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RESEARCH ARTICLE

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Nutrition profile of underutilized *Lahsua (Digera arvensis*) and *Pakar (Ficus infectoria*) leaves incorporated traditional recipies

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ABSTRACT

Micronutrient malnutrition poses a serious threat to the heath of vulnerable groups of population. Among the plant foods green leafy vegetables are the cheapest and locally available food, rich in micronutrients. *Lahsua (Digera arvensis)* and *Pakar (Ficus infectoria)* are found to be underutilized leafy vegetables in Northern India. In the present study was observed that underutilized green leafy vegetables which are equally nutritious to any other traditional green leafy vegetables can be incorporated in daily dietaries.

Key words : Green leafy vegetables, Product development, Nutrition content

INTRODUCTION

Development of nutritious and organoleptically acceptable recipes with locally available foods is a challenge for the food scientist. However, the benefits of such food-based strategies to prevent micronutrient malnutrition are manifold. They: (a) are preventive, (b) are cost-effective, (c) are sustainable, (d) are income-generating, (e) are culturally acceptable and feasible to implement, (f) promote self-reliance and community participation, and (g) foster the development of environmentally sound food production systems (Nambiar *et al.*,2005). Use of green leafy vegetables to eradicate underlying micronutrient deficiencies has been advocated for a long time. Several studies have indicated green leafy vegetables as a group to be important sources of nutrients required for growth and maintenance. *Lahsua* (*Digera arvensis*) herbs are distributed throughout India and is commonly seen after rains especially in the eastern and northern provinces of India. It has an impressive range of medicinal uses with high nutritional value. Different parts of this plant contain a profile of important minerals, and are a good source of protein, vitamins, beta-carotene, amino acids and various phenolics (Seshadri and Nambiar, 2003). Fodder plants, long an integral part of farming systems, provide a source of green fodder during the dry season when the decreased forage far exceeds the sustainable supply for livestock (Amatya, 1992, Lekhak, 1998). Underutilized *Pakar* (*Ficus infectoria*) is an evergreen tree hugely growing in Northern parts of India. Foliage buds are eaten as vegetable and pickle (Siwakoti and Varma, 1996). It is an important leafy vegetable, high in nutritional value and rich in vitamin A, iron and protein. In view of this, the present investigation was undertaken to evaluate the nutritional composition of traditional recipes incorporated underutilized leafy vegetables.

MATERIALS AND METHODS

The present study was conducted at College of Home Science and Women's Development, Allahabad Agricultural Institute-Deemed University, Allahabad.

Sample used:

Underutilized *Lahasua* (*Digera arvensis*) leaves and *Pakar* (*Ficus infectoria*) leaves was procured directly from field and used in the product preparation. Totally six products out of which three each of *Lahsua* and *Pakar* were incorporated products were prepared.

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Preparation of the samples and analysis:

Lahsua (*Digera arvensis*) leaves were used for the incorporation into three products, namely, *Paustic paratha, Sag* and *Dal*. The treatments and replication of the products are shown in Table 1. Young leaves of *Pakar (Ficus infectoria)* were used for the incorporation into three products, namely *Magodii*, *Sag* and *Dal*. The treatments of the products are shown in Table 2.

These *Lahsua* and *Pakar* incorporated products were homogenized individually, dried at 60^0C and finely powdered. The dried powder was further used in the analysis of proximate and mineral analysis. Nutrients such as moisture, protein, fat, crude fibre, calcium, iron were analyzed as per AOAC (1997) methods. Energy and carbohydrate were calculated by difference method.

Table 1 : Treatment and products developed by incorporating fresh *Lahsua (Digera arvensis)* leaves

Treatments	Products and incorporation level of fresh *Lahsua* leaves by substituting main ingredients		
	Paustic paratha	*Sag*	*Dal*
T_0 (control)	-	-	-
T_1	15 %	15 %	15 %
T_2	30 %	30 %	30 %
T_3	45 %	45 %	45 %

Table 2 : Treatment and products developed by incorporating Pakar (*Ficus infectoria*) leaves

Treatments	Products and incorporation level of fresh *Pakar* leaves by substituting main ingredients		
	Magodii	*Sag*	*Dal*
T_0 (control)	-	-	-
T_1	25 %	20 %	20 %
T_2	50 %	40 %	30 %
T_3	75 %	60 %	40 %

RESULTS AND DISCUSSION

The results obtained from the present investigation are presented below:

Nutritional composition of formulated products developed by incorporated '*Lahsua*' (*Digera arvensis*) leaves:

Table 3 presents information regarding the mean nutrient composition of *Lahsua* incorporated products (per 100g).Results showed that the moisture content was highest in *Paustic Paratha* (19.017%) and least in *Sag* (8.05 %). The protein content was highest in *Dal* (16.7 g/100g) and least in *Sag* (1.38 g /100g).This may be due to 50 per cent of pulse present in *Lahsua* based *Dal* which

Table 3 : Mean nutrient composition of the products developed by incorporating *Lahsua* leaves (*Digera arvensis)* (Per 100g)

