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Process for the Preparation of Value Added *Instant Tomato-mushroom Soup Mix* Incorporated with Psyllium Husk and its Quality Evaluation

***Anjali Verma and **Renu Mogra**

Deptt. of Foods & Nutrition, College of Home Science MPUAT, Udaipur, Rajasthan

*Corresponding Author E-mail: anjali190191@gmail.com

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ABSTRACT

The present study was carried out with objectives to develop value added instant tomato-mushroom soup mix using psyllium husk powder and its quality evaluation. The overall acceptability scores of developed instant soup mixes revealed that 2 per cent incorporation of psyllium husk powder was found most acceptable (7.74±0.03) among other combinations. Tomato-mushroom soup mix was found to contain 5.14±0.02g moisture, 7.95±0.03g crude protein, 1.46±0.02g crude fat, 2.53±0.01g total ash, 7.84±0.03g crude fibre, 75.07±0.11g carbohydrate, 341.29±0.96kcal energy, 11.42±0.02g total dietary fibre, 93.89±0.04mg calcium, 2.12±0.02mg iron and 148.52±0.05mg phosphorous, 42.19±1.77 per cent in-vitro protein digestibility and 0.280±0.005 mg (13.2%) in-vitro iron bioavailability per 100g. Thus, it can be concluded from the results that the developed instant vegetable soup mix was good in acceptability nutritionally good especially rich in total dietary fibre content.

Key words: *Psyllium husk powder, physico-chemical characteristics, In-vitro protein digestibility, In-vitro iron bioavailability, fibre*

INTRODUCTION

Now a day, the attention is focused on the development of products with health claims on the label, which can result in value-added products for the producer companies. A fibre-rich diet is lower in energy density, often has a lower fat content, and is larger in volume. This larger mass of food takes longer to eat and its presence in the stomach may bring a feeling of satiety sooner, although this feeling of fullness is short term. According to Anderson *et al.*[2], more effective communication and consumer education is required to enhance fiber consumption from foods or supplements.

As a type of dietary fiber, psyllium, which mainly grows in India, is known as a mucilaginous material. Due to its strong water-holding capacity and gel-forming ability, psyllium has been used for treatment of constipation for a long time.

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However, recent studies on psyllium implicated that the beneficial effect associated with consumption of psyllium as a dietary fiber source may not only be limited to its laxative effect. Copious evidence showed that psyllium can also present functions such as lowering cholesterol, hypoglycemia, as well as preventing cancers[10]. The FDA has approved the use of food products containing psyllium husk due to its associated health claims[5].

OBJECTIVES

The present study was carried out with the objectives:

1. To develop value added instant tomato-mushroom soup mix using psyllium husk powder.
2. To evaluate the quality (Physico-chemical and nutritional quality) of developed instant tomato-mushroom soup mix.

MATERIALS AND METHODS

Procurement of raw materials: Raw ingredients were procured in a single lot from the local market of Udaipur, Rajasthan to avoid varietal difference.

Processing of raw materials: Simple techniques were used for the processing of psyllium husk and other ingredients. Psyllium husk was dried in an electrical oven and powdered. Vegetables such as tomato, ginger, coriander leaves and mushrooms were sorted and washed under running water to remove damaged part, dust particles and other impurities. They were cut in small pieces and dried in oven. Dried materials were ground separately in a mixer grinder to prepare powder.

Standardization and preparation: Standardization was done in terms of ingredients, amounts, processing steps and sensory qualities of products. For the purpose, basic ingredient of instant tomato-mushroom soup mix was replaced with psyllium husk powder in different proportion to find out best combination. Instant tomato-mushroom soup mix in which tomato powder was replaced by psyllium husk powder at different levels as 2 per cent, 4 per cent, 6 per cent and 8 per cent, were prepared and the soups were reconstituted from prepared mixes and evaluated for sensory characteristics.

Table 1: Standardized recipe of instant tomato-mushroom soup

Ingredients	Control	T_1 (2%)	T_2 (4%)	T_3 (6%)	T_4 (8%)
Tomato powder (g)	12	11.60	11.20	10.80	10.40
Mushroom powder (g)	8	8	8	8	8
Psyllium husk powder (g)	-	0.40	0.80	1.20	1.60
Coriander leaves powder (g)	2	2	2	2	2
Ginger powder (g)	1	1	1	1	1
Corn flour (g)	10	10	10	10	10
Kashmiri mirch (g)	1	1	1	1	1
Cumin seed powder	2	2	2	2	2
White pepper powder (g)	1	1	1	1	1
Salt (g)	5	5	5	5	5
Butter (g)	5	5	5	5	5
Water (ml)	150	225	275	300	375

Procedure:

All the dry ingredients were mixed. Boiled with water and cooked at low flame for 3-4 minutes. Cholesterol free butter (five g) and white pepper powder were added and soup was served hot.

