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# Evaluation of sensory quality of chicken enriched noodles during storage at ambient temperature

**Surender Kumar, Nita Khanna, Vaquil, Suman Bishnoi and Sanjay Yadav**

**Abstract**
The present study was conducted to formulate noodles by incorporating various levels (10-50%) of chicken meat mince (CMM) chicken meat powder (CMP) in refined wheat flour, separately. These noodles were dried in hot air oven at 60±2 °C for 5-6 hours to attain moisture content less than 12% as per the PFA specifications for noodles. The noodles developed only with RWF considered as control. As per sensory evaluation, noodles with 20% CMM and 20% CMP enrichment were most acceptable among the treatments and along with control studied for sensory evaluation during storage. The noodles were found to be suitable for consumption even after 60 days of storage at room temperature.

**Keywords:** Noodles, chicken meat mince (CMM) chicken meat powder (CMP), sensory evaluation, microbiological evaluation, storage

## Introduction
One of the greatest challenges today is to develop inexpensive foods that are nutritionally superior and highly acceptable to consumers. Wheat is abundant in some areas of the world and is one of the least expensive cereals available for creating fabricated foods high in nutrition. Pasta, whether it is in the form of flat noodles, elbow macaroni or spaghetti is consumed worldwide. It is economical, easy to prepare, shelf stable and can be served in different ways. An increase in fast food culture and craze, Chinese food items have also contributed to increase in consumption of noodles. In addition, because of their high popularity, these products could be a vehicle to improve the nutritive value of the habitual diets (Oh *et al*. 1983) [15].

The terms, pasta and noodles are often used synonymously but differ in their origin, raw materials and method of manufacture. Pasta being a low moisture food retains its nutritional and organoleptic characteristics for a longer period of time (Mercier and Cantrelli, 1986) [11]. As low moisture food, they have long shelf life and can easily be handled during transport (Lakshmi and Khader, 1997) [10]. Although the use and functionality of wheat flour fortified with different legume flours (Kwee *et al*.,1969; Breen *et al*.,1977; Nielsen *et al*.,1980; Lakshmi and Khader, 1997; Singh, 2001; Shogren *et al*., 2006) [9, 3, 14, 10, 18, 17], fish protein concentrate (Woo and Erdman,1971) [21] ora-pro-nobis (OPN) leaves (Wang *et al*.1996) [20], paneer (Mytle,1999) [12], potato and sweet potato (Chen *et al*., 2003) [4], eggs (Khouryieh *et al*., 2006) [8] and white button mushroom (Vaidya *et al*.,2008) [19] in preparing and improving the nutritive value of spaghetti, vermicelli and noodles have been documented but relatively little organized research and information is available on chicken meat extruded pasta products. Cereal and grain based extruded products are high in carbohydrate and fat content but low in nutrient density and also lack some of the essential amino acids like threonine, tryptophan and lysine (Jean *et al*., 1996) [7]. But chicken meat is rich in all these amino acids. Therefore, development of noodles using refined wheat flour enriched with meat from spent hen may provide a nutritious, convenient and ready to cook food item and may also offer an important avenue for profitable disposal of spent hen.

## Material and Method
### Place of Study
The present study was carried out in the Department of Livestock Products Technology, College of Veterinary Sciences, LUVAS, Hisar to develop chicken enriched noodles by using refined wheat flour and chicken meat mince (CMM) and chicken meat powder (CMP) meat of spent hen.

**Raw Materials**
Refined wheat flour (RWF) and common salt were procured from local market, Hisar. Spice mix was developed in the laboratory itself by using coriander (15%), cumin seeds (15%), caraway seed (10%), aniseed (10%), black pepper (10%), red chilli (8%), soanth (8%), cinnamon (5%), cloves (5%), big cardamom dry (5%), mace (5%), nutmeg (2%) and green cardamom dry (2%) as ingredients. These ingredients were cleaned and then dried in hot air oven at 45±2 °C for 2 hours and then ground, sieved through a size of 100 meshes, mixed and in this way, spice mix in fine powder form was obtained. The spent hen (White Leghorn) of age about 1.5 years reared under similar feeding and management conditions were purchased from local market, Hisar and slaughtered as per standard procedure, dressed, deboned and packaged in low density polyethylene bags and stored at -20 °C for further studies.

**Preparation of chicken meat mince (CMM)**
The deboned frozen meat spent hen was minced through an electric meat mincer and then thoroughly kneaded after addition of 2% salt.

