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Standardization and Quality Evaluation of Chicken Cutlets Incorporated with *Telosma pallida* Flower

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Abstract
The present study was conducted to determine the optimal incorporation level of *Telosma pallida* flower in the development of chicken meat cutlets. Formulations were prepared with graded levels of *Telosma pallida* flower (3%, 6%, and 9%) by partially substituting lean meat. Sensory evaluation identified 3% incorporation as the most acceptable level for cutlet preparation. Subsequently, the storage stability of aerobically packaged chicken meat cutlets containing the optimized level of *Telosma pallida* flower, along with control samples, was evaluated under refrigerated conditions (4±1 °C) at intervals of 0, 3, 6, and 9 days. Assessments included physico-chemical, microbiological, and sensory analyses. Results demonstrated that chicken meat cutlets remained microbiologically safe and organoleptically acceptable for up to 6 days of refrigerated storage under aerobic packaging.

Keywords: *Telosma pallida* flower, Chicken meat cutlets, Physico-chemical attributes, Sensory attributes

Introduction
In recent years, the increasing focus on health, nutrition, and functional foods has significantly influenced consumer preferences toward healthier dietary choices. Among these, meat and meat-based products hold particular importance, as they provide high-quality protein, essential amino acids, and bioavailable micronutrients, contributing to appetite regulation and weight management (Jakobsen *et al*., 2014) [7]. However, the growing demand for nutritionally enhanced and value-added meat products has encouraged researchers to explore the incorporation of natural plant-based ingredients with functional properties.

Telosma pallida, a member of the family Asclepiadaceae, is locally known as “Versha Dodi” in Gujarati, and also referred to as “Radarudi” in certain regions. Traditionally recognized in ethnomedicine, this plant is reported to possess antifungal, antitumor, anti-asthmatic, and antioxidant properties, making it a promising natural bioactive source (Kanakhara *et al*., 2018) [8]. The incorporation of such medicinally valuable plant components into meat products could improve their nutritional profile, enhance functional benefits, and potentially extend shelf life through antioxidant action.

The increasing emphasis on health and nutrition has driven consumer demand for food products that are both wholesome and convenient. In this regard, ready-to-eat (RTE) and ready-to-prepare (RTP) foods have emerged as practical choices, particularly suited to the demands of modern, fast-paced lifestyles (Singh *et al*., 2014) [12]. Among these, meat cutlets represent a popular category of RTE products, commonly consumed as a breakfast item across different regions of the world. Cutlets are typically prepared as flattened croquettes composed of minced meat, flour, pulses, nuts, shredded potato, condiments, and spices, and are often coated with rusk crumbs to enhance texture and palatability. The expansion of the fast-food sector, fueled by rapid urbanization and shifting dietary preferences, has further contributed to the widespread acceptance and consumption of such convenient meat-based products.

Materials and Methods
Source of Raw Materials
Broiler deboned chicken meat, *Telosma pallida* flowers, spices, table salt

(Tata Chemicals Ltd, Mumbai), sugar, condiments (onion, ginger and garlic), vegetable oil (Sunflower oil - Adani Wilmar Limited Company) and low density polyethylene (200 gauge) bags were purchased from local market of Anand. All the chemicals used in the study were purchased from standard firms (Hi media). Condiments mix was prepared by peeling off onion, ginger and garlic, cutting in to small pieces and mixing it in domestic mixer. The *Telosma pallida* flowers were thoroughly cleaned and subsequently dried in a hot air oven.

Methodology for Preparation of Chicken Cutlets

Broiler deboned chicken meat was cut into small pieces and minced in meat mincer using 6 mm plate for two times and used for preparation of cutlet.

