Nutritional composition and organoleptic evaluation of value-added products developed from garden cress seeds

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ABSTRACT

Garden cress (*Lepidium sativum* L) seeds are small, oval-shaped, pointed and triangular at one end, about 3-4 mm long, 1-2 mm wide and reddish brown in colour. It has been well known as an important medicinal plant since the Vedic era. It is a fast growing edible plant and all the parts of it viz seeds, leaves and roots are of enormous economic importance. Its seeds are nutritious and also have been widely used to treat a number of diseases in traditional Indian system of medicine. In the present study garden cress seeds were analysed for the nutritional composition and results revealed that 100 g of seeds contain 4.24 g moisture, 26.32 g protein, 27.80 g fat, 7.05 g crude fibre, 29.97 g carbohydrate and 475 Kcal energy. Minerals such as calcium, phosphorus, iron, zinc, copper and manganese were found to be 253.46, 418.35, 6.48, 2.37, 2.31 and 1.52 mg respectively. Vitamins viz β-carotene, vitamin C and total tocopherol were 236.00 µg and 16.34 mg and 98.54 mg respectively. Among the developed products control sample scored higher values for all sensory attributes followed by products prepared with five per cent incorporated seeds. Value-added products developed from the seeds had acceptable sensory attributes.

Keywords: Garden cress; seeds; composition; value-added products

INTRODUCTION

Garden cress (*Lepidium sativum* L) is an annual herbaceous edible plant that is botanically related to mustard and watercress. It is cultivated in India, North America and parts of Europe and used as culinary vegetable all over Asia (Doke and Guha 2014). Its seeds contain 22.47 per cent protein, 27.48 per cent fat, 7.01 per cent crude fibre and also have significant amount of minerals such as 296.60 mg calcium, 514.59 mg phosphorus, 1193 mg potassium, 315 mg magnesium and 7.62 mg iron (Gokavi et al 2004). The most abundant amino acids are glutamic (19.3%) and leucine (8.21%). The major fatty acids are oleic (30.6%) and linolenic (30.2%) with low amount of erucic acid (3.9%). Its bran has high water holding capacity and dietary fibre (74.3%). The swelling property of husk is mainly because of mucilaginous matter present in it. The mucilage consists of a mixture of cellulose (18.3%) and uronic acid containing polysaccharides (Sharma and Agarwal 2011). Garden cress has been well known as an important medicinal plant since the Vedic era. Its seeds are nutritious and also have been widely used to treat a number of diseases in traditional Indian system of medicine (Agarwal and Sharma 2013).

MATERIAL and METHODS

Garden cress seeds were purchased from Bengaluru local market and were analysed (Anon 1980) for the nutrients namely moisture, protein, fat, ash, crude fibre and minerals viz calcium, phosphorus, iron, zinc, copper and manganese. Carbohydrate content of samples was computed by difference method. Vitamins viz β-carotene (Ranganna 1996), vitamin C (Sadashivam and Manickam 1992) and total tocopherol (Wong et al 1988) were analysed for garden cress seeds. Nutrients were analysed in duplicate and results are expressed on dry weight basis.

Value-added products prepared were Laddu, biscuits, Papad and soup by incorporating five and ten per cent of roasted garden cress seeds. The products

were evaluated for appearance, texture, aroma, taste and overall acceptability on a nine point hedonic scale by the semi-trained lab panellists (n= 20). Critical randomized design (CRD) was used for analysing sensory evaluation (Fisher and Yates 1965).

RESULTS and DISCUSSION

Nutritional contents of garden cress seeds are presented in Table 1. The seeds (100 g) contained 4.24 g moisture, 26.32 g protein, 27.80 g fat, 7.05 g crude fibre, 29.97 g carbohydrate and 475 Kcal energy. Minerals such as calcium, phosphorus, iron, zinc, copper and manganese were found to be 253.46, 418.35, 6.48, 2.37, 2.31 and 1.52 mg respectively. Vitamins viz β-carotene, vitamin C and total tocopherol were 236.00 µg, 16.34 mg and 98.54 mg respectively. Its contents have also been reported by Gaafar et al (2013) who analysed moisture (5.18%), crude protein (24.29%), crude lipids (27.85%), crude fiber (7.79%), ash (4.26%), carbohydrates (35.81%), calcium (243.12 mg), phosphorus (427.36 mg), magnesium (2427.36 mg), potassium (239.47 mg), iron (8.34 mg), zinc (1.19 mg), copper (1.25 mg) in its seeds. The variation in the nutrients may be due to varietal differences.

