

**EFFECT OF DIFFERENT PACKAGING MATERIALS AND
MODIFIED ATMOSPHERIC PACKAGING ON PHYSICAL
PARAMETERS OF WHEAT AND RICE FLOUR BLENDED
EXTRUDED PRODUCT STORED AT ROOM TEMPERATURE (28°C)
WITH THE INCORPORATION OF WPC.**

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ABSTRACT

Considering the experience that human kind has had with cereal grains for centuries, it is not surprising that cereals have become popular and nutritious breakfast entree for people of all ages. Thus in this study, a Nutritious Ready to Cook Milk and Cereal based Noodles like products were prepared using Wheat and Rice flour combination enriched with WPC. These products showed very good sensory scores, good nutritional composition and better acceptable levels on storage period

upto 3 months under room temperature when packed in Polypropelene and Polystyrene packaging material. Further with Modified atmospheric packaging (MAP) treatment also gave very good results upon storage period of 3 months under room temperature.

KEYWORDS: Extruded product, WPC, storage studies, MAP.

INTRODUCTION

Starch gelatinizes and becomes susceptible to starch-dissolving enzymes of the digestive system. If cooked with a minimum quantity of water, or without water, but at high temperature, as in toasting and extrusion cooking, non-enzymatic browning reaction between protein and reducing carbohydrate may occur, and there may be some dextrinization of

starch. Thus from the time the extrusion cooking process was introduced for food application, preparation of cereal and starch based products has been the major use.

Expanded extruded snacks generally are poor in dietary fiber, but have a good acceptance, especially among children and adolescents. Due to the good acceptance, snacks can be used as way to supply dietary fiber in significant amounts by fortification of wheat into extruded products which also acts as functional foods. Functional foods are those which present not only nutritional functions, due to the presence of substances that act into the organism regularly biochemical/physiological functions, but also contribute to higher protection to health, because they help to postpone pathological processes that result in chronic and degenerative diseases (Ferreira *et al.*, 2011). Keeping in view of all above factors, the present study aimed look.

Effect of different Packaging materials and Modified atmospheric packaging on physical parameters of wheat and rice flour blended extruded product stored at room temperature (28°C) with the incorporation of WPC.

MATERIALS AND METHODS

Packaging materials

Two different types of packaging materials are used to store or pack developed milk and cereal based noodles like products. These packaging materials are procured from Shakthi Packaging Industry, Bangalore. The two different packaging material used were polypropylene (PP) and polystyrene (PS) bags.

The developed nutritious ready to cook, milk and cereal based noodles like products, was packed in a PP and PS packaging material under normal and modified atmospheric conditions.

RESULTS AND DISCUSSION

Table 1: Effect of different packaging materials on physical parameters of wheat and rice flour blended extruded product stored at room temperature (28°C) with the incorporation of WPC.

Treatment	Packaging materials	Storage period								
		No. of days								
		1-30 days			31-60 days			61-90 days		
		CA	CR	OA	CA	CR	OA	CA	CR	OA
C	PP	7.33	7.00	7.66	6.66	6.33	6.66	6.00	5.00	5.00
	PS	7.66	7.33	8.00	7.00	6.66	6.66	6.00	5.33	5.66
F	PP	7.66	8.00	8.00	7.33	7.66	7.33	7.00	6.33	6.00
	PS	7.66	7.66	7.66	7.33	8.00	7.66	6.66	6.33	6.33
CD For Treatment		1.01	0.79	0.79	0.87	0.86	1.01	1.32	0.87	0.72
CD For Packaging		0.72	0.56	0.56	0.62	0.61	0.72	0.94	0.62	0.51

C-control

F- WPC enriched wheat and rice flour blended extruded milk and cereal based product.