Chicken cutlets were prepared by slight modified method of Singh *et al.* (2014) [12]. *Telosma pallida* was incorporated at the levels of 3, 6 and 9% by replacing the lean meat in chicken cutlets formulation. Salt, sodium nitrite and sugar were added in minced chicken meat and fried for 3 minutes in 2.5% w/w refined sunflower oil. The condiments were fried separately till the appearance of light golden brown colour. The fried chicken meat, condiments and spices were mixed in mixer. After uniform mixing of all the ingredients, the batter was moulded into cutlets with the help of round shaped metallic moulds. The cutlets were deep fat fried in sunflower oil for 3 min till appearance of golden brown colour. The internal core temperature was measured with the help of a thermometer (80 °C) and the excess fat was removed from the fried cutlets by using tissue paper

(1) pH

The pH of chicken cutlets was determining by method of Trout *et al.* (1992) [15].

(2) Product yield

The product yield was calculated as:

$$\text{Product yield (\%)} = \frac{\text{Weight of cooked chicken cutlet}}{\text{Weight of whole cutlet dough}} \text{X } 100$$

(3) Proximate composition

Moisture, crude protein, crude fat, crude fiber, ash and calcium content of chicken cutlets were determined by standard procedure of Association of Office Chemist (AOAC, 1995) [3].

(4) Microbiological analysis

Standard plate counts, Psychrophilic counts, Coliform counts and Yeast and mold counts were enumerated following the method described by American Public Health Association (APHA, 2001) [4]

(5) Sensory evaluation

Sensory evaluation panel consisting of seven members of the College of Veterinary Science and Animal Husbandry, Anand participated in sensory evaluation. The chicken cutlets were evaluated for general appearance, flavour, juiciness, texture and overall acceptability (Keeton, 1983) [10], using an 8-point descriptive scale, where 8 is extremely desirable and 1 is extremely undesirable. The panelists were seated in a room free of noise and odours and suitably illuminated. Plain water was provided for oral rinsing between the samples.

(6) Statistical analysis

Each experiment was repeated for five times. The data obtained from each experiment was analyzed statistically for analysis of variance (ANOVA) and Duncan's multiple range test as per the methods described by Snedecor and Cochran (1994) [14].

Results and Discussion

Physico-chemical attributes

Mean values of the physico-chemical attributes of chicken cutlets incorporated with different levels of *Telosma pallida* flower are presented in Table-1.

Table 1: Effect of different levels of *Telosma pallida* flowers on physico-chemical attributes of chicken cutlets

Parameters	T_1	T_2	T_3	T_4
Product yield (%)	68.66±0.38^a	58.44±0.61^b	53.11±0.22^c	51.11±0.11^d
pH	5.89±0.005^a	5.84±0.004^b	5.81±0.004^c	5.74±0.008^d
Moisture (%)	39.66±0.29 ^{a}	36.46±0.37 ^{b}	31.40±0.19 ^{c}	28.97±0.68 ^{d}
Protein (%)	18.75±0.18^a	17.35±0.03^b	15.31±0.02^c	13.13±0.02^d
Fat (%)	20.68±0.02^a	22.79±0.04^b	23.36±0.06^c	26.42±0.07^d
Ash (%)	4.30±0.07^a	3.77±0.12^b	2.95±0.00 ^{c}	2.92±0.01^c

Mean± S.E. with difference superscripts in a row differ significantly (p<0.05)

The mean value of product yield of chicken meat cutlets varied significantly (p< 0.05) among treatments. The highest product yield was recorded in T_1 (68.66±0.38^a), followed by T_2 (58.44±0.61^b), T_3 (53.11±0.22^c), and T_4 (51.11±0.11^d).

The mean value of pH of chicken meat cutlets in T_1, T_2, T_3 and T_4 were 5.89±0.005^a, 5.84±0.004^b, 5.81±0.004^c, and 5.74±0.008^d respectively. The pH values among the treatments show a significant decreasing trend (p< 0.05). This suggests that the applied treatments had a measurable effect on the acidity level, with gradual reduction in pH across treatments. This result is accordance with those Abinayaselvi *et al.* (2018) [1].