Table 1. Nutrient analysis of garden cress (*Lepidium sativum* L) seeds

Nutrient	Quantity (per 100 g seed)
Proximate	
Moisture (g)	4.24
Protein (g)	26.32
Fat (g)	27.80
Crude fibre (g)	7.05
Carbohydrates+ (g)	29.97
Energy+ (Kcal)	475
Ash (g)	4.68
Minerals	
Calcium (mg)	253.46
Phosphorus (mg)	418.35
Iron (mg)	6.48
Zinc (mg)	2.37
Copper (mg)	2.31
Manganese (mg)	1.52
Vitamins	
β-carotene (µg)	236.00
Vitamin C (mg)	16.34
Total tocopherol (mg)	98.54

+Calculated

Mean sensory scores of products prepared from garden cress seeds are given in Table 2.

In case of Laddu the sensory score for appearance/colour of GCS-1 (5%) were at par with control (8.30) but higher than GCS-2 (7.95) whereas for other traits sensory score was higher in case of control. The sensory scores for texture (7.95 and 7.90), flavour/aroma (7.90 and 7.80), taste (7.60 and 7.40) and overall acceptability (7.70 and 7.60) of GCS-1 and GCS-2 respectively were at par though lower to control.

In case of biscuits the scores wrt appearance/ colour and texture were at par in all three treatments. However in flavour/aroma, taste and overall acceptability the scores in control were higher (8.10, 8.45 and 8.15 respectively) than GCS-1 (7.85, 7.65 and 7.90 respectively) and GCS-2 (7.80, 7.50 and 7.70 respectively) the latter two being at par.

In Papar also scores wrt appearance/colour and texture differed non-significantly. The score for flavour/aroma in control (8.55) was higher than GCS-1 (8.25) followed by GCS-2 (7.85). The score in control for taste (8.15) was higher than the GCS-1 and GCS-2 (7.65 and 7.50 respectively) the latter two being at par. Similar was the trend in case of overall acceptability.

The sensory scores in soup wrt appearance/ colour, flavour/aroma, taste and overall acceptability were higher (8.15, 8.35, 8.50 and 8.25 respectively) in control than GCS-1 (7.80, 7.95, 7.90 and 7.75 respectively) and GCS-2 (7.70, 7.75, 7.70 and 7.70 respectively) the latter two treatments being at par. But in case of texture the scores of control (8.05) and GCS-1 (7.80) were at par the latter being significantly at par with GCS-2 (7.70).

Sood et al (2009) developed protein and energy rich sweet balls by using food stuffs from amaranth, sesame, linseed and jaggery and evaluated them for nutritional and sensory qualities. Protein and energy contents of various sweet balls formulations ranged from 8.85 to 13.61 per cent and 407 to 509 Kcal/100 g respectively. The acceptable level of linseed in sweet balls was found to be 10 per cent as evaluated by a panel of judges on a nine point hedonic scale.

Biscuits were prepared by using garden cress seeds and rice flakes which were rich in iron content

Table 2. Mean sensory scores of different products prepared from garden cress seeds (GCS) (n= 20)

Treatment	Mean sensory score				
	Appearance/ colour	Texture	Flavour/aroma	Taste	Overall acceptability
Laddu					
Control	8.30	8.15	8.30	8.30	8.35
GCS-1 (5%)	8.30	7.95	7.90	7.60	7.70
GCS-2 (10%)	7.95	7.90	7.80	7.40	7.60
F-value	*	NS	*	*	*
SEm±	0.12	0.15	0.13	0.12	0.10
$CD_{0.05}$	0.34	-	0.36	0.35	0.30
Biscuit					
Control	7.90	7.85	8.10	8.45	8.15
GCS-1 (5%)	7.75	7.75	7.85	7.65	7.90
GCS-2 (10%)	7.65	7.70	7.80	7.50	7.70
F-value	NS	NS	*	*	*
SEm±	0.09	0.09	0.08	0.11	0.09
$CD_{0.05}$	-	-	0.23	0.31	0.26
Papad					
Control	8.25	7.80	8.55	8.15	8.15
GCS-1 (5%)	8.20	7.75	8.25	7.65	7.80
GCS-2 (10%)	8.10	7.70	7.85	7.50	7.70
F-value	NS	NS	*	*	*
SEm±	0.08	0.09	0.09	0.11	0.09
$CD_{0.05}$	-	-	0.28	0.33	0.26
Soup					
Control	8.15	8.05	8.35	8.50	8.25
GCS-1 (5%)	7.80	7.80	7.95	7.90	7.75
GCS-2 (10%)	7.70	7.70	7.75	7.70	7.70
F-value	*	*	*	*	*
SEm±	0.09	0.11	0.11	0.12	0.11
$CD_{0.05}$	0.26	0.31	0.32	0.36	0.33

NS= Non-significant

and organoleptic evaluation was carried out for its acceptability by panel members (Zanvar and Devi 2007). Mohite et al (2012) did organoleptic evaluation of health drink and observed that health drink prepared with three per cent (w/v) of processed garden cress seed powder scored highest (8.75) compared to other drinks using different concentration (1-5% w/v).

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