Sensory Evaluation: Acceptability of the products was assessed on 9-point Hedonic scale with the help of selected panel of judges. The panelist was asked to record the level of liking or disliking by giving marks for various characteristics of the products as taste, flavour,

texture, colour and appearance and overall acceptability.

Quality assessment: Developed instant mixes were subjected to the following quality characteristics in the present investigation:

1. Physico-chemical properties (Wettability, water and oil absorption capacity, viscosity, swelling index and bulk density)
2. Nutritional evaluation (Proximate, total dietary fibre and minerals content and *in-vitro* protein disability and iron bioavailability)

Statistical Analysis: Analysis of variance (ANOVA) one- way classification was applied to determine the significant difference in sensory characteristics for assessing the acceptability of developed instant soup mixes with different combination for the selection of instant mix formulation. Paired 't' test was used to assess the physico-chemical characteristics, nutritional characteristics, mineral profile, *in-vitro* protein digestibility and *in-vitro* iron bioavailability of developed instant soup mix.

RESULTS AND DISCUSSION

Sensory Evaluation: Results of the sensory evaluation of the tomato-mushroom soup prepared by incorporating 2, 4, 6 and 8 per cent of psyllium husk powder along with control are presented in Table 2. Data reveals that the products fell in the category of liked slightly to liked very much. Among all the treatments T_1 (2% incorporation of psyllium husk powder) showed the highest score for all the sensory characteristics viz., colour (8.27±0.04), flavour (7.90±0.10), taste (7.66±0.15), consistency (7.30±0.10), appearance (7.53±0.15) and overall acceptability (7.74±0.03). Significant difference ($p \leq 0.01$) was found for all sensory attributes except colour between them. With regards to overall acceptability, it was observed that T_1 was liked the most followed by T_2, T_3 and T_4. Therefore, T_1 (2% incorporation of psyllium husk powder) of tomato-mushroom soup was selected for further study to prepare tomato-mushroom soup mix.

Ziai *et al.*[11] reported that psyllium husk is used in food, pharmaceutical and cosmetic industry. In foods, it is used in ice cream, instant juices, and breakfast cereals and in bakery products like biscuits, cakes, breads and muffins with varying functional and health aspects.

Kamaljit *et al.*[6] conducted a study in which the oat fiber and psyllium husk were incorporated at levels of 0, 1, 2, 3, 4 and 5 per cent in wheat flour on percentage weight basis for preparation of bread according to standard AACC methods. Oat fiber at 5 per cent and psyllium husk at 3 per cent levels were found best for bread and accepted sensorily.

Table: 2: Mean±SD score of sensory evaluation of tomato-mushroom soup

S.No.	Products	Sensory attributes					
		Colour	Flavour	Taste	Consistency	Appearance	Overall acceptability
1.	Control	8.26±0.05	8.16±0.05	8.33±0.15	8.36±0.11	8.43±0.11	8.32±0.08
2.	T_1	8.27±0.04	7.90±0.10	7.66±0.15	7.30±0.10	7.53±0.15	7.74±0.03
3.	T_2	8.26±0.05	7.80±0.10	7.43±0.15	6.86±0.05	7.36±0.15	7.55±0.08
4.	T_3	8.23±0.05	7.90±0.00	5.93±0.15	5.66±0.05	6.26±0.23	6.80±0.01
5.	T_4	8.23±0.05	7.36±0.11	5.56±0.37	5.26±0.15	6.00±0.10	6.47±0.10
	SE	0.0316	0.0494	0.1256	0.0596	0.0907	0.0409
	CD5%	NS	0.1558**	0.3958**	0.1879**	0.2857**	0.1288**

All the values are (Mean±SD) of three observations

T_1- 2 per cent, T_2- 4 per cent, T_3-6 per cent and T_4-8 per cent incorporation of psyllium husk powder

SE- Standard Error, NS- Non Significant, **- Significant at 1 per cent level

Physico-chemical properties: Physico-chemical properties of control and developed psyllium husk powder incorporated (at 2% level) tomato-mushroom soup have been presented in Table 3. Result reveals that mean value of psyllium husk powder incorporated tomato-mushroom soup mix were 28.66±1.52, 233.00±1.63, 146.10±0.65, 2.370±0.06, 96.26±0.40 and 0.74±0.01 in wettability, water absorption capacity, oil absorption capacity, swelling index, viscosity and bulk density respectively. The wettability, water absorption capacity, oil absorption capacity, swelling index and viscosity of psyllium husk powder incorporated tomato-mushroom soup mix were observed to increase significantly ($p \leq 0.01$) when compared with control.

