Development of fortified rice based pasta incorporated with spinach powder

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Pasta was prepared from rice flour, with spinach powder (RF:LP), was incorporated with 10, 15, and 20 % and spinach powder 05% in all combination on the basis of sensory evaluation. These rice flour pasta was improved nutrient content moisture, protein, ash, fibre, carbohydrate, fat, iron calcium of the pasta in the range of 8.45-9.20, 10.32-10.03, 6.80-3.80, 7.70-7.20, 2.30-1.80, 68.59-72.88, 19-18.20, 139.00-134.00, 17.40-16.90, respectively. 10 per cent linseed pasta was found best with regard to nutrient content and sensory characteristics.

Key Words : Pasta, Rice flour, Linseed flour, Spinach powder

INTRODUCTION

As the industry has responded to consumer demand for a more health full supply, the variety of the functional foods that are consistently available to consumer grown tremendously and functional foods account for increasing percentage new food products (Nutr.Bus. J., 2003). Pasta is an extensively food usually made from wheat, which is consumed in most countries worldwide. It is however, rather low in protein and is relatively deficient lysine, an essential amino acid. This is especially important for efforts to feed the hungry using pasta as the primary source of calorie and protein. Pasta products such as macaroni, spaghetti, noodles are very popular in Europe and in the western hemisphere. However, the consumption of the convenience food is increasing rapidly with the advance in economic condition of developing countries too. In India use of pasta products are increasing steadily. Pasta products are good source of carbohydrate and moderate source of proteins, but some essential amino

acids and fibre content are low (Sowbhgya and Ali, 2001). Ricebased pasta is good for gluten tolerance disease because rice have not found glutenand important food ingredient for ready to eat break fast cereals and snacks. Rice is rich in starch, vitamin B and moderate in protein and poor in fat and calcium. Chung *et al.* (2004) reported that lutein, a carotenoid protective against eye diseases such as age-related macular degeneration and cataract, is found in green vegetables, especially spinach, as well as kale and broccoli. Linseed comes from the family Linaceae,Genus Linum which include majority of the herbs and surbs found in temperate and subtropical regions bordering the Mediterranean sea. Lucas *et al.* (2002) studied a flaxseedimproves lipid profile without altering biomarkers of bone metabolism in post menopausal women.

METHODOLOGY

Rice flour and Linseed flour was purchased from the local market and spinach leaves was also purchased from the local market and cleaned, washed, dried (hot oven 75^{0}C for 5 hour) and after drying, grind the leaves, then sieved 20 mesh sieves then produced powder.

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Spinach powder was incorporated with rice flour at different levels 03, 05, 07, 10 per cent. To standardized the level of spinaches powder to make pasta and cooked with organoleptic evaluation by semi skilled panel. On the basis of overall acceptability 05% spinach powder was acceptable. Pasta was prepared with the help of the pasta making machine (La man farina Italy). Pasta containing rice flour,linseedflour and spinach powder in different blends (85:10:05, 80:15:05 and 75:20:05).

Proximate analysis :

Pasta were prepared from different blends were analyzed their proximate composition using standard method of AOAC (1995).

Organoleptic evaluation :

Sensory quality like colour, flavour, texture, taste and overall acceptability of pasta was evaluated by semi skilled panel by using 9 point hedonic scale.

Statistical analysis :

The data was statistically analyzed by one way ANOVA test.

OBSERVATIONS AND ASSESSMENT

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Proximate analysis :

Table 1 showed RF:LF:SP (75:20:05, 80:15:05 and 85:10:05) pasta of moisture was 8.45 to 9.20 per cent. Moisture of 75:20:05 ratio pasta was non-significantly differ. Crude protein was 10.32 to 10.03 per cent and non significantly differ. Crude fat was 6.80 to3.80 per cent and non-significantly differ ($P \leq 0.05$) and significantly differ 85:10:05. Midha and Mogra (2007) reported crude fat of vermicelli1.2 to 2.7 per cent which was quite lower in presentq study while working with MGS (Malted wheat flour: green gram dhal: spinach powder). The crude fat1.07 to 3.48 of noodles was quite lower in present investigation revealed by Agarwal *et al.* (2004). Crude fibre was 7.70, 7.40 and 7.20. The result showed crude fibre of pasta was significantly differ. Midha and Mogra (2007) reported crude fibre 2.2 to 2.4 per cent of vermicelli which was lower to present study. Ash was 2.30, 2.00 and 1.80 per cent, respectively and 75:20:05 pasta was non-significant differ. Midha and Mogra (2007) reported ash was 2.9 to 5.8 per cent of vermicelli which was quite higher to present study. Carbohydrate of pasta was very quite different and non-significant differ with other ratio. Starch of all groups was quite similar and non-significantly differs and significantly differ 85:10:05. In present investigation was higher to 35.53 to 40.10 reported by Kavitha *et al.* (2006). Calcium was 139-134 mg per 100 g, respectively and significantly to other ratios.The results are lower with findings by Midha and

