Organoleptic Evaluation of Papaya Incorporated Extruded Products

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ABSTRACT India is devoted to agriculture and lies in forefront for its produce. In order to sustain and utilise agricultural produce, food processing and preservation are important. Processed food products include instant mixes, extruded products and fruit based beverages. The studies on Ready to Prepare products with respect to extruded products are more. Yet studies on extrudedproducts incorporating fruits/ vegetables are less. Hence a study on "Organoleptic Evaluation of papaya incorporated Extruded Products" was conducted with the objective to develop and evaluate a mix incorporated with papaya and extruding the same. The organoleptic evaluation was done using five point rating scale. Papaya incorporated at five per cent was judged best among the incorporations. Theproximate and vitamin content were analysed for best accepted incorporations. The quality characteristics like cooked weight, rehydration ratio, cooking time were also evaluated. Cooked weight increased and cooking time decreased after dry roasting raw extruded products.

Introduction:

The versatility, high productivity, low operating costs, energy efficiency, shorter cooking times(El-Hadyand Habiba, 2003), least damage to nutritional abilities,appropriate sensory attributes and long shelf life (Bergman, gulberto and Weber, 1994) and unique product shapes(Koksel et al.,2004)are the advantages of extrusion.Extruded products include Linguini,macroni, sphagetti, vermicelli, noodles.

The concept of extrusion is not new in India. Subbulakshmi (2001) reveals that simple mechanical extrusion are being practised in India since long time and snacks like "sev" and "murrukku" are prepared at household level. Extruded pasta products were traditionally made only from durum wheat and extruded snacks with rice flour and gram flour in India. Due to the effort of many researchers, the pasta products were blended with protein rich ingredients. The fortification of vitamins and minerals can be by the addition of fruits and or vegetables. Many studies on extruded products with different formulations are available yet the studies with incorporation of fruits and vegetables are limited.Hence a study entitled "Organoleptic Evaluation of Papaya Incorporated Extruded Products" was conducted.

The objectives of the study were to develop processed flour with incorporation of semi riped papaya powder. And also to analysis its organoleptic quality, nutrient content and quality features.

Experimental Methodology
Ingredients Selection

The selection of ingredients for development of nutritious mix was based on availability, nutrient content and cost. The ingredients include whole wheat flour (45 per cent) as base. The other ingredients include red gram dhal(10 per cent), green gram dhal (5 per cent), groundnut (10 per cent), wheat bran (2.5 per cent), corn flour (12.5 per cent), rice flakes (5 per cent), oats (5 per cent) and skim milk powder (5 per cent). The raw materials were processed and mixed as mentioned and pulverised. The pulverised flour was extruded through hand extruder and also as ver-

micelli and swirl shaped pasta mechanically.

The pulverised ingredients were mixed with water and steamed, tempered and extruded through a hand extruder in the shape of noodles. The extruded noodles were sun dried for a five hours. The dried noodles was packed and stored.

Semi ripe papaya was selected and skin was peeled and deseeded and cut into cubes and sun dried for a period of eight hours. The dried papaya cubes were powdered and packed air tight. The papaya powder was added to the processed flour as 2.5, 5.00, 7.50 and 10.00%.

organoleptic evaluation

The hand extruded noodles were organoleptically evaluated with selected recipes using five point rating scale. The best accepted incorporation was identified with selected recipes and best accepted incorporation wasmechanically extruded.

Analysis of nutrients and quality characteristics

The proximate contents were analysed by AOAC (2006)for best accepted incorporations. Vitamins like Beta carotene was analysed by HPLC method and thiamine and riboflavin were analysed by fluorimetric method.

The quality characteristics of the best accepted incorporations were evaluatedin raw form before and after dry roasting the product. A slight colour change was noted as end point within three to five minutes.Cooking time was determined by placing the sample between the glass slides after boiling in water. The end point was complete mashing between the slides. Wettability of the accepted samples was evaluated by the method suggested by Srilakshmi (2005); rehydration ratio and per centage water in the rehydrated sample was analysed according to NIIR (2002) specifications.

The results obtained are tabulated and discussed with cited literatures.

Results and Discussion
Table I
Organoleptic Evaluation of Recipes Prepared Using Papaya Incorporated Hand Extruded Noodles

Criteria (percentage)	Colour and appearance (5)	Taste (5)	Texture (5)	Flavour (5)	Overall acceptability (5)	Total (25)
Vegetable noodles						
2.5	3.78	3.52	3.84	3.28	3.52	17.94
5.0	3.52	4.00	3.88	3.40	3.48	18.24
7.5	3.44	3.80	3.12	3.32	3.00	16.68
10.0	3.60	3.36	3.20	3.44	3.90	17.52
Pakoda						
2.5	3.52	3.80	3.80	3.92	3.04	18.08
5.0	3.72	3.72	3.36	3.64	3.80	18.24
7.5	3.24	3.28	3.92	3.48	3.04	18.08
10.0	2.88	3.04	3.24	3.28	3.36	15.80
Tomato bhath						
2.5	3.44	3.28	3.04	3.32	3.32	16.40
5.0	3.44	3.12	3.00	3.24	3.24	16.04
7.5	3.40	3.04	2.96	3.16	3.28	15.84
10.0	3.36	3.28	3.44	3.20	3.52	16.80
Payasam						
2.5	3.52	3.28	3.72	3.92	3.96	18.40
5.0	3.56	3.16	3.56	3.36	3.68	17.32
7.5	3.48	3.52	3.76	3.24	4.00	18.00
10.0	3.56	3.84	3.80	3.48	3.84	18.52
souP						
2.5	3.72	3.76	3.58	2.96	3.72	17.74
5.0	3.72	3.84	3.24	3.44	3.84	18.08
7.5	3.64	3.84	3.36	3.28	3.80	17.92
10.0	3.52	3.52	3.00	3.32	3.48	16.48

