Original Research

Development and Quality Evaluation of the Wheat Flour Based Quail Meat Enriched Noodles

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Abstract

The study was aimed to develop noodles with incorporation of different levels of quail mincemeat (0%, 40%, 50% and 60%).The sensory score for the selected 40% level were 7.44 for appearance, 7.55 for flavour, 7.55 for juiciness, 7.33 for texture and 7.66 for overall palatability. There was non-significant (P<0.05) decrease in bulk density (0%-0.35g/ml and 40% 0.34g/ml) and significant (p>0.05) increase in true density with addition of quail mincemeat in wheat flour based noodles. The cooking parameter, the cooking time increased significantly i.e. for 0% -8 min, 40%-11 min, 50%-12.33 min and 60%- 15 min. The water uptake for 0%, 40%, 50% and 60% was 2.73 ml/g 2.37 ml/g, 1.85 ml/g to 1.56 ml/g respectively, the swelling index differed non-significantly within treatments. The acceptable quality noodles were prepared with incorporation of 40% quail mincemeat in wheat flour based noodles without adversely affecting the sensory qualities and physico-chemical characteristics.

Key words: Quail Mince Meat, Sensory Analysis, Wheat Flour

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Introduction

Generally, quails are small-to-medium sized birds, belonging to the same biological family of chicken and pheasants (*Phasianidae*), given the overall similarity in physical characteristics and behaviour. Quails, most commonly bred for human consumption, belong to the species *Coturnix Coturnix Japonica*. Their distribution in the wild spreads over large areas of Asia, Europe and Africa, but they were first domesticated in Japan (Boni *et al.*, 2010).The domesticated subspecies, *Coturnix coturnix japonica*, called Japanese quail is also known by other names such as; Common quail, Eastern quail, Asiatic quail, Pharaoh´s quail and also known as Bater in Hindi terminology (Fah and Vohra., 2008). White meat, including quail meat, is

considered superior to red meat because it contains low fat content, low cholesterol and high amount of iron. Quail is one of the leanest types of poultry and a good source of protein, essential fatty acids and minerals such as sodium, potassium and iron (Boni *et al.*, 2010). Pasta products like noodles have a great hold over Indian consumer market due to their nutritional and organoleptic features (Mercier and Cantarelli, 1986).

Materials and Methods

Japanese quail were procured from the department of poultry science, COVAS Parbhani. Birds were dressed and connective tissue, fat etc. were separated and boneless meat were packed in low density polyethylene (LDPE) bags and stored overnight at 41^0C. Quail meat noodles were prepared as per method of the Kumar *et al.,* (2011) and Kapse (2016) with slight modification was used for preparation of quail meat noodles throughout the study. The spice mixes (2%) were added at the time of cooking of the quail meat noodles.

Basic Formulation of Wheat Flour Based Quail Meat Noodles (in g)

S. No.	Ingredients	Control	T1	T2	T3
1	Mince meat	0	40	50	60
2	Salt	2	2	2	2
3	Wheat flour	90	50	40	30
4	Starch corn	8	8	8	8
5	Water requirement (ml)	50	40	35	30

Wheat flour based noodles were prepared by incorporating different levels (0%, 40%, 50% and 60%) of quail minced meat. Wheat flour based noodles prepared by incorporating selected levels of quail minced meat were aseptically packed in LDPE, stored at room temperature (35 ± 2^0C) and assessed for sensory properties using 8 point hedonic scale is it Keeton (1983), physico-chemical attributes: pH (AOAC 1995), bulk density and true density (Sahay and Singh, 2001); cooking parameter: cooking time (Oh *et al., 1983*), water uptake (Vetrimani and Rahim, 1994), Swelling Index (Chen *et al.*, 2002).

Result and Discussion

Sensory Quality

The average scores for different sensory attributes of cooked wheat flour based quail meat enriched noodles incorporated with different levels of quail mincemeat (40%, 50%, 60%) are presented in Table 1. It is revealed from observations that incorporation of quail mincem eat upto 40% level did not have any significant effect ($P<0.05$) on appearance scores of products. Quail mincemeat incorporated with 40% recorded optimum sensory scores for appearances as compared to that of control. Further addition of quail

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mincemeat upto 50% and 60%, the score for appearance decreased significantly. It might be due to case hardening at high temperature during cooking. Present findings are in agreement with Berwal and Khanna (2013) for value added chicken meat mince incorporated cookies.