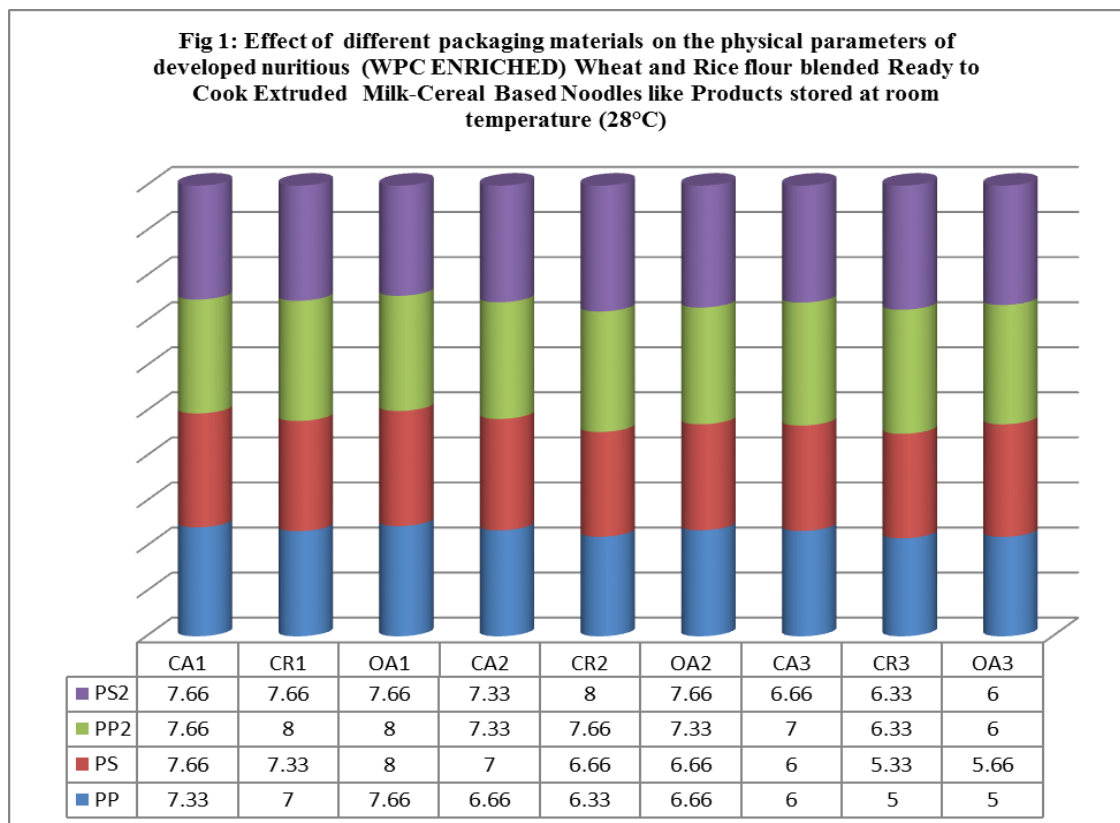
CA- color and appearance

CR- crispness

OA- overall acceptability

PP- polypropylene

PS- polystyrene



Effect of different packaging materials on physical parameters of Wheat and Rice flour blended Extruded Product stored at room temperature (28°C) with the incorporation of WPC presented in the Table 1.

On 30th, 60th and 90th day stored at 28°C the CA (color and appearance), CR (crispness) and OA (overall acceptability) with respect to PP Packaging material of control milk and cereal based extruded product samples recorded 7.33, 7.00, 7.66 respectively. 6.66, 6.33, 6.66 respectively. 6.00, 5.00, 5.00 respectively. Further C sample at 30th, 60th and 90th day stored at 28°C the CA, CR, OA with respect to PS packaging recorded 7.66, 7.33, 8.00 respectively. 7.00, 6.66, 6.66 respectively. 6.00, 5.33, 5.66 respectively.