The mean value of moisture of chicken meat cutlets in T_1, T_2, T_3 and T_4 were 39.66 ±0.29^a, 36.46±0.37^b, 31.40±0.19^c and 28.97±0.68^d respectively. Moisture content significantly decreased across treatments from T_1 to T_4. This finding is similar to Gamit *et al.* (2020) [6]

The mean value of protein of chicken meat cutlets in T_1, T_2, T_3 and T_4 were 18.75±0.18^a, 17.35±0.03^b, 15.31±0.02^c and 13.13±0.02^d respectively. Protein content decreased significantly from T_1 to T_4. This result accordance to Gamit *et al.* (2020) [6].

The mean protein content of chicken meat cutlets was recorded as 18.75±0.18^a, 17.35±0.03^b, 15.31±0.02^c, and 13.13±0.02^d in treatments T_1, T_2, T_3, and T_4, respectively. A significant reduction in protein content was observed progressively from T_1 to T_4. This result accordance to Gamit *et al.* (2020) [6].

The mean value of fat of chicken meat cutlets in T_1, T_2, T_3 and T_4 were 20.68±0.02^a, 22.79±0.04^b, 23.36±0.06^c and 26.42±0.07^d respectively. Fat content increased significantly from T_1 to T_4. This finding contrasts with the results presented by Gamit *et al.* (2017) [5].

The mean value of ash content of chicken meat cutlets in T_1, T_2, T_3 and T_4 were 4.30±0.07^a, 3.77±0.12^b, 2.95±0.00^c and T_4: 2.92±0.01^c respectively. Ash content decreased significantly from T_1 to T_3 and then remained stable between T_3 and T_4 (no significant difference between T_3 and

T_4). This finding contrasts with the results presented by Gamit *et al*. (2020) [6].

Sensory evaluation

According to the criteria of sensory evaluation, attributes such as general appearance, flavour, texture, juiciness, and overall acceptability were assessed. The selection of the best product was determined by the sensory evaluation panelists using the 8-point Hedonic Scale. Mean values of the sensory attributes of chicken cutlets of chicken cutlets incorporated with different levels of *Telosma pallida* flower are presented in Table-2.

Table 2: Effect of different levels of *Telosma pallida* flowers on sensory attributes of chicken cutlets

Sensory Attributes	T_1	T_2	T_3	T_4
General appearance	7.54 ± 0.10^{a}	7.17 ± 0.11^{a}	6.50 ± 0.19^{b}	5.92 ± 0.19^{c}
Flavour	7.58 ± 0.10^{a}	7.08 ± 0.15^{a}	6.38 ± 0.20^{b}	6.04 ± 0.24^{b}
Texture	7.17 ± 0.13^{a}	7.13 ± 0.17^{a}	6.58 ± 0.20^{b}	6.25 ± 0.22^{b}
Juiciness	7.13 ± 0.17^{a}	6.75 ± 0.17^{ab}	6.38 ± 0.18^{bc}	5.83 ± 0.21^{c}
Overall acceptability	7.38 ± 0.13^{a}	7.33 ± 0.17^{a}	6.58 ± 0.14^{b}	6.04 ± 0.17^{c}

Mean ±S.E. with difference superscripts in a row differ significantly ($p<0.05$)

The general appearance scores were highest in T_1 (7.54 ± 0.10^{a}) and T_2 (7.17 ± 0.11^{a}), with no significant difference between them. However, a significant decline was observed in T_3 (6.50 ± 0.19^{b}) and further in T_4 (5.92 ± 0.19^{c}). This indicates that visual appeal of chicken cutlets diminished progressively with treatment modification. The finding similar to Gamit *et al*. (2020) [6].

The mean value of flavour was rated significantly higher in T_1 (7.58 ± 0.10^{a}) and T_2 (7.08 ± 0.15^{a}), whereas lower scores were recorded in T_3 (6.38 ± 0.20^{b}) and T_4 (6.04 ± 0.24^{b}). This suggests that the treatments in T_3 and T_4 adversely affected flavour perception compared to T_1 and T_2. This finding is consistent with the results reported by Sivakumar *et al*. (2024) [13].