Table 1: Effect of addition of quail meat on sensory attributes of wheat flour based noodles sensory attributes

Levels of Quail	Appearance	Flavour	Juiciness	Texture	Overall Palatability
0%	7.55^{a}±0.00	7.55^{a}±0.22	7.11^{a}±0.11	7.44^{a}±0.11	7.44^{a}±0.11
40%	7.44^{a}±0.11	7.55^{a}±0.29	7.55^{a}±0.11	7.33^{a}±0.33	7.66^{a}±0.00
50%	6.33^{b}±0.19	6.44^{b}±0.22	5.86^{b}±0.13	5.64^{b}±0.19	5.33^{b}±0.19
60%	6.22^{b}±0.22	5.66^{b}±0.33	5.55^{b}±0.22	5.55^{b}±0.29	5.11^{b}±0.11
SE ±CD	0.22±0.62	0.21±0.60	0.19±0.56	0.17±0.49	0.14±0.41

Means with common superscripts did not differ significantly (p<0.05); NS = Non Significant; No. of trials-3 times

Quail mince meat (40%) added in wheat flour based noodles the flavour scores did not differ significantly (P<0.05) with control The flavour scores for the quail mincemeat incorporated at 40% were highest as compared to other treatment (50% and 60%). Present findings are in agreement with Verma *et al.* (2014), who reported highest flavor scores in wheat flour chicken noodles having highest 30% level of chicken meat. The sensory scores of juiciness for the quail mince wheat flour based noodles did not differ significantly (P<0.05) as compare to control. The highest juiciness score were recorded for noodles incorporated with quail mincemeat at 40%. Further addition of the quail mincemeat decreased the juiciness significantly. Present findings of investigation are in close agreement with Kapse (2016) for chevon mince meat enriched noodles. Texture scores of the wheat flour based noodles incorporated 40% levels of quail mincemeat did not differ significantly (p<0.05) with control. The score for texture of wheat flour noodle (control) were highest followed by 40% quail mincemeat incorporated noodles. The 60% quail mincemeat incorporated wheat flour based noodles had the least mean value for the texture. Similar findings were recorded by De Oliveira *et al.* (2006) for spaghetti and twist noodles and Bukya *et al.* (2013) for preparation of chicken biscuits. The present investigation findings are in agreement with those of Verma *et al.* (2014) for the preparations of wheat flour based chicken meat noodles.

Overall palatability scores of quail mince meat 40% enriched wheat flour based noodles differs significantly (P>0.05) with 50% and 60% added quail mince meat noodles. Among the treatment, the mince meat enriched at 40% was recorded significantly (P>0.05) higher scores for overall palatability as compare to control and other treatments.

Physico-chemical Attributes

The observations in respect to physico-chemical characteristics of control and noodles prepared from quail mince meat are presented in Table 2. It is observed that the addition of quail mince in wheat flour based

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noodles slightly decreases the pH upto 50% as compare to control. Further addition upto 60% mincemeat significantly (P>0.05) decreases the pH with other treatments. The control noodles showed highest value for pH and lowest pH was recorded for 60% quail mincemeat incorporated wheat flour based noodles. The gradual decline in pH with increased quail mincemeat was due to the acidic nature of quail meat. This result is broadly in agreement with observations of Chin *et al.* (2012) for surimi powder in wet yellow noodles and kapse (2016) for chevon enriched noodles.