Makala[7] showed that the applied nutritional fibre (Psyllium husk) confers good functional properties to the model product as meat products. Psyllium husk caused an increase in the batter's stability, as demonstrated by good water binding and holding capacity and a significant limitation of thermal drips. According to Fischer *et al.*[4] gel-forming fraction of the alkali extractable polysaccharides of psyllium are composed of arabinose, xylose and traces of other sugars. Husk obtained after milling is white hydrophilic material forming clear and colorless mucilaginous gel after water absorption. Its carboxymethyle derivative is fibrous and mucilaginous in taste.

Further Al-Assaf *et al.*[1] demonstrated that a factor in physiological fibre behavior of psyllium gum is its high viscosity and gel-like character in water.

Table: 3: Physico-chemical properties of tomato- mushroom soup mix

Physico-chemical Properties	Control	Tomato- Mushroom Soup Mix	SE	t-value
Wettability (Seconds)	18.66±1.15	28.66±1.52	1.10	9.045**
Water Absorption Capacity (%)	139.60±4.03	233.00±1.63	2.51	37.162**
Oil Absorption Capacity (%)	104.56±1.23	146.10±0.65	0.80	51.472**
Swelling Index (%)	1.625±0.00	2.370±0.06	0.03	20.126**
Viscosity (mPa.s)	47.23±0.55	96.26±0.40	0.39	124.323**
Bulk Density (g/ml)	0.73±0.00	0.74±0.01	0.00	NS

All the values are (Mean±SD) of three observations
SE- Standard Error, NS- Non Significant, **- Significant at 1 per cent level

Nutritional evaluation: Data regarding the nutrient composition of tomato-mushroom soup mix have been presented in Table 4. Persual of data in the table clearly shows that psyllium husk powder incorporated tomato-mushroom soup mix were found to contain 5.14±0.02g moisture, 7.95±0.03g crude protein, 1.46±0.02g crude fat, 2.53±0.01g total ash, 7.84±0.03g crude fibre, 75.07±0.11g carbohydrate and 341.29±0.96kcal energy per 100g. Total dietary fibre content was found to be 11.42±0.02g for psyllium husk powder incorporated tomato- mushroom soup whereas it was 10.08±0.03g for control sample. Statistically significant difference was observed in the crude fat at 5 per cent level and in the total ash content at 1 per cent level. The total dietary fibre content was observed to be higher than control sample ($p \leq 0.01$). Results shows that psyllium husk powder incorporated tomato-mushroom soup mix contained 93.89±0.04 mg of calcium, 2.12±0.02 mg of iron and 148.52±0.05 mg of phosphorous per 100g. Statistically significant difference ($p \leq 0.05$) was found for all the minerals. Perusal of data shows *In-vitro* protein digestibility and In-vitro iron bioavailability of psyllium husk incorporated

tomato-mushroom soup mix were 42.19±1.77 per cent and 0.280±0.005 mg (13.2 per cent) respectively.

Psyllium is an active compound in preventing and curing various ailments. These characteristics make this substance vital for functional foods and nutraceutical products. Arabinoxylans the active ingredient in psyllium husk had imperative physiological functions. The addition in meal, functional food and its administration in nutraceutical products can provide better healthy human livings[8]. Accoring to Saeed *et al.*[9], the nutraceutical and functional importance of food is often associated with the presence of bioactive molecules. Among the group of nutraceuticaly important foods, dietary fiber and its different fractions have attained immense importance.

Dhar *et al.*[3] stated that psyllium Husk may also be added to fresh fruit drinks or flavored drinks to improve the mouth-feel of the drink and make it richer and impart good consistency to it. In food and beverage industry psyllium is use to Improves softness and body texture, to provide strength as binder and stabilizer.

