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Research Note

Optimization of Bamboo Chicken Processing

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Bamboo chicken is a traditional low fat meat product of coastal Andhra Pradesh. Processing method was standardized and product was prepared with both traditional bamboo and locally available bamboo. The products were analyzed for physico-chemical (pH and proximate composition) and sensory attributes. No significant different in pH, moisture and fat content and sensory attributes between the treated formulation and the control product was observed. The finished product is dry due to draining out of the fluid present in the bamboo chicken after cooking.

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India is a country with huge ethnic diversity and geographical variation which are the reasons for origin of different traditional products. Some of such products which involve traditional indigenous knowledge of meat product processing are Kargyong, Kheuri, Satchu, Arjia, Chilu, and Suka ko masu. These products are traditionally prepared by tribes and are consumed by the people of respective states and adjoining areas (Rai *et al*. 2009).One of such products is bamboo chicken, vernacularly known as Bongu kodi kura, a low fat meat preparation made with desi chicken meat. It is usually available in and around forest region of coastal Andhra Pradesh where Koya and Konda Reddy tribes live.The difficultyin procuring utensils and other required ingredients and their proximity of the tribes to Mullemu (*Bambusa bambos*) bamboo might have resulted in the origin of the product long ago. Further, bamboo is believed to possess certain antibacterial, antifungal and antioxidant properties (Ankur das *et al.* 2013). Bamboo clums have low fat and protein content and are rich in phosphorus and potassium. It contains moisture up to 92.5% and vitamins up to 0.3% (Visuphaka 1993). On the other hand *Bambusa bambos* bamboo which was abundant in this area is a less flexible bamboo of limited use. Utilization of this type of bamboo in preparation of low fat meat product like bamboo chicken will add a new use for it, making this bamboo economically more viable. The commercial value of this traditional preparation also encourages the backyard poultry farming of Desi chicken in practicing tribal groups. This preparation is most popular in adjoining areas as a low fat and less spicy preparation.

Traditional products of the tribal origin need to be propagated. Hence, the present study was aimed to document the preparation method and optimize bamboo chicken processing under the laboratory conditions.

A study was conducted to collect information regarding the origin of the product in the Maredumilli forest division of East Godavari district. Details about the product preparation were collected from the local people of Maredumilli, Pedda Geddada, Rampachodavaram, Pujaripakalu and Vetukuru villages where the tribes live.

Optimizing bamboo chicken processing: Optimizing bamboo chicken processing was based on combination of essential criteria such as cooking method, bamboo type and product stability during storage. The conditions of processing were reproduced in the laboratory.

To standardize the preparation of Bamboo chicken,desi birds of 6 months age were purchased at the backyard rural households in and around Gannavaram. The slaughter of the birds was conducted in Halal method and skinning was performed manually. The meat was deboned and cut into pieces of 3×1×1cm size and packaged in LDPE bags. The packaged meat was kept under refrigeration at 4 ± 1^0C till use. The chicken product prepared utilising the bamboo (*Bambusa bambos)*procured from region of its origin is taken as control group and the chicken product prepared with locally available bamboo (*Dendrocalamus strictus)* was taken as treatment group.

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About 500 g of deboned chicken pieces were marinated for one hour with ginger garlic paste, salt, lemon juice, chili powder, coriander, and cumin powder (Table 1). The marinated pieces were stuffed into the hollow of a bamboo clum and open side of the bamboo was closed with Teak (*Pterocarpus santalinus*) leaves. Then, the stuffed bamboo clums were subjected to cooking under direct flame from the combustion of fire wood simulating traditional cooking method. The bamboo was kept in slanting position at 45^0angle with open end up with frequent rotation of the bamboo at regular time intervals of 2 minutes till 20 minutes. Then,turned to horizontal position to allow draining of fluid which exudes out during cooking. When chicken was heated in bamboo, the fat was liquefied and expelled out along the liquid in the bamboo. The drained out fluid was collected and amount of drain out, and percent fat in the drain out were measured.

Table 1: Proportion of ingredients added to the standardized bamboo chicken

Ingredient	Percent
	92.54
	1.85
Chili powder	0.92
Ginger garlic paste	3.70
Cumin powder	0.37
Coriander powder	0.23
Lemon juice	0.39

Amount of drain out was measured by pouring the fluid into the measuring cylinder and recording it. Amount of fat in fluid drained out was measured through centrifugation of drained fluid at 2000 rpm for 10 minutes in a centrifuge (Remi, R 24) and the supernatant was collected. The collected supernatant was estimated for its fat content using soxhelt extraction apparatus according to AOAC and the percent fat in the drain out was expressed as percentage against total drain out.

The products were analysed for physico-chemical (pH and proximate composition) and sensory attributes. pH of the preparation was estimated by following the method of Trout *et al.*(1992) using digital pH meter (Oakton Instruments, USA). The percentage moisture, fat, and crude protein were estimated as per AOAC (1995). The sensory attributes viz., colour, flavor, juiciness, tenderness and overall acceptability were evaluated on a 9 point hedonic scale.

The data thus obtained for the above parameters were subjected to statistical analysis using SPSS MAC Version 20.

The physico-chemical properties and sensory properties of bamboo chicken preparation prepared with traditional bamboo (C) and locally available bamboo (T) were presented in Table 2.The pH values of the standardized products were well within the range and are in accordance with Singh *et al*. (2001) as in intermediate moisture chicken meat. Malav *et al*. (2013) also reported similar values in chicken meat blocks extended with sorghum flour and potato. No significant different in pH, moisture and fat content between the treated formulation and the control product.The finished product is dry due to draining out of the fluid present in the bamboo chicken after cooking. The unique feature of bamboo chicken was the draining of the fat present within the meat along with the drained out fluid.

The high values of protein content of the final preparation might be attributed to the evaporation of moisture content and decrease in the fat content. These results are comparable to findings of Singh *et al.*(2001) and Wang *et al.* (2009) who reported increase in protein content upon decreasing the moisture content. Sensory evaluation revealed no significant difference between control and treatment groups with relation to its colour, flavor, juiciness, tenderness and overall acceptability.

Table 2: Phisico-chemical and sensory attributes of bamboo chicken

Parameter	Control	Treatment
pH	5.84 ± 0.04	5.92 ± 0.06
Amount of drain out	101.67 ± 4.11^a	40.67 ± 1.33^b
Fat in drainout (%)	2.62 ± 0.22^a	2.15 ± 0.12^b
Moisture (%)	62.06± 0.32	61.8 ± 0.14
Protein (%)	27.55 ± 0.23^a	23.46 ± 0.39^b
Fat (%)	1.19 ± 0.16	1.02 ±0.05
Colour	7.48 ± 0.05	7.33 ± 0.10
Flavour	7.63 ± 0.11	7.39 ± 0.15
Tenderness	7.61 ± 0.24	7.22 ± 0.05
Juiciness	7.33 ± 0.26	7.39 ± 0.15
Overall Acceptability	7.76 ± 0.11	7.11 ± 0.15

Mean values bearing the same superscript does not differ significantly ($P<0.05$) for the given parameter.

(C-Preparation using *Bambusa bambos*; T- Preparation using *Dendrocalamus strictus*).

The bamboo chicken prepared with both traditional bamboo and locally available bamboo did not show any significant difference in the physico-chemical (pH and proximate composition) and sensory attributes. The finished product is dry and low in fat content.

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