Intl. J. Food . Ferment. Technol. 5(1), 91-94, June, 2015

DOI Number: 10.5958/2277-9396.2015.00013.6

RESEARCH NOTE

Development of Value Added Food Products by the Incorporation of Fresh Faba Bean

Alka Gupta, Poonam Kumari and Ranu Prasad

Department of Foods and Nutrition, Ethelind School of Home Science, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad – 211007 (U.P.) India.
Corresponding author: ami7823@gmail.com

Paper No. 86 Received: 20 October 2014 Accepted: 20 July 2015

Abstract

To determine the sensory quality of the developed product and the nutritive value of different food products made by the incorporation of fresh faba bean pods at different levels. Food product were prepared from, *"Rava Upma"* and *"Dal Vada"* by incorporation of fresh faba bean pods mix at the level of 20%, 30% and 40% as treatments T_1, T_2 and T_3 respectively. T_0, without incorporation of fresh faba bean pods served as control. The replicated three times for all two food products and data obtained investigation were statistically analyzed by using analysis of variance (ANOVA) and critical difference (CD) techniques. Sensory evaluation was carried out by using nine point Hedonic scale. Chemical analysis was carried out by the standard procedure of AOAC (2005). On the basis of findings, it was observed that in case of *"Rava Upma"* 30% incorporation level (T_2) was adjudged as the best with regard to color, body and texture, taste and flavour and overall acceptability. In case of *"Dal Vada"* 40% incorporation level (T_3) adjuged the best with respect to color, body and texture, taste and flavour and overall acceptability. *"Dal Vada"* was also found to be rich in several nutrients. It is concluded that fresh faba bean pods can be incorporated in the preparation of different food as well as improve their nutrient content.

Keywords: Faba beans, sensory evaluation, chemical analysis, value addition, nutrient content

Faba bean (*Vicia faba* L.), also referred to as the broad bean, horse bean or field bean, is a major food and feed legume. It is a source of protein in food, especially in Mediterranean countries and China and its seeds have high nutritional value (Crépona, *et al.* 2010). The world production of faba beans during 2010 was 4.3 Mt from 2.55 Mha, which is relatively small compared with world production of soybean and pea (262 Mt and 10 Mt, respectively) (FAO STAT, 2010)

Broad beans contain good amounts of vitamin C and folate, good amounts of niacin, and small but useful levels of zinc and iron. Like peas, they are also an excellent vegetable source of protein and are also a very good source of both soluble and insoluble fibres. They are also some phyto-chemicals. The beans are one of the richest sources of catechins – many health benefits of catechin rich foods, such as protecting against chronic diseases, including cardiovascular disease and cancer, are thought to be attributable to their antioxidant activity. *In vitro* studies have shown catechins to inhibit LDL oxidation and platelet aggregation, reduce inflammation and improve vascular endothelial function. Broad beans also contain the medicinal compound L-dopa, used in treating Parkinson's disease. Although it is present in the whole plant, young pods and beans contain more L-dopa than mature dried beans. It has been estimated

that around 85 grams of fresh green fava beans may contain between 50 and 100 mg of levodopa (Holden, 2001). But they can also cause potentially fatal haemolytic anaemia in certain ethnic groups with a genetic condition known as favism. The beans contain some β- and α-carotene, and good amounts of lutein and zeaxanthin. Raw green beans also contain chlorophyll and reasonable amounts of the flavonoids quercetin and kaempferol at 2.73 mg/100 g and 0.41 mg/100 g respectively (USDA, 2003). Yellow beans have slightly higher levels of both (3.03 mg/100 g and 0.42 mg/100 g) (USDA, 2003).

Broad beans contain only very small amounts of carotenoids (USDA, 2005), with a little β-carotene and, unlike peas, no lutein or zeaxanthin. However, they do contain a number of phenolic compounds, including the flavonols, quercetin and myricetin, and additionally are an excellent source of other flavonoids known as catechins, flavanols or flavan-3-ols (USDA 2003).

Materials and Methods

Selection of raw materials

Fresh pods of Faba beans and other materials were collected from the local market of Allahabad district of Uttar Pradesh (India).

Basic Formulation of Value Addition of Faba beans in different Food products

The basic recipes were standardized and serve as control (T_0). Three treatments i.e., incorporation of fresh faba bean pods on different levels. *Rava, Upma* and *Dal Vada* was referred to as T_1, T_2 and T_3 respectively for each of the two products.