Nutritious (WPC enriched) Wheat and Rice flour blended Ready to Cook Extruded Milk-Cereal Based Noodles like Products sample at 30th, 60th and 90th day stored at 28°C the CA, CR, OA with respect to PP packaging recorded 7.66, 8.00, 8.00 respectively. 7.33, 7.66, 7.33 respectively. 7.00, 6.33, 6.00 respectively. Further F sample at 30th, 60th and 90th day stored at 28°C the CA, CR, OA with respect to PS packaging recorded 7.66, 7.66, 7.66 respectively. 7.33, 8.00, 7.66 respectively. 6.66, 6.33, 6.33 respectively. The statistical data was shown in the table with respect to treatment and packaging materials. storage period the extruded products did not cross any unacceptable levels w.r.t physical parameters. This can be adjudged with the report submitted by Sowbhagya *et al.*, (2000a) prepared maize vermicelli with and without antioxidant (tertiary butylhydroquinone, TBHQ) and packed in cast polypropylene (CPP) and a laminate of metallized polyester with low density polyethylene (M-PET/PE). The packs were stored at 38°C, 92 per cent RH (accelerated storage) for 100 to 140 days. Solid loss of the product upon cooking decreased from 12.4 to 7.6 per cent at an accelerated storage and to 9.6 per cent at normal storage. Firmness and elasticity of the cooked product however, increased upon storage. The sensory properties of the cooked product remained good upto 100 days.

Table 2: Influence of MAP on physical parameters of wheat and rice flour blended extruded product stored at room temperature (28°C) with the incorporation of WPC.

Treatment	Packaging materials	Storage period								
		No. of days								
		1-30 days			31-60 days			61-90 days		
		CA	CR	OA	CA	CR	OA	CA	CR	OA
C	PP	7.33	7.00	7.66	6.66	6.33	6.66	6.00	5.00	5.00
	PS	7.66	7.33	8.00	7.00	6.66	6.66	6.00	5.33	5.66
J	PP	7.66	7.33	7.66	7.33	6.66	6.66	6.66	6.00	6.33
	PS	7.66	7.66	7.66	7.00	6.66	7.00	6.33	6.33	6.33
CD FOR TREATMENT		1.01	0.93	0.87	0.79	1.01	0.87	1.42	0.70	0.93
CD FOR PACKAGING		0.72	0.66	0.62	0.56	0.72	0.62	1.01	0.50	0.66

C-control

J- WPC enriched wheat and rice flour blended extruded milk and cereal based product packed in MAP.

