Ethnic methodology of preparation of low fat meat products in North Coastal Andhra Pradesh

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An in-depth study of different indigenous meat products and their special attributes may be very useful in the development of meat industry, wherein meat based fast foods are gaining importance in all over the country. The documentation of traditional meat products was meagre or almost nil till recent times. Even though oral elucidation by the native people exists, the documentation was in its naive phase, keeping this traditional knowledge far from light. Ethnic tribes of Eastern Ghats of North Coastal Andhra Pradesh and Southern Chhattisgarh are well known for meat products preparation. Their culinary skills of making different preparations were known for making healthy, fat free and very low cost preparations. There were three such traditional/ethnic meat products Nara Kodi Iguru, Mamsapu Mottikalu, and Bongu Kodi Kura which are known for their low fat content. Scanty literature is found regarding culinary skills of making these products. This paper is aimed to document the culinary skills of these traditional/ethnic meat products and bring these delicious and healthy low fat meat products to the notice of the society.

Keywords: Mamsapu Mottikalu, Nara kodi Iguru, Bamboo chicken, Ethnic meat preparations, Koya & Konda Reddy tribes

Meat is part of the diet for 60% of people in India. Being a wide country with large number of ethnic groups with diversity in tradition, culture and varied food habits, a large variety of meat products on indigenous taste profile are being prepared and consumed in India. These products vary from region to region and place to place. They are mostly native in origin and termed as “traditional or indigenous meat products”. In and around North Coastal Andhra Pradesh Koya and Konda Reddy tribal groups exist since many centuries and meat makes important part of their diet. The remote geographical location kept them at far reach from the urban amenities. Proximity to the nature and locally available goods such as bamboos, leaves of different plants, mud pots encouraged them to develop different culinary methods to cook the meat with available resources in a simple and healthy way. Three unique methods of cooking are found to be reducing the fat content in the meat during the process of cooking. The chicken cooked in these methods was proved delicious. In ancient days sport animals like deer, porcupine, and wild hog were being used for preparation of these products along with chicken, mutton and beef. After imposition of the laws on hunting now preparations are restricted to chicken, mutton and beef, but the cooking methodology remained same for very long time.

In present society the fat consumption comes with caution. High fat intake is associated with increased risk for some types of cancer, and saturated fat intake is associated with high blood cholesterol and coronary heart disease. Consumption of a diet rich in fat has been identified as a risk factor for excess energy intake, positive energy balance, and the development of obesity. Consequently, health conscious individuals were modifying their dietary habits and eating less fat. Reduction of fat content was attempted with several of fat replacers by researchers during recent times. These replacers were successful in reducing the fat content of foods especially meat by mere substitution of the proportion of food content only. They cannot eliminate or exude out inter-muscular fat. For reducing the fat content in foods like meat fat replacers are being utilized, which could lower the fat content of the product without affecting the palatability. But they are successful to some extent only. The fat replacers like Olestra possess creates

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side effects like indigestibility, abdominal cramping, reduces the absorption of the vitamins. All these factors are forcing consumers to reduce meat consumption in their diet. But meat contains purest protein and Vitamin-B12. Protein diet is essential for various body functions of different age group of people and Vitamin-B12 is essential for brain functions and preventing Alzheimer’s disease. Hence, development of low fat meat products by adopting various processing techniques and culinary methods are essential to cater the need of animal protein and vitamin supplementation with low fat intake. Ethnic meat products processing tribal culinary preparation are areas of interest to find good processing procedures for production of low fat meat products without using fat replacers or advanced technology. In this context the methods of producing various traditional/ethnic meat products was of great importance, as it removes the fat through natural methods without addition of fat replacers, besides imparting a new taste to the meat products, finally presenting a healthy fat free and delicious product for consumers.

### Methodology

A field survey was conducted to understand the culinary methods which were known for production low fat ethnic meat products. The villages of Vetukuru, Maredumilli, Poojaari pakaklu, Guju maamidi valasa, Pedda geddada, and Rampa in the Maredumilli and Rampachodavaram forest range of East Godavari district of Andhra Pradesh, on the borders of Andhra Pradesh and Chhattisgarh were selected for the survey. A random sample survey was conducted in the above forest areas covering twenty households and five commercial outlets. The households were selected randomly from both Koya and Konda Reddy tribes. Hands-on-training and information regarding the products, procedure of preparation, history of the products and socio-economy was obtained through direct interaction with elderly people local households and commercial outlets. The Proximate composition (% moisture, % crude protein, % crude fat, and % ash) low fat meat products were estimated as per AOAC, 1995 at the department of Livestock Products Technology, N T Rama Rao College of Veterinary Science, Gannavaram.