Table 2: Effect of addition of quail meat on physico-chemical characteristics of wheat flour based noodles

Levels of Quail Mince Meat	Physico-chemical Characteristics		
	pH	Bulk density (g/ml) (uncooked)	True density (g/ml) (uncooked)
0%	5.92^{a}±0.028	0.35±0.014	1.23^{b}±0.009
40%	5.86^{a}±0.016	0.34±0.026	1.38^{b}±0.012
50%	5.85^{a}±0.021	0.29±0.015	1.42^{b}±0.009
60%	5.43^{b}±0.06	0.30±0.029	1.48^{a}±0.012
SE ±CD	0.036±0.119	0.022	0.01±0.034

Means with common superscripts did not differ significantly (p<0.05); NS = Non Significant; No. of trials-3 times

Gradual decline in bulk density was noticed with addition of quail mincemeat in wheat flour based noodle. The highest bulk density was recorded for control and lowest bulk density for 60% quail mincemeat added wheat flour based noodles. The non-significant (P<0.05) decreasing trend was recorded for bulk density due to addition of quail mincemeat in wheat flour based noodles. These findings are very well agreed with observation of Kumar *et al.* (2011) for chicken mince enriched noodles. The bulk density of the flours could be used to determine their handling requirement, because it is the function of mass and volume. Bulk density is also important in infant feeding where less bulk is desirable. The control noodles showed lowest value for true density and highest true density was recorded for 60% quail mincemeat incorporated wheat flour base noodles. The non-significant (P<0.05) increasing trend was observed for true density content upto 50%. Further addition upto 60% quail mincemeat significantly differs with control and other treatments. The results are in conformity with Kapse (2016) for preparation of chevon enriched noodles and Kumar *et al.* (2011) observed increase in true density of chicken mince incorporated noodles.

Cooking Parameter

The observations in respect of cooking characteristics viz., cooking time, water uptake and swelling index of control and wheat flour based noodle incorporated with different levels of quail mincemeat (40%, 50% and 60%) are presented in Table 3. Cooking time of quail mincemeat enriched wheat flour based noodles differ significantly (P>0.05) with incorporation of various levels of quail mincemeat. However, quail mince meat incorporated of 40% and 50% did not differ significantly (P<0.05). Increasing cooking time

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with addition of quail mince meat might be due to more heat treatment was required for the cooking of noodles incorporated with quail meat. Present findings are in agreement with Kumar *et al*. (2011) for chicken enriched noodles and Kapse (2016) for chevon enriched noodles.

Table 3: Effect of addition of quail meat on cooking characteristics of wheat flour based noodles

Levels of quail mince meat	Cooking characteristics		
	Cooking time (minutes)	Water uptake (ml/g) (cooked)	Swelling index
0%	8.33^{c}±0.33	2.73^{a}±0.07	1.67±.0.086
40%	11.00^{b}±0.57	2.37^{b}±0.12	1.62±.0.086
50%	12.33^{b}±0.33	1.85^{b}±0.12	1.53±0.09
60%	15.00^{a}±0.57	1.56^{c}±0.06	1.52±0.09
SE ±CD	0.47±1.56	0.1±0.33	0.08±NS

Means with common superscripts did not differ significantly (p<0.05); NS = Non Significant; No. of trials-3 times

The water uptake of wheat flour based noodle incorporated with different levels of quail mince meat differ significantly (P>0.05). The water uptake decreases with addition of quail mince meat. The highest water uptake was recorded for control noodles and lowest value was recorded for 60% of quail mince meat added in wheat flour based noodles. The present findings are corroborated with Kapse (2016) who reported highest water uptake for control and lowest value recorded for 30% chevon mince enriched noodles. Water absorption capacity represents the ability of the products to associate with water under conditions when water is limiting such as dough's and pastes. The swelling index of the wheat flour based noodles incorporated with different levels of quail mince meat did not differ significantly (P<0.05). The swelling index of control and quail mince meat enriched noodles was comparable irrespective of the levels of quail mince meat. The highest level for swelling index was recorded for control and lowest value was recorded for 60% of quail mince meat added wheat flour based noodles. Similar findings were reported by Kumar *et al.* (2011) for chicken meat enriched noodles. Swelling power test provided suitable predictive method for identifying noodle-quality flours. Formation of protein-amylose complex in native starches and flours may be the cause of decreased in swelling power.

Conclusion

The acceptable quality of noodles were prepared with incorporation of 40% quail mincemeat in wheat flour based noodles without adversely affecting the sensory qualities and physico-chemical characteristics. Addition of quail mincemeat in wheat flour based noodles was increase the protein content of the product.

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