**Preparation of Chicken meat powder (CMP)**
Minced meat was placed in a pan and the minimum quantity of water was added to start the cooking. The traditional cooking was done for about 35 minutes till the meat was thoroughly browned as per recommendation of Bate Smith *et al* (1943) [2]. This precooked meat mince was dried in a cabinet tray drier at 60 ºC for 9 hours and then stored in air tight food grade plastic jars at an ambient temperature (27±2 ºC) for further use in noodle preparation.

**Preparation of Noodles**
Noodles were prepared following the procedure of Lakshmi Devi and Khader (1997) [10]. Control noodles were prepared by using RWF and 2% spice mix but without CMM and CMP while chicken enriched noodles were prepared by using different levels of RWF, CMM and CMP as given in Table-1. Different levels of water were added to each treatment to find out optimum level of water which gave dough of acceptable handling quality. The dough was then folded and sheeted through a hand operated noodle machine to get a sheet of 3 mm thickness. This sheet was again passed through the rolls to get a final sheet of 1.5 mm thickness. The dough sheet was then cut into noodle strips.

**Table 1:** Levels of chicken meat mince (CMM) and chicken meat powder (CMP) with refined wheat flour (RWF)

| Treatment | RWF (%) | CMM (%) | CMP (%) |
|---|---|---|---|
| $T_1$ | 100 | - | - |
| $T_2$ | 90 | 10 | - |
| $T_3$ | 80 | 20 | - |
| $T_4$ | 70 | 30 | - |
| $T_5$ | 60 | 40 | - |
| $T_6$ | 50 | 50 | - |
| $T_7$ | 90 | - | 10 |
| $T_8$ | 80 | - | 20 |
| $T_9$ | 70 | - | 30 |
| $T_{10}$ | 60 | - | 40 |
| $T_{11}$ | 50 | - | 50 |

The prepared noodles were dried in hot air oven at temperature level of 60±2 °C for 5-6 hours to get moisture content below 12% so as to meet the PFA specifications for noodles.

**Noodle cooking**
Noodles (40 g) were cooked in (500 ml) of boiling tap water. The water was held at a gentle boil and the noodles stirred occasionally. The optimum cooking time, which was the time required for the white core in the noodle strand to disappear was determined (in minutes). After cooking was completed, the noodles were cooled in running tap water for one minute and then drained.

**Sensory evaluation**
The products developed were evaluated for the sensory characteristics viz. color, mouthfeel, texture, flavor and overall acceptability using 9 point Hedonic scale (Nelson and Trout, 1964) [13] by a panel of 6 semi-trained judges of department of Animal Products Technology, College of Animal Sciences, Chaudhary Charan Singh Haryana Agricultural University, Hisar.

**Storage studies**
Out of various levels of CMM and CMP tried for preparing chicken enriched noodles, two best samples (one prepared with chicken meat mince (CMM) and another with chicken meat powder (CMP) based on sensory evaluation were selected and stored along with control samples for 2 months at ambient conditions in sealed polythene bags. The samples were drawn at 0,15$^{th}$, 30$^{th}$, 45$^{th}$ and 60$^{th}$ day of storage for sensory evaluation.

**Result and Discussion**
Out of various levels of CMM and CMP tried for preparing chicken enriched noodles, The samples selected were 20% CMM and 20% CMP enriched noodles. These samples along with control were stored for two months at ambient conditions in sealed polythene bags.

**Sensory quality**
The stored noodles were cooked at 0, 15$^{th}$, 30$^{th}$, 45$^{th}$ and 60$^{th}$ day of storage and evaluated for sensory quality i.e colour, mouthfeel, texture, flavour and overall acceptability.

**Colour**
The mean colour scores of control, 20% CMM and 20% CMP noodles at ambient temperature for 60 days are shown in Table-2. The colour scores were 8.15, 7.9. 7.85, 7.7 and 7.45 on 0$^{th}$, 15$^{th}$, 30$^{th}$, 45$^{th}$ and 60$^{th}$ day of storage, respectively for control noodles.

