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NUTRITIONAL EVALUATION OF "READY-TO-COOK" VALUE ADDED NUTRITIOUS MIXES

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ABSTRACT

The purpose of this paper is to study the nutritional composition of ready-to-cook value added nutritious mixture formulated by incorporating of seeds powder and dehydrated vegetables. It was analysed for proximate composition, protein, crude fibre, fat, beta carotene, ascorbic acid, iron and calcium. Protein content of R-T-C nutritious mixture was increased by 15.42% whereas fat content increased by 23.06 during processing. R-T-C mixture contained 297.66 mg/100 g of calcium and 3773.55 µg/100 g of β-carotene. Vitamin C content decreased during processing by 28.23%. The study indicated that nutritious mixture is a good source of various nutrients like proteins, crude fibre, beta-carotene, iron and calcium and its nutritional quality is superior to many other commonly used mixtures. Most accepted value added nutritious mix was stored in polythene & laminated aluminium pouch and evaluated further for shelf life quality.

KEYWORDS: Ready-to-Cook, Dehydrated, Value Added, Proximate Composition

INTRODUCTION

Traditional foods have become the first preference of the consumers. Many cereals based traditional foods have been processed and their instant mixes like instant *upma, instant idli mix,* and instant *dosa mix* have been developed. These ready-to cook mixtures are easily available to the consumer and also give the satisfaction of cooking by self but such mixes not contains all the nutrients in a balanced form as they are prepared by using refined cereals and pulses which are deficient in essential macro and micronutrients. As a consequence of demand for "partially processed" ready-to cook foods has rapidly increasing in developing countries. Supplementation and value addition are the most cost effective and supportable strategy to handle the problem of macronutrients and micronutrients deficiencies. Use of cereals and pulses as basic ingredients and nutrient rich foods like seeds and vegetables powder for value addition can become a plan for development of nutritious instant mixes.

Niger is an oilseed crop, which plays significant role in the food and nutritional security of the poorest of the poor tribal segment of Indian population (Rajpurohit 2011). It can supply 23.9g protein, 39.0g fat, 17.1g carbohydrate, 300mg calcium and 56.7mg iron per 100gm. The components of flaxseed also identified to exhibit the health benefits are fiber,

proteins, lignans and linolenic acid (Rathi and Mogra 2013).Flax seeds provides 18.3g protein, 42.2g fat, 29.0g carbohydrate, 255mg calcium, 5.7mg iron and 27.2g dietary fibre per 100gm (Gopalan 2010). It is a functional food that is rich in omega 3 fatty acids and antioxidants and is low in carbohydrates. In exploratory studies, flax seeds was incorporated in recipes, which resulted in a reduction in the glycemic index of the food items.(Mani *et al* 2011),.Oats is very good source of nutrients. It provides 13.6g protein, 42.2g fat, 62.8g carbohydrate, 50mg calcium, 3.8mg iron and 11.1g dietary fibre per 100gm (Gopalan 2010).The water-soluble, mixed-linkage β-glucan, a form of soluble dietary fibre, is considered the main biologically active component responsible for the capacity of many oat products to lower postprandial glycaemia and fasting plasma cholesterol in human subjects (Wang et al 2014),.

In terms of nutrition, bengal gram is an important legume with rich source of protein, folate and dietary fibre (Doke and Guha 2012).This investigation was carried out with an objective to enhance the nutritional value of traditional basic food *besan puda* with value addition of seeds powder (niger and flaxseeds) ,dehydrated vegetables and other nutritious ingredients.

METHODOLOGY

The ingredients required for formulation of ready to cook vegetable nutritious mixture were purchased from the market of Meerapur, Allahabad, Uttar Pradesh. The ingredients viz. bengal dal flour, oats flour, niger and flax seeds, tray-dried dehydrated onion, coriander leaves, beans, carrots and green chillies powder, salt, haldi, cumin seeds, were cleaned and stored for further research. A basic besan puda was standardized using the ingredients such as oats flour, seeds flour and dehydrated vegetables flour. Nine variations were tried by changing the proportion of ingredients. The prepared nutritious mixture from different variations was organoleptically evaluated for sensory characteristics by trained 7 panel members for its acceptability using five point ranking scale (Chowdhury et al 2011). Nine variations of value added vegetable ready-to-cook nutritious mix were formulated by changing the ingredients composition of basic *besan puda* and the products were prepared with shallow frying. The prepared nine variations of *nutritious mix* were evaluated organoleptically and nutritionally in comparison with basic variation and highly accepted variation was selected for further study.

Nutritional Evaluation of Standardized Basic and Value Added Ready-to-Cook Nutritious Mix

All the nine variation of value added ready-to-cook nutritious mixture & standardized basic *besan puda* mix were analyzed for nutritional quality assessment. The parameters analyzed were protein, total fat, crude fibre, calcium, iron by AOAC procedures (1990).Vitamin C in the mixtures were assessed by procedure of Gupta (2007) whereas carotene content was estimated by using the method prescribed by Rangana (2001).

