

EFFECT OF ENRICHMENT OF EXTRUDED PRODUCTS WITH DIFFERENT LEVELS OF WHEY PROTEIN CONCENTRATE (WPC) AND CASEINATES.

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ABSTRACT

Keeping in view all the above factors, the present study is aimed to prepare, extruded products enriched with different levels of whey protein concentrate (WPC) and caseinates. In this background the proposed research paper is aimed at the following objectives.

To study the effect of enrichment of extruded products with different levels of Whey Protein Concentrate (WPC).

To evaluate the proximate composition of developed products.

INTRODUCTION

Extrusion cooking of cereals is widely practiced. Extruded cereals command a significant share of the snack foods in the market. The nutrient density of snack foods has been low and has stigmatized these products as 'junk' foods. Fortification with milk proteins to enhance nutritional quality has been limited due to adverse effects of protein supplementation in significant amounts. Inclusion of whey proteins, casienates and some other milk proteins will improves the textural as well as nutritional properties of extruded products (Guha *et al.*, 1997).

METHODOLOGY:

RESULTS:

Process optimization to enrich the milk and cereal based noodles like product with Whey Protein Concentrate (WPC).

Whey protein posse's very good functional properties such as solubility, foaming, gelling, emulsifying and water binding properties.

Owing to its functional propertie, It had wide range of applications in the food industry. To enrich milk and cereal based noodles like products in this study WPC were incorporated. Previously standardized product with Ragi and Rice, Wheat and Rice, with that the different combinations of WPC at 2, 4, 6 and 8 per cent level had tried and the products which secured highest score upon sensory evolution was used for further studies.

Table 1: Sensory characteristics of ragi and rice flour blended ready to cook extruded milk-cereal based noodles like products varied in whey protein concentrate (WPC) levels.

WPC (%)	Color & Appearance	Body and Texture	Flavor	Overall Acceptability
0	6.33 ^a	6.66 ^a	6.00 ^a	6.66 ^a
2	6.66 ^a	6.66 ^a	6.66 ^b	7.00 ^a
4	7.33 ^a	7.33 ^a	7.66 ^b	7.33 ^a
6	8.00 ^a	8.33 ^a	7.33 ^b	7.00 ^a
8	8.66 ^a	8.33 ^a	7.66 ^b	7.66 ^a
F-Value	4.10	6.30	5.87	1.08
Pr>F Value	0.0320	0.0085	0.0107	0.4152
C D	2.48	1.75	1.57	1.92

Note: All values are average of three trials, Figures with the same superscripts in a column indicates no significant difference at P<0.01 level

0- Control (without WPC)

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The WPC (whey protein concentrate) was used at four different levels i.e., at 2, 4, 6 and 8 per cent to enrich the ragi and rice flour blended ready to cook milk and cereal based noodles like products. From the investigation it was proved that addition of WPC at 8 per cent level was beneficial because 2, 4 and 6 per cent level did not show any desirable changes. The 8 per cent level secured highest marks (7.66) on overall acceptability compare to other levels. Thus incorporation of 8 per cent WPC was selected for further studies.

Table 2: Proximate composition of ragi and rice flour blended ready to cook extruded milk-cereal based noodles like products varied in WPC levels.

WPC (%)	Moisture g (%)	Protein g (%)	Fat g (%)	Fibre g (%)	Ash g (%)	Carbohydrates g (%)
0	6.81 ^a	15.62 ^a	15.61 ^a	1.35 ^a	7.72 ^a	52.87 ^a
2	6.82 ^a	16.19 ^b	15.69 ^b	1.38 ^a	7.80 ^b	52.10 ^b
4	6.86 ^a	16.90 ^c	15.75 ^b	1.40 ^b	7.86 ^b	51.22 ^c
6	6.86 ^a	17.02 ^d	15.81 ^c	1.40 ^b	7.90 ^{bc}	50.95 ^d
8	6.86 ^a	17.26 ^e	15.84 ^c	1.39 ^{bc}	7.93 ^{cd}	50.71 ^e
F-Value	1.99	1008.53	48.29	8.17	42.48	545.66
Pr>F Value	0.1724	<.0001	<.0001	0.0034	<.0001	<.0001
C D	0.08	0.11	0.07	0.05	0.06	0.20

Note: All values are average of three trials

Figures with the same superscripts in a column indicates no significant difference at P<0.01 level

0- Control (without WPC)

The incorporation of WPC into ragi and rice flour blended ready to cook milk and cereal based noodles like products significantly varies the chemical composition. So the chemical analysis of different levels of WPC incorporated ragi and rice flour blended Ready To Cook Milk and Cereal Based Noodles like products were analyzed. This results showed that 8 per cent level incorporation was beneficial with the increase of protein percentage to 17.26 as against 15.62 in control, fat percentage to 15.84 as against 15.61 in control similarly fibre, ash and carbohydrates per centage of 1.39, 7.93 and 50.71 as against 1.35, 7.72 and 52.87 respectively.

