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Importance of meat packing

Darko Veljanovski*, Blagojce Najdovski [2]

[1]*Faculty of Biotechical sciences, St.Clement Ohridski Bitola, Republic of North Macedonia*
[2]*Faculty of Biotechical sciences, St.Clement Ohridski Bitola, Republic of North Macedonia*

[1]*(darko.veljanovski@uklo.edu.mk) Email of the corresponding author*

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Abstract – The meat industry is an important sector of the food industry in the world and is in first place among several ranked agricultural and livestock products such as milk, wheat, corn, rice, but the industry in the Republic of North Macedonia is not so developed due to economic conditions. Both animal husbandry and meat production in the industry have a great socio-economic importance in the country. Apart from the production of meat and meat products, storage is also important, and above all of permanent and semi-permanent meat products.

The meat and meat processing industry is constantly growing, but the production is not for that industry, indeed the meat habits, lifestyles of the population are changing, quality awareness and changing food habits and hence there is a market for scientifically produced meat products. There is also a demand for processed, packaged and ready-to-eat or ready-to-serve meat products that require minimal preparation. Meat and meat products are classified as fresh meat, frozen meat, dry meat, thermally processed meat and dehydrated meat products. Packaging requirements may vary in terms of the requirements that packaging must meet for the product itself. In any case, fresh, frozen or dehydrated meat cannot and must not be kept in the same way, much less be kept and stored in the same conditions. Each product must be stored according to the conditions of protection.

Keywords – packing, meat, safety, healty food

I. INTRODUCTION

Food packaging is an integral part of food processing and a vital link between the processor and the eventual consumer for the safe delivery of the product through the various stages of processing, storage, transportation, distribution and marketing[1]. All over th-e world, consumers are showing greater awareness of food packaging as it provides awareness of quality, quantity and hygiene standards. A very important aspect for meat preservation is the proper packaging of the product. The main purpose of packaging is to protect the meat or meat product from microbial contamination, the effect of light, oxygen or any physical damage or chemical change. The choice of packaging material should be made very carefully to protect the product from different physico-chemical properties such as the nature of pigments, sensory attributes and microflora. The goal is to slow down or prevent major changes and make them happen products available to consumers in the most attractive form. However, the initial quality of the meat it must be very good because the packaging can only maintain the existing quality of the meat or delay it

the onset of spoilage by controlling the factors that contribute to it. The product, therefore, is protected only for a limited period determined by the packaging system used. Thus, meat and meat products need a specialized packaging profile depending on the type of processing, storage condition and distribution.

With respect to each group of products shown above, their packaging requirements and types are discussed separately, because every of them is different.

II. MATERIALS AND METHOD

Packing of different types of food is suitable for every food and food product, especialy for meat and meat products. Mostly used types of meat in this country are frozen and fresh meat.

Frozen meat

A large part of the produced meat is stored as a frozen meat, so freezing is one way to preserve meat, that offers the greatest advantages of increasing shelf life, and paralelly with that inhibiting the growth of bacteria and preserving flavor and texture. Somethimes when the frozen meat is not properly packed, there is dehydration occurs with burns from the refrigerator itself. In this case the texture, color and smell of the meat are changing, and meat fat is also prone to developing oxidative rancidity if it is well oxygenated the barrier is not used.

Because of that and similar reasons, frozen meat needs protection from dehydration and loss of surface texture, temperature fluctuations, collecting smells/tastes, loss of moisture etc. [3]

Fresh meat

In contrast of the other ways of storing meat, fresh meat is very easily perishable and in itself is a biologically active product. Its quality depends on the growth of microorganisms, as well as the enzyme activity and oxidation itself. Microbiological activity continues even after the cooling and packaging process itself, although at a reduced rate. The fresh meat itself is influenced by factors that make it less salable, namely the changes in taste, texture, color and most strikingly the smell. The pigments that are present in fresh meat are proteins i.e. hemoglobin and myoglobin. Myoglobin is the one that has a purple-red color which is the characteristic color of fresh meat when it is fresh and it will be cut. Myoglobin in the presence of oxygen is transformed into oxymyoglobin, which gives the meat a bright red color, while in the absence of oxygen, oxymyoglobin is converted back to myoglobin. Hemoglobin has the function of transporting oxygen in the blood, and in contrast, myoglobin has a role in storing oxygen in cells.

