# Technologies for meat & meat products

## ICAR-National Research Centre on Meat

Chengicherla, Hyderabad - 500 092, Telangana.

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

Agrisearch with a human touch

## Hygienic slaughter and dressing of food animals and poultry

Experimental abattoir at NRC on Meat has facility for imparting training on "Clean meat production" from sheep, goat and poultry. Sheep and goat slaughter facility includes animal restrainer, electric stunner, overhead rails, electric stimulator, carcass splitter, bone cutting saw and cold store facilities consisting of chilling, deboning and freezer rooms. Further, facilities like bleeding cones, scalder, defeathering machine and dressing tables are also available for hygienic slaughter of chicken. Institute is regularly conducting hands on training and demonstrations in clean meat production to various stakeholders viz, butchers, entrepreneurs, municipal health officials and veterinary officers. The experimental abattoir serves as model for entrepreneurs who want to establish small and medium scale units. Further, this unit is also utilized to impart in-plants training to students of Veterinary and Food Science on slaughtering of food animals. Complete package of practices for clean meat production, starting from live animal reception, lairage, hygienic slaughter and dressing, ante-mortem and post-mortem inspection, personnel and plant hygiene, meat borne zoonotic diseases, concept of HACCP in slaughter, cut-up parts, meat quality, packaging and storage will be demonstrated during the training. The Centre will also provide DPR and consultancy for any interested entrepreneurs for establishing the slaughterhouse.

On-line slaughtering and chilling facility for sheep and goat at NRC on Meat

## Technologies for value added meat products

A state-of-the art products processing facility with meat slicer, mincer, bowl-chopper, planetary mixer, vacuum tumbler, blade tenderizer, multi needle brine injector, batter applicator, automatic patty making machine, sausage stuffer, dual cooking oven etc. has been established for research, entrepreneurial training and new product development. The Institute has a newly established Incubation Centre exclusively for training entrepreneurs and also provides service facility for interested meat processors. Various meat products technologies available at the Centre are explained below:

Pilot plant

Incubation Centre

### ★ Technology for emulsion meat products

Small scale technologies with low cost machinery and locally available ingredients and culinary practices have great relevance in Indian situation for large scale adoption. Meat emulsion technology is a relevant technology for quality meat products production utilizing tough meat and by-products from old (spent) animals. A variety of products such as nuggets, patties, sausages slices, etc. could be produced utilizing simple appliances even on cottage scale. Many tested formulation utilizing various locally available ingredients like binders, extenders have been standardized for transfer to commercial production.

Chicken nuggets

Chicken sausages

### ★ Technology for restructured meat products

Restructured meat products are meat products that are partially or completely disassembled and then reformed into the same or different form. Processing technologies for protein rich restructured meat blocks, slices, cubes and restructured bites enriched with soya proteins have been developed.

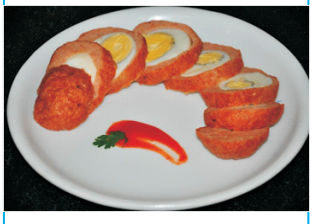
Restructured chicken slices


Restructured mutton ham

### ★ Technology for enrobed meat products

Enrobing is the process of making "further processed products" by applying edible coating to the products. It includes two important steps, i.e, breading and battering. It improves the texture of the product, consumer acceptability and remarkably reduces the product cost. Enrobing also contributes other benefits like preserving the nutritive value, reducing moisture and weight loss, and improving juiciness and tenderness. These improvements are brought about by coating ingredients that act as sealants and also prevent high oil uptake during

Drummettes



Enrobed chicken eggs

frying of products. The technology for production of succulent, attractive enrobed meat products utilizing locally available ingredients is available at the centre.

## ★ Technology for cured and smoked meat products

Cured and smoked meat products are very popular worldwide and form a considerable proportion of processed meats. In India among various meats, chicken and mutton are having higher acceptability. Hence, cured and smoked chicken legs, chicken breasts and mutton ham were developed as variety and value added products. The technology could be utilized for commercial production and is important both for minimizing adverse effects of imports and for promoting domestic sector prospects. Suitable packaging technology for preserving quality and extending shelf life was also standardized.

Smoked chicken leg and breast cuts

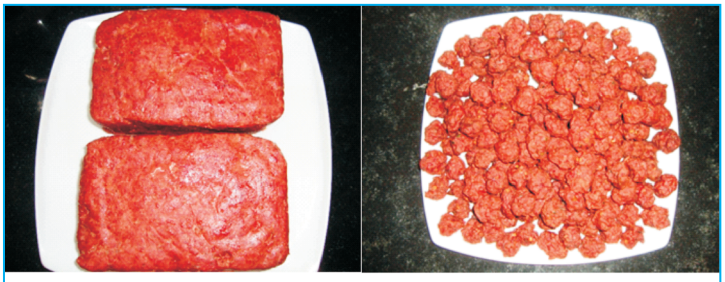
## ★ Technology for speciality meat products with health and nutritional benefits

Functional foods and natural health products encompass a wide range of food ingredients, with a variety of bioactivities responsible for their efficacy in health promotion and disease prevention. Value added convenience meat products with different natural ingredients like dietary fibres, natural antioxidants have been developed. In addition, meat products can be enriched with fibre to produce low fat and low cholesterol product.


