J.Meat Sci., 2015, 10(2) : 40 - 43

Research Note

Survey on the Preparation and Consumption Pattern of Smoked Dried Beef in Kerala

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Idiyirachi is a traditional smoked dried beef available in hilly areas of Kerala. Hundred houses at Adimaly Gramapanchayat of Idukki district of Kerala were surveyed to document the information regarding method of preparation, ingredients used, packaging, storage and consumption of the product. Sun drying and/or smoking were the basic methods practiced to dry the meat. The representative sample when analysed for chemical composition varied non-significantly under different methods of preparation except acid insoluble ash. Aerobic plate count and yeast and mould count were significantly less in smoked beef samples.

Keywords : *Traditional knowledge, Smoked meat, Method of preparation, Consumption*

Received : 12-7-2014 Accepted: 16-9-2014

In India the people living in hilly areas produce and consume dried and smoked meat products. There are a number of traditional dried meat products prepared in different parts of the world that rely on the interaction of preservation techniques such as drying, use of salt and sugar and use of spices to limit microbial growth and to impart characteristic flavour. There are many methods used to prepare these ethnic meat products and such traditional meat products in many countries have been well documented and studied such as *pemmican* of North America, *charque* of South America, *Biltong* of South Africa, *kilishi* of Africa, *Alheira* of Portugal, *Androlla* of Spain, *Nham* in Thailand, *salsiccia* and *soppressatta* of Italy. *Satchu* and *sukakomasu* are dried beef products prepared and consumed by people living in Sikkim, Arunachal Pradesh, Darjeeling hills and Ladakh in India. Some of these ethnic meat products are sold in local market and it contributes to local economy. Smoked dried beef popularly known as *Idiyirachi* is a common value added preserved meat available in hilly areas of Kerala. Since many people have migrated from these areas to different parts of Kerala as well as to other places, such products are marketed extensively. An effort was made to record the traditional knowledge of the people in hilly tracts of Kerala on production of smoked dried beef *Idiyirachi.*

Methodology of survey: A survey was conducted with a questionnaire in 100 selected houses at Adimaly Gramapanchayat, Idukki district, Kerala to document the information about the method of preparation, ingredients incorporated, keeping quality, culinary skills on preparation, method of preservation and economics of producing locally available dried beef - *Idiyirachi*. Samples of dried beef collected from different producers were grouped based on method of preparation as sundried, smoke dried&sun dried and smoked for the analysis.

Quality analysis of the samples: Samples were analysed for proximate composition, *viz*., moisture, fat, protein, ash and acid insoluble ash content as per AOAC (1990). The energy content of smoked dried beef was determined as per FAO (2002) on wet matter basis by the formulae: Energy (kcal) = (fat per cent x 9) + (protein per cent x 4) + (carbohydrate per cent x 4). For sodium chloride content estimation, the samples were digested in concentrated nitric acid and perchloric acid. The wet ash obtained after digestion was used for estimating sodium content by flame photometer (Systronics 128, India). The sodium obtained in parts per billion was expressed as sodium chloride in gram percentage. pH was determined as per Garcia *et al*. (1995) by blending 10 g samples in 10 ml distilled water in a stomacher (Seward Stomacher® 400 circulator). pH of the resulting homogenate was measured with a digital pH meter (ìpH system-Systronics, India).The tyrosine values of the samples were estimated as per the method described by Pearson (1968) as an indicator of protein quality. The Tyrosine Value (TV) was calculated by reference to the standard graph and expressed as mg/100 g of smoked dried beef. The TBARS were determined as per Witte *et al.* (1970) with modifications as an indicator of lipid oxidation. The absorbance was determined at 530 nm against blank containing 5 ml distilled water and 5 ml 2-thiobarbituric acid

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solution (0.005 M in distilled water) in UV Vis Spectrophotometer 119 (Systronics, India). The absorbance was converted to TBARS values and was expressed as mg of malonaldehyde per kg (mg mal / kg) of smoked dried beef. Aerobic plate count (APC) of the sample was estimated by pour plate technique (Mortan 2001) and yeast and mould count as per Beuchat and Cousin (2001) per gram of the sample.

Statistical analysis: The data obtained were analyzed by one way analysis of variance using SPSS package (version 17) as per Snedecor and Cochran (1994).

