

Processed Meat Products in a Changing World

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ABSTRACT

Today's consumers want foods that are convenient, of good quality, and are healthy and safe, yet provide diversity in terms of new flavours, products, and are good value for money. Product development by the red meat industry must meet consumers' diverse needs, otherwise the industry will continue to lose market share. The meat industry can meet consumers' needs in many ways, including: providing meat in a form ready to be used as a food ingredient by food processors and the hospitality trade; developing products for ethnic markets; developing products that meet demographic changes in the population; developing products suitable for consumers with compromised immune systems; developing products with reduced fat, salt and nitrite contents; developing meat-based nutraceuticals; providing meat products that require minimal further preparation and/or cooking; and providing portion control. The issue of food safety, as meat undergoes further processing and handling during processing, distribution and sale, and less heat treatment by the end consumer, must also be addressed. Meat fulfils many nutritional needs; this must also be recognized and used as a selling point.

INTRODUCTION

The world is changing. Its population is rapidly increasing and is expected to double by the year 2025. Advances in health and nutritional sciences are ensuring that people live longer, and people want to lead active lives well into their retirement. The world is becoming a global village, both from a communication and an economic point of view. Household units are becoming smaller, more children are attending school than ever before, and once at school are staying longer. More caregivers of both the elderly and the young in the family unit are working. People have less time to cook. In the Western world, and increasingly in Asian and other countries with growing economies, these trends have meant a growth in convenience foods, particularly ready meals, and in the food service industry. Tremendous improvements in processing and packaging technologies have helped this change to 'consumerism'. People are more willing to try or to adopt new foods, and religious beliefs and groups are demanding products to suit their beliefs and traditional tastes. Also, there is an increasing concern about food safety; which becomes of greater importance as conditions that compromise our immunity are discovered. These demographic changes have translated into an increased demand for processed meat products (Anon., 1996a; Fowler, 1997), which represents an opportunity for processed meats in general and processed red meat products in particular. The red meat industry needs to do more to take advantage of these changes for the following reasons:

- The industry is still suffering from a commodity mentality and is lagging behind the pork and poultry industries in developing added-value products.
- Consumer concerns about nutrition and health are causing a decline in consumption of red meat products.
- Consumer concerns about food safety, in terms of bacterial and chemical contaminants, as well as the BSE issue, are decreasing the demand for red meats.
- Consumer concerns about animal welfare are also decreasing the demand for red meats.

For the industry to be more competitive, it must turn away from its current commodity-based mentality to one of adding value through further processing. A diverse range of products that meets the needs of all segments of the population needs to be developed. The red meat industry also needs to keep up with changes in consumer needs and perceptions and have a rapid response attitude to address issues that arise.

STRATEGIES FOR PROCESSED MEATS TO MEET THE DEMANDS OF A CHANGING WORLD

More convenience

Convenience means appropriate portion size, fast and easy preparation, and easy clean-up (Borchert, 1990). Convenience will remain a key factor in determining which products are developed and marketed (Anon., 1996b), and product convenience must be matched by guaranteed good taste, eye appeal and safety.

A significant population segment is always 'on the move'. Processed meat products that fit this life style are best represented by the snack meat products (Armstrong, 1996a). These foods are eaten 'on the run'. The red meat industry can exploit this category to improve their product range. Dried or intermediate moisture meat products that are shelf stable and require no further heating can be produced easily with beef. The advantage of the large cuts possible with beef carcasses and the low fat content of beef compared to pork. MIRINZ's Processed Meats Section is involved in developing different categories of snack meat products, including both traditional and soft beef jerky products and snack sausages (McBeth, 1996; Anon., 1997b). Traditional sausage, pastrami or corned beef type products could be made more convenient by producing smaller packaging smaller portions to meet the requirements of single consumers and the older and younger segments of the population.

The consumer is looking for easy-to-use products. Meat is now often seen as an ingredient, rather than as the traditional major part of the meal. Although consumers may still want to do the 'cooking', they do not want to do the messy pre-preparation operations. Instead, they want convenience in the form of minimal preparation. Free-flow frozen meat pieces, whether as cubes or ground meat, enable the end user to have a convenient ingredient stored in their freezers. When required, they just need to remove the amount they want and return the rest to the freezer. This is how we view frozen vegetables such as peas, beans, carrots, corn, cauliflower and broccoli. It is also how we have come to view chicken products, fish products and shellfish. Free-flow, easy-to-use products are also seeing increased demand in the food service industry - for pizza toppings, patties, taco fillings, etc. MIRINZ is involved in product development in this area.

