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Shelf life study of marinated Peri Peri chicken wings under refrigerated storage

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Abstract
This research was undertaken to assess the storage life of marinated Peri Peri chicken wings with control raw chicken wings were evaluated for various quality parameters of chicken meat for six to seven days under chilled storage conditions. Generally the storage life of the chilled raw chicken wings is three to four days. When we marinate the raw chicken wings with spices, the shelf life of the product increases. There was slight deteriorative changes observed in the scores of quality parameters of fresh raw chicken wings when compared to marinated Peri Peri chicken wings as storage increased from one to six days at chilled storage of below 4 ℃.

Keywords: Peri Peri chicken wings, Marination, Shelf life

1. Introduction
Chicken meat is one of the leanest types of poultry meat because of the low fat and is a good source of protein (Castro Ferreira *et al*., 2000) [3]. Chicken meat is an excellent source of several important vitamins and nutrients such as iron, niacin, zinc, potassium, and B complex vitamins. Most of the fat in chicken is within the skin and most of the fat within the meat is in the dark meat i.e leg and thigh (Lemos ALSC *et al*, 1999) [4]. The white meat without skin is a good food source for people on low-fat and low sodium diets. It contains high level of monounsaturated and polyunsaturated fats which help to lower the levels of LDL cholesterol in blood. Chicken meat is easier to digest than other types of meat, which makes it a good choice for individuals who have digestive problems (Otles and Cagindi, 2008) [5]. Hence, the chicken meat marinated with peri peri spice mixes to improve the storage life of chicken wings under chilled conditions (Alvarado *et al*. 2007) [1].

2. Materials and Methods
The research was carried out to compare the shelf life of marinated peri peri chicken wings with raw chicken wings under chilled storage conditions. Different quality parameters of meat was conducted.

2.1 Experimental design
Freshly packaged chicken wings of commercial broilers were purchased from a local market in Hyderabad. The chicken wings were marinated with peri peri spice mix and packed and kept at below 4 ℃. The raw chilled chicken wings (without marination) are used as a control. The experimental parameters of both control and marinated peri peri chicken wings samples were analyzed for 6 days under chilled storage of below 4 ℃.

Table 1: Formulation of Peri Peri spice mix

S. No.	Name of the ingredient	Quantity (gm)
1	Red chilli powder	10
2	Black pepper	15
3	Parsley	10
4	Oregano	15
5	Garlic powder	10
6	Iodised salt	5
7	Tamarind powder	5
8	Onion powder	10
9	Lemon juice powder	10
10	Acidity regulator	10

Table 2: Formulation of Marination: Peri Peri chicken wings

S. No	Product	Quantity
1	Raw chicken wings (kg)	1.0 kg
2	Lemon juice (ml)	8-10 ml
3	Peri peri spice mix (gm)	160 gm

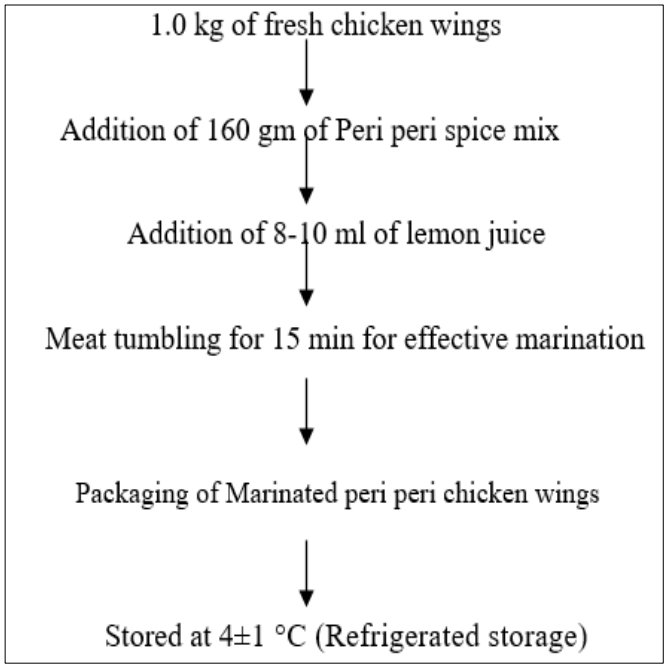

Fig 1: Processing flow chart

2.2 Shelf life study
Storage study was carried out for raw chicken wings and marinated peri peri chicken wings samples. Storage study was conducted for six days stored at below 4 ℃. On each test day, 3 samples of control and marinated peri peri chicken wings were assessed in triplicates for various quality parameters of chicken meat.