**Table 2:** Effect of storage on acceptability of colour scores of CMM and CMP enriched noodles

| Storage period (days) | Control noodles | 20% CMM enriched noodles | 20% CMP enriched noodles |
|---|---|---|---|
| 0 | $8.15^{aA} \pm .0.076$ | $8.0^{aAB} \pm 0.026$ | $7.85^{aB} \pm 0.076$ |
| 15 | $7.9^{abA} \pm 0.067$ | $7.85^{abA} \pm 0.076$ | $7.8^{abA} \pm 0.082$ |
| 30 | $7.85^{bA} \pm 0.076$ | $7.7^{abAB} \pm 0.111$ | $7.55^{bcB} \pm 0.117$ |
| 45 | $7.7^{bcA} \pm 0.11$ | $7.51^{cB} \pm 0.82$ | $7.45^{cB} \pm 0.09$ |
| 60 | $7.45^{cA} \pm 0.117$ | $7.41^{cA} \pm 0.074$ | $7.35^{cA} \pm 0.076$ |

*Means bearing different superscripts (small letter) in a column differ significantly ($p \leq 0.05$)
*Means bearing different superscripts (capital letter) in a row differ significantly ($p \leq 0.05$)
For 20% CMM noodles the colour scores were 8.0, 7.85, 7.7, 7.51 and 7.41 and for 20% CMP the scores were 7.85, 7.8, 7.55, 7.45 and 7.35, respectively.

The analysis of variance revealed that mean colour scores decreased significantly ($p \leq 0.05$) during storage period. However, scores were in acceptable range (above 6 i.e like slightly) during the whole period of 2 months. The mean colour score was highest for control noodles and lowest for 20% CMP noodles.

**Mouthfeel**

The effect of storage on mean mouthfeel scores for control, 20% CMM and 20% CMP noodles is presented in Table-3.

**Table 3:** Effect of storage on acceptability of mouthfeel scores of CMM and CMP enriched noodles

| Storage period (days) | Control noodles | 20% CMM enriched noodles | 20% CMP enriched noodles |
|---|---|---|---|
| 0 | $8.05^{aA} \pm 0.005$ | $7.9^{aAB} \pm 0.067$ | $7.85^{aB} \pm 0.076$ |
| 15 | $8.0^{aA} \pm 0.075$ | $7.80^{abAB} \pm 0.111$ | $7.70^{abB} \pm 0.111$ |
| 30 | $7.85^{abA} \pm 0.076$ | $7.6^{bAB} \pm 0.1$ | $7.50^{bcB} \pm 0.105$ |
| 45 | $7.65^{bcA} \pm 0.130$ | $7.40^{cB} \pm 0.073$ | $7.35^{cdB} \pm 0.076$ |
| 60 | $7.45^{cA} \pm 0.090$ | $7.25^{Cab} \pm 0.083$ | $7.15^{dB} \pm 0.107$ |

*Means bearing different superscripts (small letter) in a column differ significantly ($p \leq 0.05$)
*Means bearing different superscripts (capital letter) in a row differ significantly ($p \leq 0.05$)
For control noodles, mean mouthfeel scores were 8.05, 8.0, 7.85, 7.65 and 7.45 for $0^{th}$, $15^{th}$, $30^{th}$, $45^{th}$ and $60^{th}$ day of storage, respectively. The scores for 20% CMM and 20% CMP noodles for $0^{th}$, $15^{th}$, $30^{th}$, $45^{th}$ and $60^{th}$ day of storage were 7.9, 7.8, 7.6, 7.4 & 7.25 and 7.85, 7.7, 7.5, 7.35 and 7.15, respectively.

The analysis of variance revealed significant ($p \leq 0.05$) decrease in mouthfeel score during storage period but all scores were in acceptable range. Like colour scores, mouthfeel scores were highest for control and lowest for 20% CMP enriched noodles.

**Table 4:** Effect of storage on acceptability of texture scores of CMM and CMP enriched noodles

| Storage period (days) | Control noodles | 20% CMM enriched noodles | 20% CMP enriched noodles |
|---|---|---|---|
| 0 | $8.10^{aA} \pm 0.01$ | $7.9^{aAB} \pm 0.067$ | $7.7^{aB} \pm 0.111$ |
| 15 | $7.9^{abA} \pm 0.067$ | $7.85^{aAB} \pm 0.076$ | $7.65^{aB} \pm 0.107$ |
| 30 | $7.75^{bA} \pm 0.112$ | $7.6^{bA} \pm 0.01$ | $7.50^{abA} \pm 0.105$ |
| 45 | $7.6^{cdA} \pm 0.125$ | $7.35^{cB} \pm 0.076$ | $7.30^{bcB} \pm 0.082$ |
| 60 | $7.35^{Da} \pm 0.076$ | $7.25^{Cb} \pm 0.083$ | $7.2^{cB} \pm 0.111$ |