The mean value of texture scores remained comparable between T_1 (7.17 ± 0.13^{a}) and T_2 (7.13 ± 0.17^{a}), but declined significantly in T_3 (6.58 ± 0.20^{b}) and T_4 (6.25 ± 0.22^{b}). This reflects that treatments T_1 and T_2 were more effective in maintaining desirable textural properties of the cutlets. The result aligns closely with the observations made by Sharada *et al*. (2025) [11].

The mean value of juiciness was rated highest in T_1 (7.13 ± 0.17^{a}), followed by T_2 (6.75 ± 0.17^{ab}). A gradual and significant reduction was evident in T_3 (6.38 ± 0.18^{bc}) and T_4 (5.83 ± 0.21^{c}). This indicates that increasing treatment variation reduced moisture retention, thereby affecting juiciness negatively.

The mean value of overall acceptability was highest in T_1 (7.38 ± 0.13^{a}) and T_2 (7.33 ± 0.17^{a}), with no significant difference between them. However, a marked reduction was observed in T_3 (6.58 ± 0.14^{b}) and further in T_4 (6.04 ± 0.17^{c}), demonstrating that consumer preference declined with increasing treatment levels. These results are consistent with the observations of Kaur *et al*. (2022) [9], who reported that all sensory attributes, including colour and appearance, flavour, juiciness, and overall acceptability, exhibited significant decreasing trends at 2%, 4%, and 6% incorporation levels of cauliflower stem and leaf powder."

Based on sensory evaluation, the most acceptable product was Treatment T_2, containing 3% *Telosma pallida* flower powder. This formulation, along with the control, was further assessed for storage stability. The products were packaged in LDPE bags and stored under refrigerated conditions (4 °C). The mean values of sensory attributes of chicken cutlets prepared with the optimized level of *Telosma pallida* flower powder, along with the control, during refrigerated storage are presented in Table 3.

Table 3: Effect of refrigerated storage on sensory attributes of chicken cutlets prepared with optimized level of *Telosma pallida* flower

Treatments	Refrigerated storage period (Days)			
	0 days	3 days	6 days	9 days
General appearance				
T_1	7.75 ±0.16	7.13±0.12	6.50 ±0.18	ND
T_2	7.63±0.26	6.88±0.12	6.00±0.00	ND
	NS	NS	*	
Flavour				
T_1	7.38±0.26	6.88±0.12	6.50±0.18	ND
T_2	7.38±0.26	6.25±0.16	5.50±0.18	ND
	NS	**	**	
Texture				
T_1	7.25±0.25	7.00±0.00	6.38±0.18	ND
T_2	7.00±0.18	6.38±0.18	5.88±0.12	ND
	NS	**	**	
Juiciness				
T_1	7.38±0.32	6.75±0.16	6.25±0.16	ND
T_2	7.00±0.37	6.00±0.00	5.25±0.16	ND
	NS	**	**	
Overall acceptability				
T_1	7.75±0.16	7.00±0.00	6.38±0.18	ND
T_2	7.13±0.29	6.13±0.12	5.63±0.18	ND
	NS	**	**	

Mean± S.E. with difference superscripts in a column (*) / (**) differ significantly ($p<0.05$) / ($p<0.01$)
NS= None Significant
ND=Not detected

