AJHS
Asian Journal of Home Science
Volume **8** | Issue 1 | June, 2013 | 343-346

A Case Study

Nutrient composition of two non-conventional greens *(Lasia spinosa and Alpinia nigra)* of Assam having therapeutic importance

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Received: 13.02.2013; **Revised:** 31.07.2012; **Accepted:** 01.09.2012

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ABSTRACT : Changmora (*Lasia spinosa*) and Tora (*Alpinia nigra*) are two non- conventional greens of Assam known to be used in rural dietaries as culinary herbs as well as therapy to treat various diseases. The tender leaves of *L. spinosa* and shoots of *A.nigra* were analyzed for their nutrient composition. Both the leaves and the shoots exhibited a good amount of energy (308.68 Kcal and 246.55 Kcal, respectively) indicating the presence of high energy yielding nutrients *i.e.* carbohydrates – 43.50 g and 30.70 g, protein – 14.50 g and 11.25 g and fat–8.52 g and 8.75 g, respectively. These two herbs are known to be used for treating inflammation and rheumatism probably due to their high fat content as anti-inflammatory factors. The leaves of *L.spinosa* and the shoots of *A.nigra* contained high amount of fibre-14.60 g and 31.2 g, respectively showing their importance in alleviating various chronic degenerative diseases. These two greens contained ample amount of minerals like calcium (416.00 mg and 250.00 mg, respectively), potassium (109.41mg and 57.67 mg, respectively) and iron (19.45 mg and 9.10 mg, respectively). High amount of calcium content in *A.nigra* signifies its therapeutic use in alleviating bone weakness. Both the greens were found to be a rich source of ascorbic acid (leaves 165.18 mg and shoots 95.89 mg, respectively). Thus *L.spinosa* and *A.nigra* could be considered as two potential non-conventional greens of Assam accredited with well-balanced nutrients and health caring properties.

KEY WORDS : *Lasia spinosa, Alpinia nigra*, Therapy, Macro, Micro nutrients

HOW TO CITE THIS PAPER : Firdusi, Syeda Nishat, Neog, Nilima and Barooah, Mridula Saikia (2013). Nutrient composition of two non-conventional greens *(Lasia spinosa and Alpinia nigra)* of Assam having therapeutic importance. *Asian J. Home Sci.*, **8** (1): 343-346.

Nature has bestowed the environment with innumerable flora and fauna serving as food to mankind. Leafy vegetables either a leaf, a flower, a stem, a seed, a shoot or rhizome, a fruit, a bark or any other part of a plant (DeCava, 2009), are indispensable in constituting a nutritious diet for man, not only provide energy but also promises supply of health protective factors as proteins and micro-nutrients like calcium, iron, vitamin A, vitamin C, iodine etc. The bulk of the fibrous framework of leaves provide the necessary roughages in the diet that satisfies one's appetite, also stimulate intestinal functions in reducing the incidence of disorders like chronic constipation, diverticular diseases, hemorrhoids and various cancer of the gastrointestinal tract etc. are well established facts. (Myers, 2007; Dahm *et al.*, 2010).

Assam, one of the major states of the North-East India is known to be the home of thousands of species of the rare and valuable flora of the world, endowed with ample amount of nutrients. Many floras are used in Assamese dietaries for culinary preparation which are also accredited with various health beneficial nutrient compounds including protein, carbohydrate, vitamin and fiber contribute to the antioxidant capacity (Betancur-Ancona *et al.*,2004). Some of the edible greens with nutritional properties are also known to be used for therapeutic purposes. A few non-conventional greens having ample functional properties are grown extensively in Assam are Bormanimuni (*Centella asiatica*, Umbelleferae), Sarumanimuni (*Hydrocotyle sibthorpioides*), Mochundari (*Houttuyania cordata* Piprraceae), Jilmil (*Chenopodium album*, Chonopodiaceae), Posotia (*Vitex negundo* L.), Nephapu (*Clerodendrum colebrokiam*) etc. (Neog, 2003)

which are used in culinary preparation and found to have tremendous therapeutic values. Many of such greens are still unexplored scientifically and are grown wildly or sometimes in homestead gardens particularly in rural areas. An attempt has, therefore, been made to analyse the nutrient composition of edible parts of two such non-conventional greens of Assam namely *Lasia spinosa* (Local name-Changmora) and *Alpinia nigra* (Local name-Tora) to acknowledge their role in the human diet.

