Value Addition and Storage Techniques

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Summary

Currently, less than 30% of chicken meat is processed into clean precut preserved products across African countries. Most poultry are sold on live markets and slaughtered on-site which gives farmers lower returns and causes supply shortages and public health hazards. Secondary processing of whole raw chicken into value-added products and cold storage allow sales to a larger consumer base all year round thereby increasing revenue for producers. The demand for ready-to-cook or precooked chicken meat by households, institutions, and restaurants is rapidly increasing due to urbanization, income growth, and awareness for healthy diets and food quality. Expansion of product ranges and sales of processed chicken meat is limited by a lack of adequate technology and skill, insufficient cold chain facilities, poorly organized marketing system, and trade barriers. Mechanized equipment makes it possible to process high volumes, and refrigerators and freezers allow long-term storage and long-distance transport. Value addition and storage facilities are available for small and medium enterprises, and farmers can form cooperatives to raise sufficient capital and volumes.

Technical Description

Poultry farming is showing rapid growth across Sub-Saharan Africa, but the secondary processing industry of this value chain does not advance at an equal pace. Precut and precooked chicken are convenient for consumers because they reduce preparation time, offer relished portions and parts, reduce health hazards and risks of home butchering. Processing and storage technologies make it possible to expand the range of poultry products, augment value for producers, stabilize supply on local markets, and upgrade this agro-food industry. Strict hygiene and quality norms of processed poultry products must be maintained to promote marketing and consumption patterns. Small electric slicers, deboning machines and grinders are best suited for low volume poultry processing, while fully automated outfits exist for large enterprises. Packaging for storage, transport and marketing can be done using wrapped trays or airtight packages, each serving different markets. Chamber-style vacuum sealers allow strict portion control, long shelf-life, and high food hygiene. For preservation, processed poultry products must be rapidly cooled to 4°C within two hours after slaughter, achieved through different combinations of forced air, water immersion, spray, or vacuum chilling.

Uses

Semi-automated processing plants for small to medium-scale operations are usually located on poultry farms that have a capacity of handling a few thousand chicken per day. Fully mechanized chicken processing plants are located close to clusters of large poultry farms and usually have a capacity of more than 50,000 chickens per day.

Composition

Equipment for cutting, deboning, grinding, and chilling can be bought as individual components or as an assembly production line. Depending on preferences of consumers poultry can be processed into two halves or separated into wings, legs, and breasts, with or without skin and bones. Further processing involves ready-to-cook marinated, chopped, breaded, crumbed, glazed, roasted, fried, and grilled products.

Means of application

After defeathering and disembowelment the whole bird is passed onto cutting stations where it is divided into different parts. Deboning is most common for breasts (fillets and tenders), and sometimes applied to thighs. Before packaging and chilling, the clean and cut meat is portioned based on weight, length, width, and thickness. This step is key for marketing, price control and food safety. Restaurants and fast-food kitchens rely on portioning since they apply standard cooking procedures where meat is placed in a fryer at a set temperature and time. Portions that are too heavy or thick will not reach a safe internal temperature with programmed settings.

Agroecologies	All Agroecologies.
Regions	Africa South of Sahara.
Developed in Countries	Benin, Zimbabwe, Zambia, Uganda, Tanzania, South Sudan, Somalia, Sierra Leone, Senegal, Rwanda, Nigeria, Niger, Mozambique, Malawi, Madagascar, Kenya, Ivory Coast, Guinea, Ghana, Gabon, Ethiopia, Democratic Republic of the Congo, Central African Republic, Burundi, Botswana.
Available in	Benin, Zimbabwe, Zambia, Uganda, Tanzania, South Sudan, Somalia, Sierra Leone, Senegal, Rwanda, Nigeria, Niger, Mozambique, Malawi, Madagascar, Kenya, Ivory Coast, Guinea, Ghana, Gabon, Ethiopia, Democratic Republic of the Congo, Central African Republic, Burundi, Botswana.
Solution Forms	Equipment.
Solution Applications	Value addition, Agri-Food Processing.

Agricultural Commodities	Poultry.
Target Beneficiaries	Agro-dealers, Commercial farmers, Small-scale farmers.

Commercialization

Commercialization Category

Commercially available

Startup Requirements

Various factors must be considered when beginning a poultry processing business; most importantly the laws and regulations concerning food safety and enterprises to get the permits and licenses, the target market to get the right product and sales strategies, the location with access to clean water, reliable electricity and waste disposal, and the appropriate size of equipment, staff training and quality assurance procedures. The main investment for a poultry processing plant are the machines for cutting, deboning, chilling, and refrigeration. Costs heavily depend on the capacity, location, and sundry expenses.

Production Costs

Prices of small electric processing machines range from US $ 500 to $1,000. A basic processing plant with defeathering, cutting and storage lines for 500 chicken per day has a start-up cost of US $15,600. Further costs include salaries for butchers and electricity for running machines and cold storage facilities, which are more than US $4,000 in total for a 500-bird per day plant.

Customer Segmentation

The largest client base for processed poultry are supermarkets, restaurants, caterers, and institutions (e.g., schools, hospitals, and factories). High-quality and appropriately portioned chicken products open new markets and have a very large growth potential.

Potential Profitability

Information from Ghana’s poultry industry shows that a 500-bird processing plant has a net present value of more than US $110,000, a value:cost ratio of 1.06, and internal return rate of 303%. The sector analysis shows that investments become financially nonviable when the supply cost or sales incomes change by 9%. Generally, higher gross profits are obtained by larger enterprises, smaller operations have to manage costs more carefully.

Licensing Requirements

Details about the equipment design and production lines are protected by trade secrets. Food safety, enterprise and environmental regulations exist for poultry processing industries in African countries that must be through licensing and regular inspection.

Innovation as Public Good

Some of the knowhow for preparing precut and precooked chicken products is a Public Good which is disseminated by the International Livestock Research Institute.

Solution Images



Processed poultry products popular with consumers



Low-capacity external vacuum sealer

Institutions



Accompanying Solutions

Mechanized Defeathering and Egg Sorting