Survey: Among 100 houses surveyed, 98 percent consumed either sun dried beef or smoked dried beef (Table 1). More than 50 per cent of the surveyed population consumed dried beef at least once in two to four months. About 12 per cent of the people consumed dried beef very rarely. It was observed that 82.65 percent of the consumers prepared product in their home itself. Among the 82.65 per cent who prepared dried beef at home, 64 per cent preferred smoke drying as the method of preparation. The other methods include sun drying (21 per cent) or a combination of sun drying and smoking (15 per cent). Salt was the major ingredient used for curing. Eighty persons out of 81 surveyed used salt as ingredient and 96 per cent used turmeric. Along with salt and turmeric few persons used ingredients such as pepper, chilli powder, garam masala etc. The period of sun drying varied from 3-6 days on hot summer days. The smoking was conducted by hanging the meat above the traditional oven and the smoke was generated from fire wood. The process continued for 3 to 4 days but not continuous smoking. The method of packaging included sealed polythene covers, wrapping in polythene covers, keeping in bamboo baskets or use of air tight containers. The average shelf life noticed was about 4 -5 weeks with shortest duration of 3 -4 weeks in plastic tins. But in the cases where the product was kept above the oven (continuous smoking) or in refrigeration (low temperature), it had an extended shelf life of 4-5 months. Rai *et al.*(2009) reported that *sukakamasu* (dried/smoked beef), an ethnic meat product of people in Darjeeling hills in India and Nepal, prepared by smoking buffalo/goat meat strips over earthen kitchen oven for 6-7 days had a shelf life of several weeks at room temperature. Lawrie (1998) reported 3 year or more shelf life for compressed blocks of dehydrated beef in sealed cans at moderate storage temperature with a decrease in reconstitution capacity after 12 months. In the present study, the storage period was very short mainly due to the unhygienic practice of preparation, packaging and the storage at ambient temperature. Out of 100 persons surveyed, only four has marketed their product on small scale in different areas. It was observed that there is a heavy demand and a good profit for the product. Unfortunately very few want to refine their technology and to get trained better in the field.

Quality analysis of dried beef

The moisture, fat, protein, ash, energy and sodium chloride content varied non- significantly ($P>0.05$) between dried beef samples prepared by different producers in different methods, whereas acid insoluble ash and carbohydrate content were

Table 1: Consumption pattern, source, common ingredients and method of packing and storage of dried beef

Consumption pattern (%)	Smoked dried beef	53
	Sun dried beef	18
	Both sundried and smoked beef	27
	Not consumed	2
Sources (%)	Market	6.12
	Home	82.65
	Free supply	11.23
Curing ingredients used	Salt	98.76
in the preparation (%)	Turmeric	96.30
	Pepper	39.51
	Chilli powder	4.94
	Other ingredients such as Garam masala,	3.70
	coriander powder, green chilli, ginger	
Method of packing (%)	Plastic tins (Room temperature)	45.68
	Polythene covers- sealed (Room temperature)	7.41
	Wrapping in polythene covers (Room temperature)	16.05
	Kept in bamboo baskets above oven	28.4
	Refrigeration	2.47

significantly different (P<0.05) (Table 2). Similarly, physicochemical qualities like pH, TBARS, TV, rehydration ratio were non-significant between samples procured from different producers. In light of the above, it could be inferred that the method of preparation ran down in the households from generation to generation. This was the reason, the physicochemical characteristics remained comparable. Aerobic plate count and yeast and mould count were significantly different among samples. Most of the educated Keralites are concerned about the intake of sodium chloride, this may be the reason, the product samples contained comparatively low percentage of sodium chloride and the mean content varied non- significantly between different methods of preparation. The aerobic plate count was 2.45±0.07 and yeast and mould was 2.95±0.06 for smoked dried beef which were significantly less in comparison to other method of preparation. Doe (1998) reported that smoking increased the shelf life of fish as a result of the combined effect of dehydration, antimicrobial and antioxidant activities of several smoke constituents mainly formaldehyde, carboxylic acids and phenols.The difference in aerobic plate count and yeast and mould count among the samples might be due to variation in the different surroundings where the products were prepared and handled.

Table 2: Physico-chemical and microbiological qualities of dried beef

	Sun dried beef	Smoked beef	Sun dried and smoked beef
Moisture	21.41±1.81	21.09±1.62	23.61±1.16
Fat	10.88±0.96	9.07±0.77	8.31±0.42
Protein	55.03±2.27	58.15±1.99	57.70±0.88
	5.51±0.43	4.97±0.61	4.64±0.56
Acid insoluble Ash	0.05^{a}±0.001	0.07^{b}±0.005	0.08^{b}±0.004
Carbohydrate	7.18^{ab}±0.40	6.73^{b}±0.49	5.74^{b}±0.28
Energy	346.75±8.2	341.10±6.8	328.56±6.71
Sodium chloride	3.86±0.95	2.67±0.40	3.04±0.67
	5.60±0.07	5.54±0.06	5.42±0.05
TBARS (mg malonaldehyde/kg)	0.62±0.07	0.44±0.04	0.62±0.07
TV (mg/100g)	1.09±0.05	1.07±0.05	1.05±0.06
Rehydration Ratio	1.25±0.02	1.15±0.01	1.16±0.02
Aerobic plate count	3.28^{a}±0.14	2.45^{b}±0.07	3.21^{a}±0.07
(log 10 cfu/g)			
Yeast and Mould count			
(log 10 cfu/g)	3.41^{a}±0.15	2.95^{b}±0.06	3.66^{c}±0.14

Means bearing same alphabets in the row do not indicate significant difference (P<0.05)

The survey and analysis of representative samples endorse the fact that the method of preparation ran down in the households from generation to generation. This was the reason, the physic-chemical characteristics remained comparable. But environmental factors and hygiene played a role in changing the quality of the product. From the response of the persons who marketed the product, it was observed that there was a great demand for the product. Even though they were not interested in refining their technology, the proper transfer of technology is important in improving the quality of the product.

The authors are thankful to the Dean, College of Veterinary and Animal Science, Mannuthy,KVASU, Kerala for providing necessary facilities to carry out this story.

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