### Results and discussion

People of Koya and Konda Reddy tribes are preparing meat products in proximity to nature with distinctive methodologies of cooking for very long time which are well known for their low fat content and also unique taste. Among these products three preparations are of great importance due to their low fat content. Among the three Bamboos chicken was getting market popularity in recent times but other 2 products were at juncture of extinction as they were rarely prepared and consumed today because of agile technical skills and very less span of error. The methodology of preparation of three products were documented and presented as under: Their proximate composition was evaluated to understand the nutritional value of the product.

**Bongu kodi kura (Bamboo chicken)**

It was locally well known preparation for its low fat content. It uses the *Bambusa bambos* (*Mullemu*) Bamboo for its preparation. It was not only lean preparation but also relished very much for peculiar flavour imparted by bamboo. The traditional method of preparation of bamboo chicken (Fig.1) starts with chopping chicken meat pieces uniformly, up to 1 kg and marinating them with lemon juice, salt, chilli powder, ginger garlic paste, cumin and coriander powder and left for 1 hr for proper absorption. The bamboo was cut below the node leaving one end open and washed with clean water. The marinated chicken was stuffed into the bamboo clum (*Bambusa bambos*) (Fig. 2) from the opening side and the opening was covered with *Teak* (*Tectona grandis*) leaves and stuffed bamboo was subjected to low and continues flame with frequent rotation till the meat inside was cooked (Fig. 3). During heating the temperature inside...
was 112 °C. At this temperature the liquid inside the bamboo oozes into lumen of the bamboo. Meat uses this liquid inside the bamboo and gets cooked. The change in the odour of steam and colour of drain out and the extent of bamboo heated indicates the time of completion of the product. After cooking the liquid was drained out of the bamboo by holding it upside down. The drain out brings the fat along with it leaving low fat meat in bamboo. Such low fat content of the preparation could be due to the processing method and the active ingredients like bamboo vinegar (acetic acid) and zhuli in the bamboo. Heat employed thermal decomposition of the active ingredients in the bamboo can lead to leaching out of the active component, i.e., fat into the cooking medium in which meat was present, thus expelling out the fat present in the product finally resulting in an extra lean product. After the collection of the drain out the Teak leaves kept as lid was removed and the cooked chicken was collected as ready to serve (Fig. 4). Due to absence of intra-muscular fat as soon as product cools down it loses the tenderness so the product must be kept inside the bamboo till consumption to maintain heat and eat before it cools down. Added oil or any other fat was not utilized for this preparation to enhance the taste making the product low fat and healthy. The imparted bamboo flavour to chicken during cooking makes the product delicious.

The % moisture, % crude protein, % crude fat, % total ash content of Bamboo chicken values were recorded as 62.06 ± 0.32, 27.55 ± 0.23, 1.19 ± 0.16 and 8.25 ± 0.37 (Table 1). The protein content of the product was high. It contains sixteen amino acids and rich in Lysine, Methionine, Cystine, Threonine, and Tryptophan. Though the fat content of the preparation was less the existing fat contain polyunsaturated fatty acids like Omega-3 and Omega-6 fatty acids. It has high mineral content especially very rich in sodium and iron. It is also a rich source of flavanoids acquired from bamboo which act as antioxidants.

The preparation with limited spices and low fat makes it safe for the people with genetic risk of fat accumulation and patient suffering with the cardiac problems. Polyunsaturated fatty acid (PUFA) prevents Hypertension, Hyperlipemia and Hyperglycaemia, controlling the cardiac problems in addition to anti-inflammatory effect. The flavanoids in the preparation attribute for the anti-cancer and antioxidant activity which helps the patients with rheumatoid arthritis and myocardial infarction. Bamboo chicken is also a muscle building food, and a perfect diet for body building with low fat, high protein and rich mineral content.