Table: 4: Nutritional evaluation of tomato-mushroom soup mix (per 100g on dry weight basis)

S.No.	Nutrients	Control	Developed Tomato-mushroom Soup Mix	SE	t-value
1.	Moisture (g)	5.16±0.05	5.14±0.02	0.036	NS
2.	Crude Protein (g)	8.00±0.10	7.95±0.03	0.062	NS
3.	Crude Fat (g)	1.56±0.01	1.46±0.02	0.014	7.320*
4.	Total ash (g)	2.28±0.01	2.53±0.01	0.010	25.351**
5.	Crude fibre (g)	7.78±0.15	7.84±0.03	0.093	NS
6.	Carbohydrate (g)	75.19±0.21	75.07±0.11	0.0671	NS
7.	Energy (kcal)	346.86±0.81	341.29±0.96	4.048	NS
8.	Total Dietary fibre (g)	10.08±0.03	11.42±0.02	0.023	58.784**
9.	Calcium (mg)	94.36±0.17	93.89±0.04	0.102	4.616*
10.	Iron (mg)	2.27±0.03	2.12±0.02	0.025	5.777*
11.	Phosphorous (mg)	148.67±0.04	148.52±0.05	0.038	3.932*
12.	*In-vitro* protein digestibility (%)	42.73±1.23	42.19±1.77	1.247	NS
13.	*In-vitro* iron bioavailability (mg)	0.31±0.002	0.280±0.005	0.003	10.494**

All the values are (Mean±SD) of three observations

SE- Standard Error, NS- Non Significant, *- significant at 5 per cent level, **- significant at 1 per cent level

SUMMARY AND CONCLUSION

Sensory acceptability of instant tomato-mushroom soup mix depicted that 2 per cent incorporation of psyllium husk powder was found highly acceptable as compared to other combinatons. Physico-chemical characteristics were found desirable for development of instant soup mix and evaluation of nutritional quality revealed that developed instant soup mix nutritionally was rich in total dietary fibre. On the basis of the results, it was concluded that the health condition of people may benefit from an increased consumption of psyllium as a source of dietary fiber. Incorporating psyllium into food products might be a good way via which a sufficient intake of psyllium will be accomplished.

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REFERENCES

1. Al-Assaf, S. A., Phillips, G. O., Williams, P. A., Takigami, S., Dettmar, P. and Havler, M., Molecular weight, tertiary structure, water binding and colon behaviour of ispaghula husk fibre. *Proc. Nutr. Soc.*, **62(1):** 211-216 (2003).
2. Anderson, J.W., Richard, P.B., Davis, J. H., Ferreri, S., Knudtson, M. Koraym, A., Waters, V. and Williams, C. L., Health benefits of dietary fiber. *Nutrition reviews*, pp. 188-205 (2009).
3. Dhar, M. K., Kaul, S., Jamwal, S., Plantago ovata Forsk. In: Gupta SK (ed.) Plant Breeding: Theory and Techniques. *India Agrobios*, pp. 56-67 (2000).
4. Fischer M. H., Yu, N., Gray, G. R., Ralp, J., Anderson L. and Marlett, J. A. The gel-forming polysaccharide of psyllium husk (*Plantago ovata* Forsk). *Carbohyd. Res.*, **339:** 2009-2017 (2004).
5. Leeds, A. R., Dietary Fiber; Role in Nutrition Management of Disease. In: Guide to Nutritional Supplements. Caballero, B. (ed.). Academic press, USA (2009).
6. Kamaljit, K., Amarjeet, K., Pal, S. T. Analysis of ingredients, functionality, formulation optimization and shelf life evaluation of high fiber bread. *Am. J. Food Technol.*, **6(4):** 306-313 (2011).
7. Makala, H., Application of psyllium husk as functional additive in comminuted meat products. Rocz. Inst. Przem. Miesni. Tl., **41:** 233-244 (2004).
8. Qaisrani, T. B., Qaisrani, M.M. and Qaisrani, T. M., Arabinoxylans from psyllium husk: A review. *J. Environ. Agri. Sci.*, **6:** 33-39 (2016).
9. Saeed, F., Pasha, I., Anjum, F. M. and Sultan, J. I., Water-extractable arabinoxylan content in milling fractions of spring wheats. *CyTA J. Food*, **9:** 43-48 (2011).
10. Yu, L., Lutterodt, H. and Cheng, Z., Beneficial health properties of psyllium and approaches to improve its functionality. *Adv. in Food and Nutr. Res.*, **55:** 193-217 (2009).
11. Ziai, S. A., Larijani, B., Akhoondzadeh, S., Fakhrzadeh, H., Dastpak, A., Bandarian, F., Rezai, A., Badi, H. N. and Emami, T., Psyllium decreased serum glucose and glycosylated hemoglobin significantly in diabetic outpatients. *J. Ethnopharmacol.*, **102:** 202-207 (2005).