Many households now have microwave ovens. For these households, and particularly the younger generation in these households, conventional cooking methods are something from the past. The red meat industry is lagging in producing meat preparations that are microwavable yet produce an appetizing and appealing meal. Too many times, consumers try to adapt a slow-cook red meat preparations for microwave cooking, only to come up with a tough, dry dish. The challenge for meat processors is to develop meats that can be microwaved yet retain the expected texture, colour and flavour. In this way, the end user can have the meal on the table within 20 minutes of starting the preparation.

The development of cold-set binders has given meat processors new ways to meet consumer requirements for convenience. The cold-set binder systems commercially available allow processors to restructure irregular trim and/or large cuts into attractive, chilled portions of convenient size. The opportunities for creativity are limitless - it is possible to restructure fresh meats into products containing vegetables or fruits, and to bind different types of fresh meats together. These restructured products allow consumers to prepare their own meals, with the added advantage of minimal wastage and preparation time, and with products being available in quantities to suit individual needs. There is also the possibility of preparing variations that meet special dietary needs in terms of salt and fat content, and increased levels of desirable nutrients such as vitamins and minerals.

Meat as an ingredient

Convenience foods and food service are the growth areas of the food industry. New Zealand has long been an exporter of commodity meat in terms of boxed beef. Developing a large range of retail products for export is risky. However, the New Zealand industry could supply meat to food processors as an ingredient to be used in formulations. This meat could come in a wide variety of forms - diced, sliced, minced; it could be supplied chilled, frozen, or dried, including freeze dried (dried forms could include powder, dried granules or dried cubes for use in different food products, and especially in the diets of the very young, the elderly, or invalids); and it could be supplied cooked, cured, fermented, or raw. In other words, meat would be supplied to overseas food manufacturers in a partially processed form intermediate between raw meat and the final retail food product.

The term coined by a former MIRINZ staff member for this type of meat is Intermediate Meat Products or IMP's (Archibald, 1990). An IMP has three basic characteristics: first, it is processed; second, it guarantees to meet certain specifications agreed to with the food manufacturer or other end user; and third, it is sold in bulk. Producing IMP's is a complete departure from the current way of handling of meat as a commodity. Once the meat is in 'ingredient' form, it could be added to a formulation or food product similar to the way spices and other condiments are used. For example, many food manufacturers require diced meat for stews, pies, or ready meals. New Zealand could supply meat that has guaranteed dice size, guaranteed tenderness, guaranteed fat content and is presented to the customer free-flow frozen. The diced meat could then simply be added directly to the formulation during manufacture of the final product. Trends within the food service industry favour partially prepared products that only require adding sauce, heating, and serving. This is because of the trend towards deskilling kitchens in restaurant chains and towards centralized kitchens preparing meals by the cook-chill method.

The inherent advantages of IMP's for food manufacturers are that manufacturers would have to do only a minimal amount of processing to incorporate the meat into their products; and that the meat would be supplied to each manufacturer's specifications, allowing the manufacturer to produce a guaranteed-quality food product. Producing to specifications means that New Zealand meat processors will have closer contact with their end users, and have greater control over the meat because distribution channels will be shortened, which will decrease distribution costs. New Zealand processors should be able to tell food manufacturers about the unique advantages of New Zealand meat, and be able to demonstrate a unique advantage of New Zealand's meat over that from elsewhere. The strategy of being a supplier of IMP's to food manufacturers overseas rather than making retail products for export has the extra advantage that the overseas food manufacturer will know the market better, is better able to detect and respond to market changes, and does not have to worry about tariffs and other trade barriers. These overseas food manufacturers may also have access to cheaper labour and appropriate packaging and labelling for the market.

Several studies have been done by our group at MIRINZ to determine the feasibility of adding value to manufacturing meat by further processing the meat for later use as an ingredient in processed meat products. These include studies on the processing factors likely to affect the processing characteristics of pre-rigor salted meat exported for patty and sausage manufacturing (Dibble, 1993, 1994a,b; Sadler 1993; Swan and Hall, 1995; Boles and Swan, 1996; Farouk and Swan, 1997a). These studies have shown that export of pre-rigor salted meat is feasible within the prevailing practices in New Zealand meat plants. Both producers and end-users can gain from this product. Red meat producers would retain and gain markets for their commodity and end-users would have raw material of good functionality with some of the processing already done for them. As well as pre-rigor mincing and salting of meat, red meat producers could inject ingredients pre-rigor so the end-user has meat suitable for different product formulations, such as restructured products, with minimum effort. For example, another study (Farouk and Swan, 1997b) showed that roasts made from manufacturing meat from grass-fed bulls, which had been injected pre-rigor with a salt/phosphate brine and then stored at -18°C for 5 or 10 weeks, was more acceptable to consumers than roasts made using uninjected beef from grass-fed bulls or grain-fed beef.