2.3 Physico-chemical parameters
2.3.1 pH
Calibrate pH Meter with Buffer Solutions of pH 4.0, 7.0 & 9.2. Prepare the sample by blending 15gm of Chicken Sample with 30ml distilled water at 2 rpm for 1min By Using Stomacher. Take prepared sample and check pH value.

2.3.2 Drip loss
The loss in weight of food upon thawing is called drip is nothing but loss in fluid during the thawing of meat .the materials lossed in drip loss are fat, blood, water, proteins. this fluid loss causes dehydration and nutrient loss in frozen food products. It results in dry tasteless products.

Drip loss % = initial weight –final weight/initial weight X100

2.4 Microbiological analysis
Total Plate count, Coliform count and Staphylococcus aureus count was enumerated for the raw chilled chicken wings and marinated peri peri chicken wings as per the standard procedure.

2.5 Sensory evaluation
The hedonic rating test 9 point scale is used to measure the sensory evaluation and consumer acceptability of chicken drumsticks.

3. Results and Discussion
3.1 Physico-chemical parameters
The Physico-chemical parameters (pH & Drip loss) of control and marinated peri peri chicken wings samples are increased during the chilled storage for 6 days, which might be due to accumulation of metabolites that resulted due to microbial growth. This results are agreed with the Rajani *et al.* (2007) [6].

Table 3: Physico-chemical parameters of samples

Days	Control sample		Peri peri chicken wings	
	pH	Drip loss (%)	pH	Drip loss (%)
1st	5.4	0.25	5.3	0.24
2nd	5.4	0.68	5.4	0.62
3rd	5.5	1.28	5.5	1.26
4th	5.6	2.89	5.6	2.06
5th	5.9	3.96	5.6	3.67
6th	6.2	4.80	5.8	3.98

3.2 Microbiological parameters
The microbiological parameters of control and marinated peri peri chicken wings samples increased during the chilled storage. As per the results there was not much increase in the microbial load of TPC, Coliform, Staphylococcus Aureus count in control sample from 1st day to 5th day. There is no spoilage detected from 1st to 3rd day but it started spoilage from 4th day onwards. Where as in Peri peri chicken wings samples, the spoilage observed after 6th day of chilled storage of below 4 ℃ similar results was explained by Anand *et al.* (1990) [2].

Table 4: Microbiological parameters of samples

Days	Control sample			Marinated peri peri wings		
	Total Plate count (cfu/gm)	Coliforms (cfu/gm)	Staph. aureus (cfu/gm)	Total Plate count (cfu/gm)	Coliforms (cfu/gm)	Staph. aureus (cfu/gm)
1st	30×103	12	Nil	10×103	04	Nil
2nd	32×103	14	Nil	16×103	06	Nil
3rd	34×103	16	01	26×103	07	Nil
4th	36×103	20	07	28×103	13	01
5th	44×103	24	11	36×103	15	03
6th	54×103	26	12	39×103	18	05

3.3 Sensory parameters
The sensory parameters of control and marinated chicken samples decreased during the chilled storage at below 4 ºC temperature. From 1st day to 6th day, the marinated peri peri chicken wings samples got the highest rating compared with the raw chicken wings sample. This results showed agreed with the Yusop SM *et al.* (2010) [7].

Table 5: Sensory parameters of samples

Days	Appearance		Color		Odour		Sliminess		Overall Acceptability	
	C	T	C	T	C	T	C	T	C	T
1st	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
2nd	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	9.5	10.0
3rd	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.5	9.0
4th	6.5	7.5	7.5	7.5	6.5	7.5	6.5	7.5	7.5	8.5
5th	5.5	6.5	4.5	7.5	3.5	6.5	4.5	6.5	3.5	6.5
6th	1.5	4.5	2.5	5.5	1.5	5.5	2.5	4.5	1.5	6.0

C- Control sample: T- Peri Peri chicken wings

4. Conclusion

Present research was conducted to know the shelf life of marinated peri peri chicken wings compared with control raw chicken wings. Results indicated that the all the quality parameters of marinated peri peri wings showed a better results compared to raw chilled chicken wings. Hence the the raw chicken wings (without marination) has the storage life of three to four days at chilled storage but the raw chicken marinated with peri peri spice mix (Peri peri chicken wings) is further increased the storage life from four days to six to seven days at chilled storage of below 4 ºC.

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