![Fig. 2—Stuffed chicken in bamboo](image)

![Fig. 3—Cooking of bamboo on flame](image)

![Fig. 4—Cooked Bamboo chicken](image)

<table>
<thead>
<tr>
<th>Name of the product</th>
<th>% moisture</th>
<th>% crude protein</th>
<th>% crude fat</th>
<th>% ash</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bongu kodi kura (Bamboo chicken)</td>
<td>62.06 ± 0.32</td>
<td>27.55 ± 0.23</td>
<td>1.19 ± 0.16</td>
<td>8.25 ± 0.37</td>
</tr>
<tr>
<td>Nara kodi iguru</td>
<td>59.34 ± 0.72</td>
<td>28.64 ± 0.39</td>
<td>2.47 ± 0.21</td>
<td>8.69 ± 0.75</td>
</tr>
<tr>
<td>Mamsapu motlikalu</td>
<td>65.34 ± 0.32</td>
<td>24.53 ± 0.03</td>
<td>2.09 ± 0.73</td>
<td>7.12 ± 0.35</td>
</tr>
<tr>
<td>Conventional chicken fry</td>
<td>61.26 ± 0.26</td>
<td>17.02 ± 1.49</td>
<td>18.05 ± 0.37</td>
<td>3.07 ± 0.21</td>
</tr>
<tr>
<td>Conventional chicken curry</td>
<td>74.72 ± 0.63</td>
<td>13.08 ± 0.73</td>
<td>11.06 ± 0.46</td>
<td>2.14 ± 0.36</td>
</tr>
</tbody>
</table>
**Nara kodi iguru**

Though this product has long history and similarity with Bamboo chicken it was not able to gain popularity like the bamboo chicken because of cumbersome procedure of preparation and leaves get burned even at small mistake or chicken remains uncocked. Due to these reasons this product was not being prepared routinely and was on the verge of extinction. *Nara* in Telugu means fibre pulled out of the petiole of toddy palm or palmyra (*Borassus flabellifer*) leaves. This fibre is used in preparation of this product. Hence the product got name “Nara Kodi Iguru”. Traditional method of preparation (Fig. 5) includes making chicken meat into uniform pieces and these chicken pieces are marinated with lemon juice, salt, chilli powder, ginger garlic paste, cumin, clove, cinnamon and coriander powder and left for 1 hr. In mean time green fresh Teak (*Tectona grandis*) leaves as plates in 4 layers. The marinated chicken was placed in these leave plates (Fig. 6) and tie with the sugar palm petiole fibres tightly and again cover with single layer of Teak leaves and tie with the sugar palm fibres, repeat the procedure simultaneously for next three layers of leaves. Teak leaves were being preferred as they impart very less extraneous flavour to the chicken. Hence, the flavour of chicken was unaffected. The entire meat pack was kept on the flame for about one hour (Fig. 7) by rotating it at regular interval of 5 minutes till cooking was done. After outer 3 layers of leaves are burnt (Fig. 8) and fourth layer of leaves turns to brown charred colour the product was removed from flame and the remaining layers of the leaves were removed and the product was served (Fig. 9). Similar to bamboo chicken, it should also be consumed hot as it loose tenderness upon getting cooled. The water inside the leaves is used for cooking the meat, as these leaves contain very less water no drain out was collected. Fat oozed out was less compared to bamboo chicken and fat gets adhered to the inner layer of leaves. This preparation neither utilizes the vegetable oil nor the fat present in the meat which makes *Nara Kodi Iguru* a low fat, healthy and delicious preparation for consumers.

The % moisture, % crude protein, % crude fat, and % total ash content values of *Nara kodi iguru* were

![Flow chart for preparation of Nara Kodi Iguru](image)

![Cooking the pack of leaves containing chicken](image)

![Pack of leaves containing Nara Kodi Iguru after completion of cooking](image)

![Cooked ethnic meat product of Nara Kodi Iguru](image)
recorded as 59.34 ± 0.72, 28.64 ± 0.39, 2.47 ± 0.21, and 8.69 ± 0.75 (Table 1). This product was also of a high protein food which consists of essential amino acids like Leucine, Lysine, Cystine, Methionine, Valine, Arginine and Tryptophan 3.25 gm, 3.68 gm, 0.55 g, 1.20 gm, 2.15 gm, 2.60 gm, and 0.5 gm, respectively per 100 gm of product (nut fact). It is also a great source of B complex vitamins and rich source of Iron, zinc, Phosphorus and Sodium. Though, it was low fat preparation it is an important provider of the essential polyunsaturated fatty acids (PUFAs), especially the omega (n)-3 fatty acids. Presence of essential amino acids, Polyunsaturated fatty acids required minerals and sufficient energy makes **Nara kodi iguru** a complete food.