"Lite" processed meats

There is an increasing consumer demand for healthier products. This includes reducing the fat content, total calories, cholesterol content, sodium content, and nitrite content (Amey, 1996; Colmenero, 1996). Consumers want the level of artificial additives to be reduced substantially or even totally eliminated from processed meat products and often want them to be replaced with 'natural' products. Several techniques and ingredients are currently being used to produce low fat processed meat products (Pearson and Gillett, 1996; Colmenero, 1996; Friedman, 1996). However, no satisfactory substitutes have yet been found that will replace fat completely in foods. Other issues such as the use of nitrites in cured meats are still being debated (Cassens, 1995). However, while consumers are concerned about health and often demand "lite" meat products, they are not willing to sacrifice product quality such as taste, mouthfeel, safety and appearance for the sake of reduced kilojoules.

Processed meats as nutraceuticals

Nutraceuticals are foods with perceived medicinal or health benefits that may prevent, ameliorate or cure a disease (LaBell, 1993). Nutraceuticals may include isolated nutrients, dietary supplements, fat replacers, omega-3 fatty acids, fibre, oligosaccharides, lactoferrin, garlic, ginseng, vitamins, minerals, proteins and peptides, bacteria and phytochemicals (Duxbury and Swientek, 1992; Woolen, 1994; Bello, 1995). With increased awareness of health and health-related issues, consumers are more receptive to the idea of nutraceuticals. The processed meat products industry should exploit the situation and position products to offset the already weakened image of meat in the eyes of the consumer. Although the New Zealand Lamb and Beef Marketing Bureau has successfully argued the case of beef and lamb in their recent advertisements, which portray red meat as a rich source of iron and zinc, both essential elements in our diet. The next step is to show what can be done with meat to provide other much-needed nutrients.

Some nutraceuticals (such as garlic) are already being used in meat, but mostly to improve the functional and eating qualities of the product rather than as a medicinal or health-promoting food. Manufacturers of processed meat products should consider incorporating fruits, vegetables and many of the products that the cereal and beverage industries are already using. The increasing number of fruits and vegetables that can now be successfully freeze dried and the number of essential nutrients for human health that have been identified present a wide range of possibilities for the processed meat products industry. There is no reason why a sausage type product could not be developed that meets consumers' requirements yet also provides consumers with a given proportion of their daily nutrient requirements. Processed meats should target meat to the various needs and lifestyles of groups in the population. For instance, processed meats that are not calorie or additive laden could be directed to toddlers and school age groups as well as the aged; processed meats that enhance performance could be targeted towards active people. Prevention of disease is of concern to many people. Speciality processed meats that ameliorate existing conditions may be the way to go. With any food product, taste, appearance and safety of nutraceuticals must be guaranteed and product quality must be verified.

Processed meats for those with compromised immunity or sensitivities

An increasing number of individuals are sensitive to some of the natural and artificial additives currently used in processed meat products. Although these individuals do not form a large proportion of consumers in any one location, the strides made in communication and improved packaging mean that specialized products can be marketed to this sector. The dairy and associated industries have succeeded in providing products to several groups with various sensitivities to milk and milk products; the processed meat industry also needs to meet this challenge. Advances in medicine and related fields have allowed several immune-related illnesses to be identified. Another challenge for the processed meats industry is to develop products that are suitable for consumers with compromised immunity.