CA- color and appearance

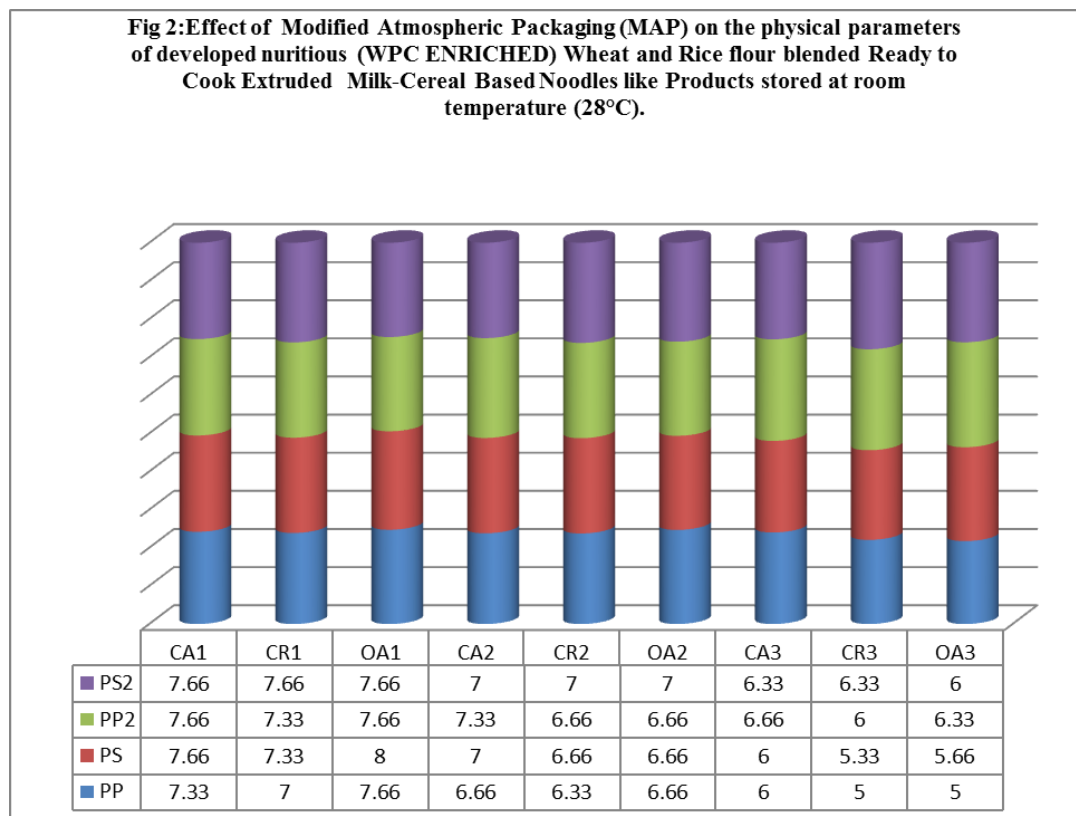
CR- crispness

OA- overall acceptability

PP- polypropylene

PS- polystyrene

Fig 2:Effect of Modified Atmospheric Packaging (MAP) on the physical parameters of developed nutritious (WPC ENRICHED) Wheat and Rice flour blended Ready to Cook Extruded Milk-Cereal Based Noodles like Products stored at room temperature (28°C).



The obtained results by the influence of MAP on developed nutritious (WPC enriched) Wheat and Rice flour blended Ready to Cook Extruded Milk-Cereal Based Noodles like Products stored at room temperature (28°C) analyzed for physical parameters, is presented in the Table 2.

On 30th, 60th and 90th day stored at 28°C the CA (color and appearance), CR (crispness) and OA (overall acceptability) with respect to PP Packaging material of control milk and cereal based extruded product (C) samples recorded 7.33, 7.00, 7.66 respectively. 6.66, 6.33, 6.66 respectively. 6.00, 5.00, 5.00 respectively. Further C sample at 30th, 60th and 90th day stored at 28°C the CA, CR, OA with respect to PS packaging recorded 7.66, 7.33, 8.00 respectively. 7.00, 6.66, 6.66 respectively. 6.00, 5.33, 5.66 respectively.

Nutritious (WPC enriched) Wheat and Rice flour blended Ready to Cook Extruded Milk-Cereal Based Noodles like Products packed in MAP (J) sample at 30th, 60th and 90th day stored at 28°C the CA, CR, OA with respect to PP packaging recorded 7.66, 7.33, 7.66 respectively. 7.33, 6.66, 6.66 respectively. 6.66, 6.00, 6.33 respectively. Further J sample at 30th, 60th and 90th day stored at 28°C the CA, CR, OA with respect to PS packaging recorded 7.66, 7.66, 7.66 respectively. 7.00, 6.66, 7.00 respectively. 6.33, 6.33, 6.33 respectively. The statistical data was shown in the table with respect to treatment and packaging materials.

This can be adjudged with the report submitted by Gangadkar (2008), packed chakli containing defatted soy flour (10%) in plastic bags under partial vacuum or air and stored at 28°C for 6 months. Characteristics such as color, carotene and sensory attributes were analyzed at 2 months intervals. Packaging atmosphere had minor effects on color. Stored chakli became lighter and yellower with all changes being greater at 28°C storage conditions.

SUMMARY AND CONCLUSION

The packaging materials such as PP (polypropylene) and PS (polystyrene) used to pack control and developed nutritious ready to cook milk and cereal based noodles like products and these were subjected to physical parameters during storage period room (28°C) for a period of 90 days. It was observed from the results that the product packed in PP and PS packaging material showed same critical difference statistically. The effect of MAP (modified atmospheric packaging) on packaging materials such as PP and PS used to pack control and developed nutritious ready to cook milk and cereal based Noodles like products and these were subjected to physical parameters during storage period room (28°C) for a

period of 90 days. It was noticed from the results that the product with MAP treatment on PP and PS packaging material showed same critical difference statistically.

Food extrusion is an emerging technology which paved way for several value added, fortified, enriched, RTE, RTC etc food products. This also plays an important role in world trade sectors by efficient profits. Hence, 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.

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