As it was a protein rich food it helps in muscle building. The essential amino acids, B complex vitamins and zinc mineral present helps to overcome the neuronal diseases like Alzheimer’s and Parkinson’s. Omega (n)-3 fatty acids controls the cholesterol level preventing the cardiac related problems and Hypertension.

**Mamsapu mottikalu**

It was a fried product prepared from chicken and mutton. This product was well flourished in past but it was neglected now with advent of new easy recipes so the product was at the brink of extinction. The traditional preparation methodology involves two steps, step.1 (Fig.10.1) and step.2 (Fig.10.2) which requires two pots, mango leaves, bamboo stick mesh, chicken and spices.

**Step 1:** Bamboo mesh was prepared using 2cm width and 15cm long bamboo sticks with grid space of 2 sq cm. The chicken meat was sliced into 3cm long pieces. Make mango leaves into cones and were fixed with small sized twigs. The mango leaf cones were arranged in the grid space of the bamboo mesh and chicken pieces were placed in each cone (Fig. 11). The cones were closed with extra leaf. The pot filled with water and coriander, clove and cinnamon powder. Green chilli and crushed garlic and ginger pieces were also added to the water (Fig. 12). The mesh with chicken filled mango leaf cones was placed on the pot as lid, ensure that half of the cone would be dipped into the water. The pot was kept on flame and cooked it for about one hour (Fig. 13). During boiling the fat in the meat gets diluted and drained in the water making the meat low fat. While cooking, chicken attains the delicious flavour of mango leaves and spices added (Fig. 14).
**Step 2:** Another pot was kept on flame and salt, chilli powder, cumin powder, coriander powder and curry leaves were added. The cooked meat slices were then added to the dry pot (without water), fried on the flame for 2 minutes (Fig. 15). The powdered ingredients get adhered to the chicken and impart their flavour to the preparation on the fire giving the preparation its final stage (Fig. 16). This preparation was healthy with low fat and possesses relishing flavour. Yet the product was being underutilized because of its cumbersome procedure and lack of idea regarding its importance.

After second step the product was subjected to proximate analysis. The % moisture, % crude protein, % crude fat, % total ash contents of *Mamsapumottikalu* values were recorded as 65.34 ± 0.32, 24.53 ± 0.03, 2.09 ± 0.73, and 7.12 ± 0.35(Table 1). The values indicate high percent of protein and minerals. The product was rich source of antioxidants as it was cooked in spice and mango leaves decoction. It was great source of fat soluble vitamins like vitamin B complex and minerals like Zinc, Phosphorus, Selenium, Iron and Sodium. It contains essential amino acids like Methionine, Cystine, Leucine, Lysine, Tryptophan and Valine, Arginine. It was also a rich source of Polyunsaturated fatty acids like omega 3- fatty acids.

The Zinc and B complex vitamins help to overcome the neuronal problems like Alzheimer's disease. Selenium along with different anti-oxidants in spices act against the free radicals and prevent oxidative reactions that causes rheumatoid arthritis, and inflammation of large blood vessels. Due to its high fibre content it acts as laxative and promote better digestion.

The protein content of the chicken meat in chicken curry was 20.30 %\(^{16}\). The protein content of these traditional products was more than 24 %, this increase of the protein content was a comparative increase with respect to the reduction of the moisture and fat content. Removal of the fat was functional step in making of these preparations. During cooking of the chicken in bamboo or in pack of leaves or in the boiling water, the fat inside the meat gets diluted in the water in presence of heat and oozes out reducing the fat content in meat. According to US Code of Federal Regulations 1995 the above products can be considered as low fat products as their fat content was less than 3 %, where the fat in the general chicken curry was 11 %\(^{19}\). The major requirement of the fat was to enhance taste\(^{20,21}\). Without fat either traditional or processed meat products looses their taste but these three are exception they gain the additional flavours which impart them unique tasterelished by the consumers.

**Conclusion**

Advent of meat fast foods with exotic taste and lack of knowledge of these ethnic preparations kept...
them at the verge of extinction. These age old delicacies help the health conscious consumers to enjoy the traditional taste without any fear of fats and added chemicals, along with rich nutritional and medicinal values. Documentation of these products not only save these rare culinary skills of tribal people but also provide a market value for them. Introducing these preparations to scientific society opens the gates for further research which was need of time regarding low fat preparations.

References