Processed meats to meet religious and ethnic needs

Religious beliefs and practices strongly influence people's perception of foods and thus the desirability of various types of foods in overseas markets (Chaudry and Regenstein, 1994). There is a global emphasis in food marketing and an increasing number of individuals with ethnic desires for or religious biases against certain meats. The meat industry must understand the requirements of these groups. Globalization is likely to lead to stronger adherence to a person's culture, including dietary beliefs, so religious and ethnic minorities can assert their identity and prevent complete assimilation into the general population. Also, the increasing level of affluence and education in some developing countries means that people are changing from traditional domestic food preparation. These changes are likely to increase demands for processed meats that meet the religious as well as the nutritional needs of the population. For instance, demand and consumption of halal and kosher foods has risen tremendously in recent times (Chaudry, 1992; Regenstein and Regenstein, 1992). New Zealand is currently the largest exporter of halal slaughtered sheepmeats and a significant exporter of halal slaughtered beef (Anon., 1996c), but most of this meat is currently exported in commodity form. There is a potential for halal processed meat products for markets in the Middle East, Asia, Africa and for migrant populations in non-Muslim countries. The exclusion of pork from the diet by many religious groups and the processing difficulties posed by poultry make the red meat industry an advantage in many markets around the world. Within the red meat industry, the weakened image of beef due to the recent BSE scare, combined with taboos associated with pork, make lamb/mutton products appealing to consumers (Farouk *et al.*, 1996). Satisfaction in religious/ethnic markets does not rest solely on the acceptability of the meat alone, but also on the ingredients and additives used in processing.

There is a trend towards increased consumption of more ethnic foods by the general population as well as by ethnic groups, and an increasing demand for variety meats (Bean, 1996; Sloan, 1996). The processed meat industry should seriously consider these marketing opportunities. The ethnic market can be an outlet not only for the usual red meats but also for 'non-traditional' red meats, including goat and camel, and for variety meats. The production of safe and palatable products to meet the growing needs of this market segment makes economic sense. For example, there is potential to process and sell goat meat to niche markets in Asia, where goat meat is traditionally consumed, or to Western countries where there are ethnic communities that traditionally eat goat meat but currently receive no or an inadequate supply of this meat. The demand for goat meat in North America currently exceeds supply due to an expanding ethnic consumer population (Glimp, 1995). Markets can also be developed in affluent countries by producing high-quality, differentiated "Westernized" goat meat or offal meat products that meet preferences of

traditional consumers of these meats (Zijdeveld, 1987). In Western societies, health problems are often associated with affluent mal-nutrition rather than under-nutrition. The lower fat content of most of the lesser known meats may encourage their acceptance over other meat sources. The success of such products will depend, in part, on flavour manipulation and product presentation, including packaging and promotion (Swan *et al.*, 1997).

Processed novel meats

Consumers want novelty in the foods they eat, and this extends to meat source. Many types of meats have been developed for niche markets. Most of these meats are currently sold fresh or frozen but they could also be further processed to add value. The demand for ostrich, emu, wallaby and kangaroo meats is growing (Alessio, 1992; Armstrong, 1996b; Berge *et al.*, 1997). Commercial possum farming and processing, for export markets in Asia, is a viable venture in New Zealand (Rodgers, 1994; Scrimgeour, 1994; Anon., 1996d). Added to this list of exotic meats are alligator, crocodile and bison (Anon., 1996e; Dunn, 1996). Some of these animals are considered pests in their countries of origin but are regarded as delicacies or exotic by many individuals. After some time, these meats may become a part of the regular diet. For example, farmed venison was a novelty 10 years ago but is now not regarded as a 'novel' meat. The red meat industry in countries that have these 'exotic' species needs to take the lead in researching and developing processed meat products from their meat.

Food safety

The increasing part that further processed foods plays in the lives of busy people has a down side - that of occasional failures in food safety. Hardly a week goes by without some report about people's health status being compromised because of contaminated food. Food safety issues will be talked about by other keynote speakers. Suffice to say that all processors should keep food safety uppermost in their minds when processing meats. Systems must be in place to monitor the quality of the ingredients coming in, and the integrity of the process and the cold chain through to the consumer. Processed meat products will be accepted by consumers only if they are convinced that these foods are safe.

CONCLUSIONS

We live in a changing world. The red meat industry needs to provide what its end users want. The end user is no longer a stay-at-home housewife bringing home a large piece of meat to be prepared and cooked for her large family over several hours. Changing lifestyles, increasing affluence, and demographic changes mean that more and more people are spending less and less time on preparing meals, and even on eating them! Product success in the next millennium will depend largely on mapping products accurately to meet the needs of the niche markets existing in our societies (Hollingsworth, 1996). It took many years for the red meat industry to change from delivering meat as a carcass to presenting it as boneless meat in a box; I hope that it will not take the same length of time for this industry to provide processed meat products that are convenient, versatile and innovative.

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