*****Means bearing different superscripts (small letter) in a column differ significantly ($p \leq 0.05$)
*Means bearing different superscripts (capital letter) in a row differ significantly ($p \leq 0.05$)

**Texture**

The mean texture scores for control, 20% CMM and 20% CMP noodles at ambient temperature for 2 months are shown in Table-4. The texture scores were 8.10, 7.9. 7.75, 7.6 & 7.35 for $0^{th}$, $15^{th}$, $30^{th}$, $45^{th}$ and $60^{th}$ day of storage, respectively for control noodles. For 20% CMM noodles the texture scores were 7.9, 7.85, 7.6, 7.35 and 7.25 and for 20% CMP the scores were 7.7, 7.65, 7.5, 7.3 and 7.2, respectively.

The analysis of variance revealed that mean texture scores decreased significantly ($p<0.05$) during storage period, but were in acceptable range (above 6 i.e better than like slightly) during the whole period of 2 months. The mean texture score was highest for control noodles and lowest for 20% CMP noodles.

**Table 5:** Effect of storage on acceptability of flavour scores of CMM and CMP enriched noodles

| Storage period (days) | Control noodles | 20% CMM enriched noodles | 20% CMP enriched noodles |
|---|---|---|---|
| 0 | $7.50^{aB} \pm 0.13$ | $8.1^{aA} \pm 0.067$ | $7.85^{aA} \pm 0.076$ |
| 15 | $7.45^{aB} \pm 0.117$ | $7.9^{abA} \pm 0.067$ | $7.8^{abA} \pm 0.082$ |
| 30 | $7.40^{aB} \pm 0.100$ | $7.8^{bcA} \pm 0.082$ | $7.7^{abAB} \pm 0.082$ |
| 45 | $7.36^{aB} \pm 0.076$ | $7.6^{cdA} \pm 0.01$ | $7.6^{bcA} \pm 0.01$ |
| 60 | $7.33^{aA} \pm 0.074$ | $7.45^{dA} \pm 0.09$ | $7.40^{cA} \pm 0.067$ |

*Means bearing different superscripts (small letter) in a column differ significantly ($p \leq 0.05$)
*Means bearing different superscripts (capital letter) in a row differ significantly ($p \leq 0.05$)

**Flavour**

The flavour scores during storage period are presented in Table-5. The score was highest for 20% CMM noodles and lowest for control noodles. The flavour scores for control noodles were 7.50, 7.45, 7.40, 7.36 and 7.33 for 0th, 15th, 30th, 45th and 60th day of storage, respectively. For 20% CMM enriched noodles, the colour scores were 8.1, 7.9, 7.8, 7.6 and 7.45 and for 20% CMP the scores were 7.85, 7.8, 7.7, 7.6 and 7.4, respectively. The slight decline in flavour score during storage period might have been due to development of somewhat rancid flavour.

**Table 6:** Effect of storage on overall acceptability scores of CMM and CMP enriched noodles

| Storage period (days) | Control noodles | 20% CMM enriched noodles | 20% CMP enriched noodles |
|---|---|---|---|
| 0 | $8.10^{aA} \pm 0.067$ | $8.0^{aB} \pm 0.05$ | $7.84^{aC} \pm 0.67$ |
| 15 | $7.95^{aA} \pm 0.050$ | $7.85^{aA} \pm 0.076$ | $7.80^{aA} \pm 0.67$ |
| 30 | $7.75^{bA} \pm 0.112$ | $7.77^{bA} \pm 0.081$ | $7.55^{bB} \pm 0.050$ |
| 45 | $7.55^{bA} \pm 0.117$ | $7.41^{cB} \pm 0.05$ | $7.40^{bcB} \pm 0.067$ |
| 60 | $7.45^{cA} \pm 0.117$ | $7.40^{cB} \pm 0.05$ | $7.35^{cC} \pm 0.076$ |

*Means bearing different superscripts (small letter) in a column differ significantly ($p \leq 0.05$)

*Means bearing different superscripts (capital letter) in a row differ significantly ($p \leq 0.05$)

The analysis of variance revealed significant ($p \leq 0.05$) decrease in flavour score during storage period but all scores were in acceptable range (above 6).

**Overall acceptability**

The effect of storage on mean overall acceptability scores for control, 20% CMM and 20% CMP noodles is presented in Table-6. For control noodles mean overall acceptability scores were 8.10, 7.95, 7.75, 7.55 and 7.45 for 0th, 15th, 30th, 45th and 60th day of storage, respectively. The scores for 20% CMM and 20% CMP noodles for 0th, 15th, 30th, 45th and 60th day of storage were 8.0, 7.85, 7.77, 7.41 & 7.40 and 7.84, 7.8, 7.55, 7.40 and 7.35, respectively.