Sensory evaluation

The sensory evaluation of prepared products was done by a panel of 10 judges to assess the acceptability of the products based on the various sensory attributes like color, appearance, texture, flavor and taste. The evaluation was done on the 9 point Hedonic scale based score card (Srilakhmi, 2007).

Nutritive Value of Developed Food Products

The proximate principles (energy, fat, carbohydrate, protein, fiber) and minerals like Calcium and Iron of the control and enriched food product were analyzed by the AOAC, (2005) methods as prescribed.

Statistical analysis

The data obtained from sensory evaluation were statistically analyzed by using analysis of variance technique (one way classification). Significant difference between the treatments was determined by using CD (critical difference) test.

Results and Discussion

Organoleptic Evaluation of Prepared Food Products

Table 2 Shows the sensory evaluation of prepared products *Rava, Upma* and *Dal Vada* using nine point hedonic scale score card. Sensory evaluation of the *'Rava Upma'* prepared from incorporation of fresh Faba beans pods showed that significant influence on Color and Appearance was highest in treatment T_2 (7.9) and non significant for Body and Texture was highest in treatment

Table 1: Details of Control and Treatments

Main Ingredient	Formulation Name	Mixing Ratio
Rava + Vegetables + Fresh Faba Bean Pods	T_0	50 g. Rava, 20 g. Onion, 30 g. Carrot.
	T_1	50 g. Rava, 15 g. Onion, 25 g. Carrot, 10 g. Faba Beans.
	T_2	50 g. Rava, 15 g. Onion, 20 g. Carrot, 15 g. Faba Beans.
	T_3	50 g. Rava, 15 g. Onion, 15 g. Carrot, 20 g. Faba Beans.
Bangal gram + Vegetables + Fresh Faba Bean Pods	T_0	50 g. Bangal gram, 50 g. Onion.
	T_1	50 g. Bangal gram, 40 g. Onion, 10 g. Faba Beans.
	T_2	50 g. Bangal gram, 35 g. Onion, 15 g. Faba Beans.
	T_3	50 g. Bangal gram, 30 g. Onion, 20 g. Faba Beans.

Table 2: For Average Sensory Score of Different Parameters in Control and Treated Sample

Parameters	Color and Appearance				Body and Texture				Taste and Flavour				Overall Acceptability			
Products / Treatments	T_0	T_1	T_2	T_3	T_0	T_1	T_2	T_3	T_0	T_1	T_2	T_3	T_0	T_1	T_2	T_3
Rava Upma	7.5	7.6	7.9	6.8	7.06	7.8	7.86	6.93	7.8	7.7	8.2	7.4	7.48	7.7	8	7.02
Dal Vada	7.6	7.2	7.8	8.9	7.8	7.4	7.9	8.2	7.5	6.7	7.8	8.4	7.74	7.03	7.8	8.24

T_2 (7.86), Taste and Flavor was highest in treatment T_2 (8.21) and Overall acceptability was highest in T_2 (8).

'Dal Vada' had significant influence on Color and Appearance was highest in T_3 (8.9). Body and Texture was highest in treatment T_3 (8.2). Taste and Flavor was highest in treatment T_3 (8.4). Overall acceptability was highest in T_2 (8.24).

The mean sensory score for prepared sample products with varying proportions of added fresh faba bean pods are shown in table 1 significant difference ($p<0.05$). Significant difference ($p<0.05$) in color for both and overall acceptability for both *Rava Upma* and *Dal Vada*. This result may be attributed partly to the varying proportions of faba beans incorporated in the place of other vegetables used in the preparation. This result of consumer oriented test was acceptable for *Dal Vada* discovered on significant difference ($p<0.05$) in color, taste and flavor, body and texture and overall acceptability of tested varying proportions, rather, similar results have been reported by where it was found Martin *et al.* (2010) addition to oil, samples formulated using sorghum and cowpeas were found to be more appealing and were liked by majority. *Rava Upma* was slightly dislike because it obtained non-significant values by the sensory evaluation for their taste and flavor, body and texture and overall acceptability. Inyang and Zakari (2008) reported that sensory panelists highly rated formulations from germinated grains for all the sensory parameters investigated.