Meat products enriched with plant fibres

## ★ Technology for value added emu meat products

Science based information on emu slaughtering, carcass characteristics, meat quality, composition, packaging, chilling and freezing has been generated and published Processing technologies for value added emu meat products viz, emu meat nuggets, patties, sausages, restructured emu meat cubes, enrobed emu meat products have been developed and provided hands-on training to emu meat processors.



Emu meat block | Emu meat croquettes

## ★ Technology for traditional meat products from chicken

### 1. Chicken Pickle

Technologies are available for processing of meat pickle from chicken carcass frames which carries considerable quantity of lean meat. Ready to eat chicken meat pickle with good taste and shelf life at ambient temperature can be made utilising the meat from deboned chicken frames.


Chicken pickle

### 2. Seekh Kebabs

Kebabs are traditional meat products popular among Indians and serve the purpose of both appetizers as well as snacks. Kebab processing technology involves blending of ground meat with salt, condiments and spices and molding the emulsion over a skewer (steel rod) smeared with oil in the form of cylindrical role and cooked in gas tandoor or hot char broiler till the desired colour develops.

Chicken seekh kebabs

### 3. Meat Balls

Processing of meat balls includes mixing ground meat along with other ingredients viz, green chillies, coriander, curry leaves and mint leaves in planetary mixer till the desired consistency of binding is obtained. The meat balls of approximately 25-30 g are made with hand and cooked in boiled water for 20 minute. The meat balls/koftas can be used for direct consumption with little shallow frying or can be made into kofta curry.

Meat balls

### 4. Cutlets

Fried and crispy chicken cutlets are made with minced chicken

and mashed potato mixed with condiments and spice mix. The cutlets are enrobed and fried to serve fresh or may be frozen. Processing technology for preparation of crispy and low-cost cutlets are available at the Centre.

Chicken cutlets

### ★ Technology for production of flakes from lamb rumen meat

Rumen constitutes major portion of ruminant's stomach and is being used locally in some parts of India for preparation of few specialty products. Technology was developed to prepare shelf stable, nutritious and tasty flakes from sheep rumen. These flakes can be stored at room temperature for about one year. These ready to use flakes just need frying before consumption at consumer level.

Ready to eat sheep rumen flakes

## Packaging Technologies

### ★ Retort pouch technology for shelf stable meat products

In developing countries like India, lack of cold chains and frequent power failures are major constrains in the preservation, distribution and marketing of highly perishable meat products. Economically viable technologies are needed to preserve the foods with longer shelf life. Technology was developed to prepare shelf stable, ready to eat (RTE) Indian traditional meat varieties such as curries, kheemas and soup. The products were thermally processed in pouches having shelf life up to six months at room temperature.

Retort pouch processing facility at NRC on Meat

### ★ Superchilling and vacuum packaging technology

Superchilling and vacuum packaging technologies for extending the shelf-life of buffalo meat steaks and mutton cubes up to 3 months without freezing with better quality attributes have been developed. Technology for extending the shelf-life of chilled chicken drumsticks upto 1 month without freezing has been developed. Technologies for extending the shelf-life of cooked and ready-to-eat meat products using different ingredient and packaging based approaches is also available.

Vacuum packed and superchilled chicken drumsticks

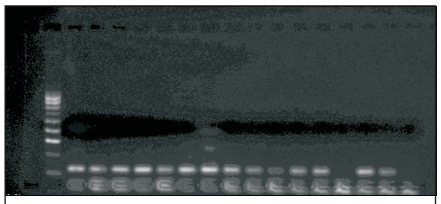
### ★ Sous-vide cooking technology

Sous vide processing technology is efficient in prolonging the shelf-life of chicken sausages to more than 90 days under refrigeration temperature (4 ± 1 °C) relative to aerobically processed control sausages which are stable for less than 20 days has been developed.

## Meat Speciation and Sex Identification Technology

### ★ Molecular techniques for meat species and sex identification

Technology for identification of species and sex of the animal from which the meat is produced has been developed which involves PCR amplification of Amelogenin XY gene. Technology is also available for detection of animal derived materials in foods and feeds.



PCR amplification of mt D loop primers by DNA extracted from binary mixtures of cow ghee and tallow

## Meat Animal Production Technology

### ★ Technology for development of complete feeds for augmenting meat production

Decreasing grazing lands and increasing labour costs call for improved meat animal production methods through effective utilization of alternative low cost feed resources. Crop residue based 'complete feed' system which can enable intensive sheep rearing for quantitative and qualitative improvement in meat production has been developed and demonstrated in the farmer's fields. This approach was found to give better economic returns per animal to the farmers and the meat of such animals was found to be of high quality.

### ★ Traceability model for export buffalo meat

Traceability is the ability to track or find out a product, batch and its history through the whole, or part, of a production chain from harvest through transport, storage, processing, sales and distributions. Centre has developed a complete system for tracing of buffalo meat. Owing to its export potential traceability can increase market access to Indian buffalo meat. System involves identification of buffaloes using RFID tagging and meat by using bar coding and through online database developed at NRC on Meat.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