinal value, nutrient content and levels of bioactive substances have been made in current literature [13]. The results of nutritional composition of curry leaves, thus suggest a good nutritional value. These leaves could be recommended as a non expensive and easily available source of plant protein, carbohydrates, fibre, minerals and vitamins

CONCLUSIONS

The results of the present study, demonstrates immense nutritional potential of curry leaves. The presence of phytosterol in the dried leaves advocates the role of the plant as an herbal alternative to reduce high blood cholesterol levels thus, helping in prevention of heart diseases. The fibre content has an advantage for diabetics to keep blood sugar levels under control. The β -carotene content suggests that the leaves could be recommended for the teenage girls and young women suffering from malnutrition and the calcium content would benefit women in

menopausal transition stage. It can ardently be incorporated in majority of routine vegetables as a major ingredient and not just as a spice or flavoring agent.

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