Table 1 : Proximate composition of rice based pasta incorporated with linseed flour with 05 per cent spinach powder

Treatments	Moisture %	Crude protein %	Crude fat %	Crude fibre %	Ash %	Carbohydrate %	Starch %	Calcium mg/100g	Iron mg/100g
RF:LF:SP 75:20:05	8.45	10.32	6.80	7.70	2.30	68.95	19.00	139	17.40
RF:LF:SP 75:20:05	8.20	10.24	5.40	7.40	2.00	69.54	18.90	136.00	17.20
RF:LF:SP 75:20:05	9.20	10.03	3.80	7.20	1.80	72.88	18.20	134.00	16.96
C.D. (P=0.05)	0.946	0.815	1.120	0.807	0.731	10.661	0.731	5.217	0.516

Table 2 : Organoleptic evaluation of rice based pasta incorporated with linseed flour with 05 per cent spinach powder

Treatments	Colour	Taste	Flavour	Texture	Over all acceptability
RF:LF:SP 75:20:5	6	5	6.50	5.80	5.40
RF:LF:SP 80:15:5	6.60	6	6.80	6.40	6.40
RF:LF:SP 85:10:5	7	6.50	6.90	6.80	6.80
C.D. (P=0.05)	0.344	0.296	0.403	0.198	0.198

Mogra (2007) and also lower findings by Kavitha *et al.* (2006). Iron of was 17.40-16.96 mg, respectively and non-significantly differ.The results are lower with findings by Midha and Mogra (2007).

Organoleptic evaluation :

Table 2 showed the score for colour was 6-7, respectively and significant differ. In present study of pasta of colour was quite lower to 8.9 reported by Kavitha *et al.* (2006). Taste was 5 to 6.50, respectively significantly differ (P≤0.05) in comparison to other ratios. Midha and Mogra (2007) reportedthe taste 7.5 to 7.9 which was quite simlar to present study. The flavour was 6.50 to 6.80. The result showed flavour of 75:20:05 pasta was non-significantly differ (P≤0.05) with 85:10:05 pasta and significantly differ 85:15:05.The flavour of pasta was quite similar 8.8 reported by Kavitha *et al.* (2006). Agarwal *et al.* (2004) revealed the flavour 7.80 which was similar to present study. The score for texture of pasta was 5.80, 6.40 and 6.80, respectively. The result showed texture of pasta was significantly differ (P≤0.05) in comparison to other ratios. The texture of pasta was similar to 8.8 reported by Kavitha *et al.* (2006). The score for over all acceptability of was 5.80, 6.40 and 6.8, respectively. Sensory score of pasta was significantly differ (P≤0.05) in comparison to other ratios. Agarwal *et al.* (2004) revealed the overall acceptability 8.30 which was higher to present study.

Conclusion :

Pasta is popular breakfast cereal now in days. Rice pasta with linseed flour combination gives fat in high quantity but in the form of poly unsaturated fatty acid. In our study gives better nutritional quality of pasta was prepared with the help of functional food. Riceflour and spinach powder combination pasta was high in nutritional value. Rice pasta of 10 per cent in seedflour with spinach powder was good consumer acceptability with good nutritional value.

LITERATURE CITED

Agarwal, P., Singh, G. and Srivastava, S. (2004). Effect of incorporating foxtail millet (Estaria italic) on the cooking characteristics of noodles. *Beverages & Food World.* 18 -19.

AOAC. (1995). Official methods of analysis. *Association of official Analytical Chemists Inc.,* Arlington USA.

Chung, H.Y., Rasmussen, M. and Johnson, E.J. (2004). Lutein bioavailability is higher from lutein-enriched eggs than from supplements and spinach in men. *J. Nutri.*, **134** (7) : 1887-1893. PMID :15284371.

Kavitha, B., Kanchana, S., Vennila, P. and Kumar, S. (2006). Development of extruded products using soya meal maker flour. *Soya Update*, **3**(5):1-6.

Lucas, F.A., Wild, R.O., Stammond, LJ., Khalil, DA., Juma, S.,Daggy, B.P., Stoecker, B.J. and Arjmandi, B.H. (2002). Flaxseed improves lipid profile without altering biomarkers of bone metabolism in post menopausal women. *J. Clinical Endocrinology & Metabolism,* **87** (4):1527-1532.

Midha, S. and Mogra, R. (2007). Quality evaluated of value added vermicelli. *J. Food Sci. Tech.,* **44**(2): 220-223.

NBJ's annual industry overview 8. Functional Foods.*Nutr. Bus. J.,* 2003

Sowbhagya, C.M. and Ali zakiuddin, S. (2001). Vermicelli noodles and their quality assessment. *J. Food Sci. & Technol.,* **38** (5): 423-432.