Table 3: Sensory characteristics of wheat and rice flour blended ready to cook extruded milk-cereal based noodles like products varied in WPC levels.

WPC (%)	Color & Appearance	Body and Texture	Flavor	Overall Acceptability
0	6.33 ^a	6.66 ^a	6.66 ^a	6.00 ^a
2	6.66 ^a	6.33 ^a	7.00 ^a	6.66 ^a
4	7.00 ^a	7.33 ^a	7.33 ^a	7.33 ^a
6	8.33 ^a	8.33 ^b	7.66 ^a	8.66 ^b
8	6.66 ^a	6.00 ^a	6.33 ^a	6.66 ^a
F-Value	2.75	5.50	1.79	6.57
Pr>F Value	0.0886	0.0132	0.2083	0.0073
C D	2.48	2.08	2.08	2.08

Note: All values are average of three trials

Figures with the same superscripts in a column indicates no significant difference at P<0.01 level

0- Control (without WPC)

The WPC was used at four different levels i.e., at 2, 4, 6 and 8 per cent to enrich the wheat and rice flour blended ready to cook milk and cereal based noodles like products. From the investigation it was proved that addition of WPC at 6 per cent level was beneficial because 2 and 4 per cent level did not show any desirable changes. At 8 per cent level product showed, increased hardness, intense colour. The 6 per cent level secured highest marks (8.33) on overall acceptability compare to other levels. Thus incorporation of 6 per cent WPC was selected for further studies.

Table 4: Effect of different levels of WPC on proximate composition of wheat and rice flour blended ready to cook extruded milk-cereal based noodles like products.

WPC (%)	Moisture g (%)	Protein g (%)	Fat g (%)	Fibre g (%)	Ash g (%)	Carbohydrates g (%)
0	10.82 ^a	10.74 ^a	9.82 ^a	3.82 ^a	7.70 ^a	57.08 ^a
2	10.73 ^{ab}	11.02 ^b	9.93 ^b	3.84 ^a	7.76 ^a	56.70 ^b
4	10.65 ^{bc}	11.26 ^c	9.96 ^{bc}	3.85 ^a	7.80 ^b	56.47 ^c
6	10.65 ^{bc}	11.56 ^d	10.03 ^c	3.86 ^a	7.84 ^{bc}	56.04 ^d
8	10.61 ^c	11.92 ^e	10.03 ^c	3.83 ^a	7.84 ^{bc}	55.75 ^e
F-Value	14.39	165.50	34.55	0.95	25.43	157.11
Pr>F Value	0.0004	<.0001	<.0001	0.474	<.0001	<.0001
C D	0.11	0.18	0.07	0.08	0.06	0.22

Note: All values are average of three trials

Figures with the same superscripts in a column indicates no significant difference at P<0.01 level

0- Control (without WPC)

The incorporation of WPC into wheat and rice flour blended ready to cook milk and cereal based noodles like products significantly varies the chemical composition. So the chemical analysis of different levels of WPC incorporated wheat and rice flour blended ready to cook milk and cereal based noodles like products were analyzed. These results showed that 6 per cent level incorporation was beneficial with the chemical composition of 10.65, 11.56, 10.03, 3.86, 7.84 and 56.04 per cent moisture, protein, fat, fibre, ash and carbohydrates respectively which matches to results pertaining to Gangadhkar (2003).

Summary and conclusion:

Milk and Cereal based Noodles like products were prepared using ragi and rice flour combination enriched with 8 per cent WPC. And wheat and rice flour combination enriched with 6 per cent WPC separately. These products showed very good sensory scores, good nutritional composition and better acceptable levels. The technology developed can be applied to the existing market samples of noodles, pasta and spaghetti kind of

products and can be commercialized by organized Dairy sectors. The product has very good nutritional, therapeutic and functional properties and it could be recommended for health conscious, children's and for every age group people.

References:

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