Treatments	Moisture (%)	Protein (g)	Fibre (g)	Fat (g)	Carbohydrate (g)	Energy (g)	Iron (mg)	Calcium (g)
Paustic Paratha (Lahsua , leaves)								
T_0	15.24±0.07	11.46+0.03	1.80±0.005	5.52±0.02	65.87±0.07	307±0.14	4.73±0.03	45.7±0.05
T_1	19.01 ±0.23	6.38±0.007	1.95±0.01	4.17±0.02	31.9 ±0.54	165±0.27	5.96±0.007	89.3±0.17
T_2	16.12±0.08	5.99±0.07	2.26±0.02	3.98±0.02	28.0±0.01	144±0.26	7.44±0.03	113.5±0.07
T_3	13.02±0.07	4.26±0.03	3.18±0.13	2.63±0.07	24.10±0.08	137±0.27	9.1±0.08	130.9±0.57
F value	3365.07*	2345.09*	12009.78*	1677.09*	2405.90*	5678.09*	1267.45*	3423.67*
C.D. (P=0.05)	0.031	0.04714	0.5631	0.6142	0.0976	0.1455	0.1603	0.7209
Sag (Lahsua, leaves)								
T_0	20.02±0.23	1.51±0.007	0.27±0.004	0.07±0.002	21.48±0.01	92±0.02	0.47±0.007	7.03±0.03
T_1	16.23±0.92	1.38±0.002	1.21±0.008	3.19±0.04	9.58±0.01	76±0.02	3.76±0.03	67.63±0.10
T_2	10.78 ±0.56	1.53±0.03	1.55±0.02	3.22±0.009	8.7±0.005	65±0.08	4.8 ±0.05	79.2±0.05
T_3	8.05±0.23	1.70±0.007	1.71±0.009	3.20±0.05	7.22±0.007	56±0.03	5.33±0.07	109.5±0.64
F value	10045.89*	5123.09*	7804.23*	3089.09*	10041.04*	42420.34*	4567.90*	4421.89*
C.D. (P=0.05)	0.1234	0.0567	0.0876	0.0204	0.0115	0.1965	0.1198	0.0124
Dal (Lahsua, leaves)								
T_0	21.09±0.43	19.46±0.10	2.60±0.003	2.80±0.005	48.43±0.03	298±0.08	3.060.009	124.9±0.40
T_1	18.67±0.09	16.7±0.003	1.56±0.03	2.62±0.02	39.7±0.08	298±0.08	6.23±0.03	169.6±0.08
T_2	17.04±0.07	15.08±0.008	2.08±0.003	2.57±0.008	35.07±0.002	253±0.47	7.68±0.07	150.6±0.08
T_3	14.09±0.09	14.03±0.005	2.36±0.03	2.45±0.005	31.05±0.004	226±0.5	8.94±0.009	101.3±0.07
F value	340012.23*	6723.02*	1156.34*	24045.19*	45480.2*	235644.78*	6734.01*	5612.99*
C.D. (P=0.05)	0.3309	0.2354	0.2308	0.0667	0.3245	0.1273	0.1151	0.4433

* significant of value at P=0.05

has higher protein content than any other pulses or pulse fractions. This could be well compared to the study reported by (Khot *et al.*, 1996) which revealed that the crude protein of mothbean usual was 14.93g. Fibre content of the developed products varied from 1.21 to 3.18 g/100g. In case of *Paustic Paratha* and *Dal,* it was observed to be maximum not only due to the basic ingredients like wheat flour, pulses and onion but also due to incorporation of *Lahsua* leaves. The control recipes in general had low fibre content whereas after the incorporation of the *Lahsua* leaves the values increased considerably. Thus, these food preparations can be recommended to persons requiring high fibre diets. Fat content of the developed products was in the range of 2.45 to 4.17 g/100g. The fat was high in *Paustic Paratha* (4.17 g/100g). This can very well be attributed to the fact that oil/fat is a main ingredients in these preparations. Boiling product like *Dal* (2.45 g/100g) which did not have oil/fat as an ingredient has been found to be lower in this dietary factor.Carbohydrate content of the developed food products was found to be in the range of 7.22 to 39.7/100g. *Dal* shows the highest carbohydrate *i.e.* 39.7 g/100g because of ingredient like black gram *Dal* which is rich in carbohydrate whereas the other dishes either had ingredients which are relatively poorer source of carbohydrate or the quantities were less. Energy values ranged between 56 to 298 Kcal/100g. The maximum energy values was observed in *Dal* and *Paustic Paratha* which had energy rich ingredients like fat, pulse and wheat flour. The range of iron content in all the developed food products was 3.76 to 9.11 mg/100g. *Paustic Paratha* was found to be highest in iron content *i.e.* 9.11 mg/100g. The presence of wheat flour, onion and *Lahsua* leaves might be one of the contributing factors for higher iron content among the products.The calcium content of the developed products ranged from 67.63 to 169.6 mg/100g. *Lahsua* leaves based product *Dal* had higher calcium content (169.6 mg/100g) among the products.