Nutritional Composition of Prepared Food Products

Table-3 shows the the effect of incorporation green pods of faba beans in *Rava Upma* and *Dal Vada*. Faba bean incorporated *Dal Vada* was rich; fibre (4.05g.); protein (11.84g.); fat (22.85g.) carbohydrates (36.2g) energy (350.5kcal.); calcium (50mg.) and iron (3.29mg.) and other product *Rava Upma* was rich in carbohydrate (42.2g.).

The mean nutrient composition for prepared sample products with varying proportions of added fresh faba bean pods is shown in table 3. In case of carbohydrate, the result agred with Martin *et al.* (2010) who reported that the carbohydrate and iron increases as cereal and cereal product was used in preparation of food product. In case of fat and energy, the results agree with those of Gokoglu *et al.* (2004) who reported that the energy was increases or decreases it depends upon the methods of cooking. The result on protein confirm those of Helland *et al.* (2002) where they reported the protein content was increased by using of germinated pulses and legumes for the preparation of different food products. In case of Iron content similar result reported Lakshmi and Vimla (2009) were also reported that dehydrated green leafy vegetable retained good amount of protein.

Conclusion

It can be concluded from the result that the incorporation of fresh faba bean pods in various food products can improve the sensory quality of the products as well as the nutritional quality of the products.

Table 3: For Nutrient Composition (per 100g.) in Control and Treated Sample

Product & Treatments	Moisture (%)	Ash (g)	Fibre (g)	Protein (g)	Fat (g)	Carbohydrate (g)	Energy (Kcal)	Calcium (mg)	Iron (mg)
1. Rava Upma									
T_0	43.6	1.2	0.6	5.74	10.49	42.2	263.8	40.8	1.28
T_1	43.4	1.41	0.6	6	10.48	41.86	236.8	37.8	1.32
T_2	43.51	1.62	0.7	6.27	10.78	41.69	263.8	36.3	1.34
T_3	44.2	1.8	0.76	7.27	10.65	41.52	263.8	34.8	1.36
2. Dal Vada									
T_0	47.1	3.5	0.9	11.3	22.85	36.2	350.5	48	3.25
T_1	46.95	3.2	1.0	11.57	22.85	35.66	349.4	49	3.27
T_2	47.16	3.56	1.1	11.70	22.84	35.39	348.85	49.5	3.28
T_3	47.95	4.05	1.18	11.84	22.84	35.12	348.3	50	3.29

References

AOAC 2005. *Official Methods of Analysis.* 16th edition, Association of Official Agricultural Chemists, Washington, DC.

Crépona, K., Marget, P., Peyronnet, C., Carrouéea, B., Arese, P. and Duc, G. 2010. Nutritional value of faba bean (*Vicia faba* L.) seeds for feed and food. *Field Crop. Res* 115: 329–339.

FAOSTAT, 2010. Production—Crops. Available online: http://faostat.fao.org (accessed on 2 May 2012).

Gokoglu, N., Yerlikaya, P. and Cengiz, E. 2004. Effects of cooking methods on the proximate composition and mineral contents of rainbow trout (*Oncorhynchus mykiss*). *Food Chemistry* 84: 19-22.

Helland, M.H., Wicklund, T. and Narvhus, J.A. 2002. Effect of germination time on alpha-amylase production and viscosity of maize porridge, *Food Research Institute* 35: 315-321.

Holden, K. 2001. Fava beans, Levodopa and Parkinson's disease. 22 September 2006. www.parkinson.org/site/pp.asp?c=9dJFLPWB&b=100110.

Inyang, C.U. and Zakari, U.M. 2008. Effect of germination and fermentation of pearl millet on proximate, chemical and sensory properties of instant "Fura"- A Nigerian Cereal Food, *Pakistan Journal of Nutrition,* 7(1): 9-12.

Lakshmi, B. and Vimla, V.A. 2000. Nutrative value of dehydrated green lefy vegetable powders, *Journal of Food Science and Technology,* 37(5): 465-471.

Martin, H., Laswai, H. and Kulwa, K. 2010. Nutrient content and acceptability of Soybean based complementary food, *African Journal of Food, Agriculture, Nutrition and Development (AJFAND)*, 10: 2040-2049.

Srilakhmi, B. 2007. *Food Sciences.* 5th Edition printed by New Age International Publishers, 294-302.

USDA 2003, USDA Database for the flavonoid content of selected foods [accessed 2006] 3 April 2006. www.nal.usda.gov/fnic/foodcomp/Data/SRI81sri8.html.

USDA 2005, *National Nutrient Database for Standard Reference Release* 18. In, Agricultural Research Service.