The analysis of variance revealed significant ($p \leq 0.05$) decrease in overall acceptability score during storage period but all scores were in acceptable range. The overall acceptability scores were highest for control and lowest for 20% CMP noodles.

**Conclusion**

The present study revealed significant ($p \leq 0.05$) decrease in scores of colour, flavour, texture, mouthfeel and overall acceptability during storage period of 2 months but scores were in acceptable range (above 6). 20% CMM noodles were comparatively better than 20% CMP noodles in sensory quality during whole period of storage.

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**References**

1. APHA. Recommended methods for microbiological examination of foods, Washington, USA, 1966.
2. Bate-Smith EC, Lea CH, Sharp JD. Dried Meat. 1943; 1:62, 100.
3. Breen MD, Banasik OJ, Walsh DE. Use of various protein sources in Pasta. Macaroni J. 1977; 58(9):26.
4. Chen Z, Schols HA, Voragen AGJ. The use of potato and sweet potato starches affect white salted noodle quality. J Food Sci. 2003; 68:2630-37.
5. Devaraju B, Begum J Mushtari, Begu-stumshed, Vidhya K. Storage and microbial quality of pasta from finger millet composite flour. Ind. Fd. Packer. 2006; 61:141-45.
6. ICMSF. Microbial Ecology of Foods. International Commission of Microbiological Specification for Foods, Academic Press, New York, 1980, II.
7. Jean IJ, Work R, Camire ME, Briggs J, Barret AH, Bushway AA. Selected properties of extruded potato and chicken meat. J Food Sci. 1996; 61(4):783-789.
8. Khouryieh H, Herald T, Aramouni F. Quality and sensory properties of fresh egg noodles formulated with either total or partial replacement of egg substitutes. J Food Sci. 2006; 71:433-437.
9. Kwee WH, Sidwell VD, Wiley RC, Hammerle OA. Quality and nutritive value of pasta made from rice, corn, soya and tapioca enriched with fish protein concentrate. Cereal Chem. 1969; 46:78.
10. Lakshmi Devi N, Khader V. Preparation of vermicelli from wheat flour-pulse blends for geriatric. J Food Sci. Technol. 1997; 34:513-514.
11. Mercier CH, Cantrelli. Pasta and extrusion cooked foods. Elsevier Science Publication. Ltd. 1986, 41.
12. Mytle M. Development of technology for milk protein enriched noodles. Ph.D. Thesis, CCS Haryana Agricultural University, Hisar, India, 1999.
13. Nelson JA, Trout GM. Judging Dairy Products. (4th edn.), Olsen Publishing Co. Milwakee, USA, 1964.
14. Nielsen MA, Sumner AK, Whalley LL. Fortification of pasta with pea flour and air classified pea protein concentrate. Cereal Chem. 1980; 57:203-206.
15. Oh NH, Seib PA, Deyoe CW, Ward AB. Noodles II. The surface firmness of cooked noodles from soft and hard wheat flours. Cereal Chem. 1983; 60:433-438.
16. PFA. The Prevention and Food Adulteration Act, 1954 and PFA rules, 2nd Amendment (1996). Eastern Book, Lucknow. Sahay, K.M. and Singh, K.K. (2001). Unit Operation of Agricultural Processing. Vikas Publications, New Delhi.
17. Shogren RL, Hareland GA, Wu YV. Sensory evaluation and composition of spaghetti fortified with soy flour. J Food. Sci. 2006; 71:S428-32.
18. Singh D. Supplementation of wheat flour noodles with soyabean flour. M.Sc. thesis, CCS Haryana Agricultural University, Hisar, 2001.
19. Vaidya D, Shreshtha G, Rai RD, Sharma PC. Development and quality evaluation of white button mushroom noodles. J Food Sci. Technol. 2008; 45(6):513-15.
20. Wang SH, Ascheri JLR, Abbuquerque MGPT, Borges GG. Technological and sensory characteristics of noodles fortified with different levels of flour from Ora-Pro-nobis

leaves. Alimentaria. 1996; 27(6):91-96 [Cited from FSTA 29(12)].
21. Woo HC, Erdman AM. Fish protein concentrate enrichment of noodles. J Home Econ. 1971; 63:263.