Nutritional composition of formulated products developed by incorporated *Pakar* (*Ficus infectoria*) leaves:

Table 4 shows the mean nutrient content of the products developed by incorporating *Pakar* leaves. Results showed that per cent moisture content was highest in *Sag* (18.56%) and lowest in *Magodi* (4.04 %). The protein content ranged from 1.46 to 14.4 g, highest was found in *Magodi* as it was a pulse based preparation. The highest fat content was observed in *Sag* (10.68 g), which may be due to the absorption of fat during frying. Lowest fat was found in *Dal* (4.31 g), which might be due to more fluid used in the preparation. Highest fibre content (3.03 g)

Table 4 : Mean nutrient composition of products developed by incorporating *Pakar (Ficus infectoria)* (Per 100g)

Treatments	Moisture (%)	Protein (g)	Fibre (g)	Fat (g)	Carbohydrate (g)	Energy (g)	Iron (mg)	Calcium (g)
***Magodi* (*Pakar*)**								
T_0	12.09±.02	18.37±0.12	0.6±0.15	9.23±0.12	44.92±0.12	336±0.03	2.92±0.00	56.25±0.12
T_1	8.08±0.34	14.4±0.15	1.4±0.12	9.42±0.11	32.90±0.006	283±0.14	3.34±0.02	84.5±0.15
T_2	6.09 ±0.25	10.25±0.11	2.2±0.01	9.60±0.14	20.83±0.01	211±0.15	3.82±0.10	112.5±0.01
T_3	4.04 ±0.46	6.12±0.14	3.03±0.05	10.1±0.12	8.80±0.02	148±0.005	4.23±0.12	140.2±0.02
F value	40123.23*	3790.02*	16.40.78*	1045.56*	45378.78*	67859.04*	3209.45*	56789.01*
C.D. (P=0.05)	0.1105	0.2056	0.3478	0.04590	0.2105	0.3467	0.2290	0.6789
***Sag* (*Pakar*)**								
T_0	22.67±0.12	1.26±0.11	0.30±0.01	4.24±0.12	17.89±0.12	76±0.02	0.38±0.25	7.91±0.12
T_1	18.56±0.01	1.46±0.15	0.98±0.17	8.75±0.03	16.03±0.25	110±0.12	1.32±0.12	41.66±0.14
T_2	13.98 ±0.04	2.46±0.11	1.83±0.06	9.08±0.05	11.77±0.02	102±0.02	2.26±0.11	75±0.25
T_3	10.78 ±0.34	3.46±0.11	2.48±0.03	10.68±0.02	8.63±0.12	93±0.02	3.2±0.23	108±0.21
F value	60125.01*	3398.01*	1805.67*	1709.02*	2434.09*	4578.03*	2378.02*	5341.07*
C.D. (P=0.05)	0.3214	0.6721	0.0451	0.1134	0.04	0.0423	0.0367	0.0432
***Dal* (*Pakar*)**								
T_0	7.89 ±0.89	17.31±0.01	2.98±0.004	2.75±0.01	46.98±0.04	294±0.03	3.660.007	128.5±0.12
T_1	6.45 ±09	13.73±0.11	1.05±0.02	4.25±0.12	32.24±0.12	222±0.12	2.88±0.12	68±0.02
T_2	5.67±0.34	12.43±0.002	1.31±0.03	4.31±0.23	28.39±0.13	202±0.23	3.08±0.15	77±0.01
T_3	4.45 ±0.67	11.12±0.005	1.42±0.03	4.37±0.01	24.25±0.15	187±0.23	3.17±0.23	86±0.03
F value	21023.01*	31052.12*	10032.10*	2424.3*	4254.01*	1526864.0*	11633.0*	2839.23*
C.D. (P=0.05)	0.0653	0.0284	0.2256	0.1718	0.6073	0.6712	0.0753	0.5623

* indicates significance of value at P=0.05)

was found in *Magodi*. *Magodi* had higher carbohydrate content with 32.90 g/100g and lowest in *Sag* (8.63 g/100g). Presence of higher amount of pulse may be contributing factor for higher carbohydrate content. The energy content was highest in *Magodi* (283 Kcal) followed by *Dal* (222 Kcal) and least was found in *Sag* (93 Kcal), which could be due to use of less amount of oil 60 per cent incorporation of *Pakar* leaves in the product preparation. Iron content was highest in *Magodi* (4.23 mg) with the presence of greens and onion might be one of the contributing factors for higher iron content among the product. However, *Sag* had a lowest of 1.32 mg of iron. The calcium content of the selected developed products ranged from 41.66 mg to 140.2 mg. *Magodi* had higher calcium content in comparison to other developed products. This may be due to use of *Pakar* leaves in the product preparation. Statistically there was significant difference between the products for all the nutrients.

Conclusion:

It can be concluded from the results that the incorporation of underutilized green leafy vegetables leaves in various traditional recipes can improve the nutritional quality of the products as well as add variety in the diet. Micronutrient deficiencies can be tackled more efficiently and successfully by incorporating underutilized green leafy vegetables which are equally nutritious like any other traditional leafy vegetables in daily dietaries.

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