Statistical Analysis

To analyze the data one way analysis of variance (ANOVA) was used to compare the differences in nutritional composition of products. The statistical analysis was carried out by using the statistical software (Graph pad prism for Windows Version 6.0).

RESULTS AND DISCUSSIONS

Nutritional Evaluation of Basic and Value Added Ready-to-Cook Nutritious Mixture

Nine variations of *ready-to-cook* prepared from value added *nutritious mix* and basic mix were evaluated for nutrient composition. All the variations were accepted by panellist and the best accepted variation was T5. "Table 1" shows the nutrient composition of the basic and value added ready-to-cook nutritious mix. Results evidenced that protein content of value added *nutritious mixtures* was higher in all the variations than basic. The statistical significant difference was noticed with protein content at 5% (2.46) and 1% (3.60) probability level**.** The results indicate that fat content of value added nutritious mixture was significantly more than basic at 5%($P<0.05$) and at 1% probability level ($P<0.01$).Previous investigation performed by Doke and Guha (2015) also reported the fat content of chickpea legumes increased during processing(16.7%). Fibre content of basic and value added ready-to-cook nutritious mix was 14.70 per cent & 20.59 (average value of all the variations) per cent respectively. Iron content of basic was 4.95 per cent & value added nutritious mixture recorded 11.7 per cent. It can be noticed that the value obtained for beta carotene and calcium content of the value added ready-to-cook nutritious mixture was significantly more due to the value addition of nutritious ingredients.

Statistical data indicated that beta carotene and calcium content of value added *nutritious mixture was* increased significantly at 5% ($P<0.05$) and at 1% probability level than basic product. The findings are in perfect correlation with the previous reports by Amruta and Co-workers also reported fibre and mineral content (1.60 and 2.63) of the value added instant *daliya* was significantly more due to the value addition of nutritious ingredients than the basic daliya(0.51 and 0.95). It indicated that in all the nine variations of ready-to-cook nutritious mixtures protein, fat, fibre, calcium, iron, and beta carotene contents were increased than the traditional basic mix except vitamin C content was lost during processing of dehydrated vegetables.

Table 1: Nutrient Compositions of Formulated "Ready-to-Cook" Nutritious Mixes

Parameters (Bengal Gram Flour :Seeds: Vegetables :Oats Powder)	Protein (G)	Fat (G)	Fibre (G)	Ca (Mg)	Fe (Mg)	Vit C (Mg)	Beta Caro-Tene (Mcg)
T_0 (100%)	16.80	4.90	14.70	116.88	4.95	16.68	432.4
T_1 (95%:2.5%:1.25%:1.25%)	21.0	6.30	20.40	260.82	11.7	4.45	1613.4
T_2 (90%:5%:2.5%:2.5%)	20.4	6.20	20.20	265.26	11.71	2.67	1924.8
T_3 (85%:5%:5%:5%)	18.51	6.12	20.32	276.24	11.7	4.62	2533.1
T_4 (80%:5%:7.5%:7.5%)	19.90	6.19	20.59	290.94	11.7	4.83	3129.0
T_5 (75%:5%:10%:10%)	19.40	5.28	19.50	284.85	11.5	3.91	3769.2
T_6 (70%:5%:12.5%:12.5%)	19.30	6.08	20.84	305.10	11.7	5.20	4377.4
T_7 (65%:5%:15%:15%)	18.70	6.10	21.03	327.60	11.7	5.33	4941.6
T_8 (60%:5%:17.5%:17.5%)	18.76	6.00	21.14	325.62	11.7	5.59	5451.6
T_9 (55%:5%:20%:20%)	18.51	6.00	21.30	342.48	11.7	5.80	6221.8

F(cal)= (Ftab=2.46) (P>0.5%)	**47.80***	**122.8***	**2064***	**4892.2***	**423.7***	**3871***	**90.88***
CD=	**0.23**	**0.55**	**0.06**	**0.12**	**0.05**	**0.08**	**0.26**

CONCLUSIONS

It can be concluded from the results that the formulation of ready to cook nutritious mixture enhances the nutritional quality than the basic traditional mix and can be useful for making different food products. All the nine variations from T1 to T8 were falls in the category of hedonic scale, liked very much to neither like or dislike except T9 which was dislike slightly by the panellist as in this the percentage of dehydrated vegetables and oats were higher than other combinations and it gives sticky mouth feel.T9 variation mixture provides high calcium and beta carotene than all the other variation and can be used for making other dish like "*besan gatta curry*" which helps in preventing calcium and beta carotene deficiencies in pregnant women and children.

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