The mean value of general appearance at day 0, both T_1 (7.75 ± 0.16) and T_2 (7.63 ± 0.26) recorded high scores with no significant difference. By day 3, appearance scores declined slightly (7.13 ± 0.12 in T_1; 6.88 ± 0.12 in T_2), but the reduction was not statistically significant. However, by day 6, a significant decline ($p<0.05$) was noted, with T_1 (6.50 ± 0.18) maintaining a better appearance compared to T_2 (6.00 ± 0.00), indicating a progressive loss of visual appeal with storage. The flavour, initially in both treatments exhibited similar flavour acceptability (7.38 ± 0.26). By day 3, a significant reduction ($P<0.01$) was observed, with T_1 (6.88 ± 0.12) retaining superior flavour compared to T_2 (6.25 ± 0.16). On day 6, the decline was more pronounced (T_1: 6.50 ± 0.18; T_2: 5.50 ± 0.18), showing that storage had a detrimental effect on flavour, particularly in T_2. The mean value of texture scores remained high at day 0 (T_1: 7.25 ± 0.25; T_2: 7.00 ± 0.18) with no significant difference. By day 3, significant deterioration ($p<0.01$) was observed, with T_1 (7.00 ± 0.00) performing better than T_2 (6.38 ± 0.18). The decline continued by day 6, where T_1 retained acceptable texture (6.38 ± 0.18) compared to T_2 (5.88 ± 0.12). The mean value of juiciness scores were higher in T_1 (7.38 ± 0.32) compared to T_2 (7.00 ± 0.37), though not significantly different at day 0. By day 3, a significant reduction ($P<0.01$) was observed (T_1: 6.75 ± 0.16; T_2: 6.00 ± 0.00). The decline was more marked by day 6, with T_1 maintaining relatively better juiciness (6.25 ± 0.16) compared to T_2 (5.25 ± 0.16). The mean value of overall acceptability at day

0 was highest in T_1 (7.75±0.16), followed by T_2 (7.13±0.29). By day 3, a significant decline ($P<0.01$) was noted (T_1: 7.00±0.00; T_2: 6.13±0.12). At day 6, both treatments exhibited further reductions, but T_1 (6.38±0.18) consistently retained higher acceptability than T_2 (5.63±0.18). These findings are in agreement with the observations of Gamit *et al*. (2020) [6], who reported a significant decline in the sensory scores of chicken cutlets prepared with finger millet flour during the storage period.

Microbiological Quality

The mean values depicting the effect of refrigerated storage on the microbiological characteristics of chicken cutlets prepared with the optimized level of *Telosma pallida* flower powder are presented in Table 4.

Table 4: Effect of refrigerated storage on microbiological characteristics of chicken cutlets prepared with optimized level of *Telosma pallida* flower

Treatments	Refrigerated storage period (Days)			
	0 days	3 days	6 days	9 days
Standard plate count (log10 cfu/gm)				
T_1	1.22±0.09	2.62± 0.24	3.41± 0.06	4.79± 0.04
T_2	1.08± 0.05	2.26± 0.18	3.15± 0.02	4.53± 0.10
	NS	NS	**	*
Psychrophilic counts (log10 cfu/gm)				
T_1	ND	ND	ND	2.78±0.18
T_2	ND	ND	ND	2.08±0.05
				**
Coliform count (log10 cfu/gm)				
T_1	ND	ND	ND	ND
T_2	ND	ND	ND	ND

Mean ±S.E. with difference superscripts in a column (*) / (**) differ significantly ($p<0.05$) / ($p<0.01$)
NS= None Significant
ND=Not detected

The standard plate count at day 0, both T_1 (1.22±0.09 $\log_{10}$ cfu/g) and T_2 (1.08±0.05 $\log_{10}$ cfu/g) exhibited very low microbial loads, with no significant difference between treatments. By day 3, counts increased moderately (T_1: 2.62±0.24; T_2: 2.26±0.18), still without significant variation. At day 6, microbial proliferation became more evident, with significantly higher ($P<0.01$) counts in T_1 (3.41±0.06) compared to T_2 (3.15±0.02). By day 9, both treatments showed further significant increases ($P<0.05$), though T_2 (4.53±0.10) maintained comparatively lower counts than T_1 (4.79±0.04), suggesting a marginally better microbial stability in the flower powder incorporated cutlets.

The psychrophilic bacteria were undetectable in both treatments up to day 6, indicating good microbial quality during the early storage period. By day 9, significant growth ($P<0.01$) was observed, with T_1 reaching 2.78±0.18 $\log_{10}$ cfu/g, while T_2 recorded a lower count of 2.08±0.05 $\log_{10}$ cfu/g. This result suggests that incorporation of *Telosma pallida* flower powder delayed psychrophilic bacterial growth under refrigerated conditions.