Table II
Organoleptic Evaluation of Recipes Prepared Vermicelli and Swirl Shaped Pasta

Recipes	Colour and appearance (5)	Taste (5)	Texture (5)	Flavour (5)	Overall acceptability (5)	Total (25)
Payasam						
Vermicelli	3.84	3.44	3.56	3.36	3.56	17.76
SSP	3.52	3.80	3.32	3.72	3.64	18.00
Soup						
Vermicelli	3.28	3.76	2.76	3.42	3.52	16.74
SSP	3.96	3.68	3.76	3.48	3.20	18.08
Veg. vermicelli and pasta						
Vermicelli	3.56	4.16	2.96	2.36	3.84	16.88
SSP	4.04	3.92	3.12	3.04	3.62	17.74
Pakoda						
Vermicelli	3.56	3.56	3.16	3.36	3.28	16.92
SSP	3.08	2.76	2.80	3.08	3.28	15.00
Tomato vermicelli and pasta						
Vermicelli	3.32	3.20	3.12	3.44	3.20	16.28
SSP	2.52	3.32	2.52	2.32	2.23	12.91

Table I and II depicts the results of organoleptic evaluation recipes prepared with extruded products. The taste scores of all prepared hand extrusion recipes were between 3.04 and 4.00 out of five rating. From the above evaluated recipes, the total scores were found to be more than 18 out 25 in three recipes for five per cent incorporation. Thus five per cent incorporation was considered as best among the four incorporations.

The taste of vegetable vermicelli was judged with the maximum score of 4.16 when compared to other recipes. Yet the total score of vegetable pasta was more as 17.74 and 16.88 for vegetable vermicelli. The most accepted recipe was judged as soup prepared with swirl shaped pasta with the total score of 18.08.

Table-III
Nutritional Parameters of Best Accepted Extruded Products

CRITERIA (100g)	Hand Extruded Noodles	Machine Extruded Noodles	Machine Extruded Swirl Shaped Pasta
Moisture(%)	9.05	8.00	8.75
Protein(g)	15.20	11.00	11.75
Fat(g)	8.30	5.75	5.75
Ash(g)	3.50	3.60	3.80
Crude fiber(g)	2.15	1.98	1.32
-carotene(μg)	300.58	327.92	324.85
Vitamin B1(mg)	0.23	0.29	0.26
Vitamin B2(mg)	0.12	0.16	0.17
Calcium(mg)	120.32	118.80	122.40
Phosphorous(mg)	355.00	355.00	355.00
Iron(mg)	4.00	2.00	2.00

Table III provides the data for nutrient content of best accepted incorporations. Fortification or supplementation of vitamins and minerals in food materials keeps public health problems in bay (Tait and Teucher, 2002). Hayter(1993) viewed that pasta products are low in fat, high in fiber and a good source of protein. The protein content of the accepted incorporations was 15.20g, 11.00g and 11.75g for noodles, vermicelli and pasta respectively. Plahar et al., (2003) developed extruded weaning foods with protein rich foods and protein content of the developed foods ranged between 16.5 and 18.7 per cent. Also Konstanceet al., (1998) prepared high protein soy products with corn meal and soy bean oil with protein content of 8 per cent. Mridula et al., (2006) observed an increase in protein ,fat, ash content of noodles prepared with the incorporation of defatted mustard flour with wheat flour. The fat content of the accepted incorporations was 8.30g for noodles and 5.75g for mechanical extrusions. The phosphorous content of all the accepted products were 355mg per 100g.

Table-IV
Quality Characteristics of Best Accepted Extruded Products

criteria	Cooking time (g)	Cooked weight (g)	Rehydration Ratio (1:x)	Percentage water in Rehydrated material	Wettability (g)
Hand Extruded Noodles					
Before roasting	7.0	+94	1:1.94	48.45	+40.8
After roasting	5.0	+116	1:2.01	53.70	+114.0

Machine extruded Noodles					
Before roasting	4.5	+32	1:1.31	24.24	+54.5
After roasting	3.0	+92	1:1.92	47.92	+116.2
Machine Extruded Swirl Shaped Pasta					
Before roasting	7.5	+102	1:1.31	50.49	+25.6
After roasting	4.7	+124	1:1.92	55.36	+55.8

Table- IV depicts the results of quality characteristics best accepted incorporations. The quality characteristics of best accepted papaya incorporations like cooked weight, rehydration ratio, percentage water in rehydrated material and wettability were found to be inclined after dry roasting the raw extruded products. Cooking time decreased with drying roasting of the product. The wettability of the swirl shaped pasta was addition of 14.4 before roasting and an addition of 21.6 after roasting. The cooked weight of vermicelli prepared using whole wheat flour and finger millet increased by 3.8 times (Sudha et al., 1998). The addition of pigeon pea increases the cooked weight of the pasta product (Anonymous, 2006).

The cooking quality of the pasta was influenced by raw material and cooking conditions. The rehydration ratio of pasta products incorporated with rice broken was 3.11 Raina et al., (2007). The rehydration ratio was 1:1.31 before roasting and 1:1.92 after roasting of mechanically extruded accepted incorporations.

Conclusion:
The developed papaya incorporations were accepted at five per cent level. The nutrient content of the accepted incorporations are also found to be satisfactory.

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