■ RESEARCH METHODS

The tender leaves of *L. spinosa* and shoots of *A. nigra* were collected from Jorhat District, Assam, India for analysis. Both the samples were collected during the month of March and April, in the year 2009-2010. The leaves of *L.spinosa* were cleaned by removing the infested and diseased portions, washed thoroughly in clean water and finally in distilled water and shade dried till the leaves became very crisp. The shoots of *A.nigra* were collected and the hard /woody portions and over growths were removed and thoroughly cleaned. The tender shoots were then thoroughly washed in clean water and finally in distilled water. The cleaned shoots were cut into thin slices and shade dried till the slice became very crisp. The dried leaves and the slices of shoots were grounded separately in an electric grinder into fine powder and stored in air tight container. The powdered samples were then used for different chemical analysis.

The moisture content of the freshly harvested plant parts were determined by the method as described in the manual of NIN (1982). The protein, fat, fiber and total mineral content of the samples were determined as per A.O.A.C. (1970) method. The carbohydrate content were determined by difference, *i.e.*, by subtracting the sum of the values (per 100 g) for moisture, crude fat, crude protein, total minerals and crude fibre from 100 (Gopalan *et al.*, 2000).The energy value was determined by multiplying the percentage of crude protein, crude fat and carbohydrate by the calorific value of these three *i.e.*, by the factor 4, 9 and 4, respectively and the estimation was recorded as Kcal per 100 g (Gopalan *et al.*, 2000). Iron content was determined according to the method described by Ranganna (1986) by using spectrophotometer (Model No. 2513). Calcium and potassium were determined by using flame photometer according to the method A.O.A.C. (1984). Vitamin C of the freshly harvested plant parts were determined by volumetric method.

■ RESEARCH FINDINGS AND DISCUSSION

The nutrient compositions of the two studied plant materials are given in the Table 1.

The results showed that the moisture content of the leaves and shoots was 86.30g and 94.70g, respectively. Earlier studies reported higher moisture content of different greens ranged from 70.7 to 94.8 per cent (Ndossi and Sreeramulu, 1991; Pramila *et al.*,1991; Kashyap and Dutt, 2007; Maisuthisakul *et al.*, 2007 and Baruah and Borah, 2009). The higher value of moisture content recorded in the studied greens fell within this range. The total ash content of *L. spinosa* and *A. nigra* was 18.75g and 12.67g, respectively representing the total amount of minerals in the samples. Earlier works have also shown that most of the vegetables are rich in a wide range of minerals ranging from 2.5 to 8.41g (11, 13 and 15) which is reflected in the individual mineral contents like iron, calcium and potassium (Table 1) present in the studied samples. The leaves of *L. spinosa* and shoots of *A. nigra* had a high fiber content of 14.60g and 31.25g, respectively on dry weight basis. The fibre content of *L. spinosa* leaves (14.60g) is in accordance with the earlier observations of Maisuthisakul *et al.* (2007) in Thailand. The beneficial effects of crude fibre from vegetables is to minimize the incidence of diabetes mellitus, obesity, coronary artery diseases and colon cancer are well documented (Myers, 2007). Dietary fibre also promotes beneficial physiological effect like laxation (AACC, 2001) which in turn contributes to the factor for treating disorders like constipation , a primary cause of piles. Purkayastha *et al.* (2006) reported the use of the leaves of *L.spinosa* in the treatment of developing piles and thus indicating their therapeutic importance. High amount of protein present in the leaves and shoots of the studied plants (14.50g and 11.25g, respectively) were also similar to the earlier observation of Maisuthisakul *et al.* (2007) from Thailand and Indryan *et al.* (2009) from India. Both the plant parts contained good amount of fats (8.52 g and 8.75 g, respectively)in contrast to earlier studies of Ndossi and Sreeramulu (1991), Kashyap and Dutta (2007), Inderayan *et al.* (2009), Rajyalakshmi *et al.* (2005); who reported that most of the vegetables contribute little amount of fat to the diet ranging from 0.96g to 2.26g. Fats specially from plant source are important for controlling inflammation, blood clotting and brain development (Bamji *et al.*, 2003). *L. spinosa* leaves and *A. nigra* shoots are widely used in traditional medicine for treatment of inflammation and rheumatism (Ueda *et al.*,2002 and Nguyen *et al.*, 2004) probably due to their high fat content as an anti-inflammatory factor. Carbohydrate content of *L. spinosa* and *A. nigra* was 43.50g and 30.70 g, respectively.