The coliforms were not detected (ND) in either treatment throughout the entire storage period (0–9 days). This indicates that hygienic handling, processing, and storage practices were maintained, and the products remained free from coliform contamination during refrigerated storage. These findings are in agreement with the observations of Gamit *et al*. (2020) [6], who reported a significant decline in the microbial quality of chicken cutlets prepared with finger millet flour during the storage period.

Conclusion

Based on the evaluation of physicochemical, proximate, microbiological, and sensory attributes, the study identified 3% incorporation of *Telosma pallida* flower powder as the optimum level for chicken cutlet formulation. Products packaged in LDPE bags and stored under refrigeration (4°C) retained acceptable microbial quality for up to six days. Furthermore, cutlets containing flower powder (T_2) exhibited comparatively lower microbial counts than the control (T_1), indicating enhanced microbial stability.

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References

1. Abinayaselvi R, Santhi D, Kalaikannan A, Nandhini K. Effect of incorporation of finger millet (*Eleusine Coracana*) as a thickening agent in chicken soup. Open Access Policy. 2018 Jan;47(1):1199-1206.
2. Anandh M, Villi R. Effect of spent hen meat emulsion and ground meat on quality and acceptability of chicken meat cutlets. International Journal of Livestock Research. 2018 Dec;8:33-40.
3. AOAC. Official Method of Analysis. 16th edition. Association of Official Analytical Chemists, Washington, DC; 1995.
4. APHA. Compendium of methods for the microbiological examination of foods. 4th edition. American Public Health Association Washington, DC; 2001.
5. Gamit M, Gupta S, Savalia CV, Patel SA. Evaluation of Chicken Cutlets Incorporated with Whole Egg Liquid. International Journal of Agriculture Sciences. 2017 Feb:0975-3710.
6. Gamit M, Gupta S, Savalia CV. Quality characteristics of chicken meat cutlets incorporated with finger millet (Eleusine coracana) flour. Journal of Animal Research. 2020 Feb;10(1):111-6.
7. Jakobsen LM Arildsen, Vuholm S, Aaslyng MD, Kristensen M, Sørensen KV, Raben A, Kehlet U. Sensory characteristics and consumer liking of sausages with 10% fat and added rye or wheat bran. Food Science & Nutrition. 2014 Sep;2(5):534-46.
8. Kanakhara RD, Rudrappa HC, Shukla VJ, Acharya R. Detailed pharmacognostical and analytical profile of Telosma pallida (L.) kurz.(Leaf): A folklore medicinal plant of Gujarat State. Ancient Science of Life. 2018 Jan;37(3):120-6.
9. Kaur S, Goswami M, Kumar P, Mehta N, Sharma A. Utilization of cauliflower stems and leaves powder in the development of high fibre spent hen meat cutlets. Journal of Meat Science. 2022 Jun;17:17-24.
10. Keeton JT. Effects of fat and NaCl/phosphate levels on the chemical and sensory properties of pork patties. Journal of Food Science. 1983 May;48(3):878-81.

11. Sharada MS, Indumathi J, Reddy GB, Shakila S, Mouli AC. Effect of Incorporation of Potato Dried Powder on the Quality Characteristics of Spent Broiler Breeder Hen Chicken Koftas. International Journal of Bio-resource and Stress Management. 2025 July;16(7): 01-08.
12. Singh PK, Kumar S, Kumar P, Bhat ZF. Effect of mincing on the quality characteristics of chevon cutlets. Journal of Animal Research. 2014 Dec;4(2):193-200.
13. Sivakumar P, Manoharan AP, Muthusamy D. Effect on Some Physicochemical Qualities of the Minced Chicken Meat Cutlet Mixed With Raw Banana Peel Powder. Journal of Environment & Bio-sciences. 2024 Jun;38(1).
14. Snedecor, G.W. and Cochran, W.G. Statistical Methods. 8th Edn, Iowa State University Press, Ames, Iowa; 1994.
15. Troutt ES, Hunt MC, Johnson DE, Claus JR, Kastner CL, Kropf DH. Characteristics of low-fat ground beef containing texture-modifying ingredients. Journal of Food science. 1992 Jan;57(1):19-24.