Table 1 : Nutrient composition of *L. spinosa* and *A. nigra* on dry matter basis (per 100 g sample)

Sr. No.	Scientific name	Part used	*Mo (g)	Ash (g)	Fi (g)	Fat (g)	Pro (g)	CHO (g)	E (kcal)	Fe (mg)	Ca (mg)	K (mg)	*Vit–C (mg)
1.	*L. spinosa*	Tender leaves	86.30	18.75	14.6	8.52	14.50	43.50	308.68	19.45	416.00	109.41	165.18
2.	*A. nigra*	Shoot	94.70	12.67	31.25	8.75	11.25	30.70	246.55	9.10	250.00	57.67	95.89

*On as is basis, * Mo- moisture, Fi-fiber, Pro-protein, CHO-carbohydrate. E- energy, Fe- iron, Ca-calcium, K-potassium, Vit-C-Vitamin-C.

The complex carbohydrates derived from plant sources have a beneficial effect in lowering the risk of cardio-vascular diseases and diabetes mellitus, thus, indicating their therapeutic importance in treating such conditions(Bamji *et al.,* 2003). Although the leafy vegetables are not considered as an important source of calories in the diet, the energy content as calculated from the various nutrients in the samples was recorded as 308.68 and 246.55 Kcal per 100 g for *L. spinosa* and *A. nigra*, respectively (Table 1).

Both the studied samples were rich source of mineral and vitamin (Table 1). The iron content of *L. spinosa* and *A. nigra* was 19.45 mg and 9.10 mg, respectively, which correspond with the value of iron recorded by Pramila *et al.* (1991) in some other non-conventional greens of Kumar and Garewall Hill. *L.spinosa* leaves and *A.nigra* shoots contained 416.00 mg and 250.00 mg of calcium, respectively. Adequate calcium intake from childhood to the end of the life span is critical for the formation and retention of a healthy skeleton (Power *et al.,* 1999) and heart (Ringer, 1883). *A. nigra* is reported to be used therapeutically for treating bone weakness (Purkayastha *et al.,* 2006) possibly due to its high calcium content. The potassium content of *L. spinosa* and *A. nigra* was 109.41 mg and 57.67 mg, respectively. Potassium is of importance as a diuretic (Sondhi and Janani, 1995).A good amount of potassium in both the studied plant parts justifies their therapeutic use in rheumatism. It has also been observed that both plant parts contained 165.18 mg and 95.89 mg of ascorbic acid, respectively. Ascorbic acid is essential for human health as protective and anti-oxidant compound from nutritional point (Padayatty *et al.*, 2003 and Bamji *et al.*, 2003). Since the two studied greens were found to be good source of ascorbic acid their incorporation in the daily diet could be beneficial.

Thus, the two non-conventional greens, *L. spinosa* and *A. nigra* of Assam are found to be accredited with well-balanced vital nutrients. From this point of view they could be regarded as valuable functional with healing properties. Therefore, it is utmost important to sensitize the people about the importance of these greens for more consumption as well as conservation for greater benefit of the human population.

Acknowledgement :

Authors are thankful to Dr P. Das, Principal Scientists, AICRP, Home Science, Department of Food and Nutrition, Faculty of Home Science, Assam Agricultural University, Jorhat and Dr (Mrs) R.Sarma, Incharge of CIF Laboratory, Department of Biochemistry, AAU, Jorhat for their necessary permission to use their esteem laboratorys and also for their help and support at different spheres of the investigation.

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