An unwanted brown color on a meet is formed due to the formation of methamyoglobin, which occurs when the meat is exposed to air for several days. Another form of discoloration of the surface of the meat is the reddish-brown color which is due to the dehydration itself that acts on the meat on its surface and this results in the concentration of the pigments. Additional pigmentation can also occur, and this occurs when moisture from the interior containing dissolved pigments migrates to the surface and evaporates. Another factor that accelerates the drying and oxidation of meat itself is ultraviolet light, and other unwanted tastes, smells and textures can appear due to the action of enzymes, mold, bacteria and oxygen in general, especially if they are not properly controlled. During the storage of fresh meat, the taste or smell can be disturbed due to the collection of foreign odors or as a result of oxidative limitation.

Considering the factors mentioned above, the main role of fresh meat packaging is to prevent the loss of moisture, to offer the meat to consumers in the desired red color, in parallel to prevent bacterial contamination of the meat and to prevent the absorption of external flavors and odors in meat, the control of oxygen transfer is also important.

In order to prevent dehydration of the meat, the relative humidity should be 82% to 92% during its storage, and this can be achieved by using packaging material that has a good water vapor barrier. The material should also prevent the absorption of odors and tastes from external sources. Control of oxygen uptake depends on a compromise between the development of ideal color and the prevention of fat oxidation. For such and similar reasons, it is recommended to use a plastic film with measured properties of oxygen impermeability.

Temperature is the most important factor in keeping fresh meat, but the material in which it is packed is also of particular importance in terms of its permeability to light, oxygen, etc.

III. RESULTS

Different types of meat are packing in different packing material and different conditions

Packing frozen meat

Plastic packaging is among the most commonly used materials for packaging frozen meat, so low-density polyethylene is usually used for this purpose, which in principle provides adequate clarity and is highly stable at low temperatures and is inexpensive.

PE packaging material - polyester or nylon, laminate films and heat-shrinkable low-density polyethylene films, as well as polyvinyl chloride and den chloride copolymer films can provide functional properties in addition to providing an attractive and transparent appearance to frozen cuts of meat.

The packaging itself enables practical handling of the product. Frozen meat can be in the form of slices, ground or various pieces. The individual packages are placed on the market with different weights, and after placing previously suitably cut or minced meat in the bags, they are folded, so that the packaged product is then sent to quick freezing at -40°C for a period of 4 to 12 hours in depending on the size and shape of the package. After freezing, the individual packages are packed and stored in boxes made of paper or plastic, which are either waxed internally or on both surfaces. These boxes are stored at -20°C and the expected shelf life for the product is generally one year.

Packaging of dehydrated meat

Dehydration is a successful way to store many meat products in suitable packaging because they oxidize easily resulting in a change in their smell. Most often, metal materials are used for packaging, i.e. cans, but due to the availability and price of the packaging material, laminates of metal foil with plastic foil, inner cellophane with outer paper, aluminum foil with PE laminate are often used. Such packages have a shelf life of one year without special storage conditions, i.e. in markets on the shelves for one year. Flexible pouches suitable for modified atmosphere vacuum packaging made of polyester - polyethylene - aluminum foil - PE or cellophane - with polyethylene and aluminum foil with PE laminates are often used.

Packing of semi-permanent meat products, dry meat

Dry meats as a semi-permanent meat product such as ham, bacon, luncheon meat have a maximum 15 days shelf, stored on 4°C depending on the degree of hardening. Its attractive pink color present in the dried meat is because of the pigment called nitrosomyoglobin. Enzyme like this is more stable than oxymyoglobin, which is realy easy oxidized to methamyglobin. The color of the meat depends due to action of light.

Packaging requirements – most important from the semi-permanent meat package is minimizing light fading by preventing the entry of oxygen and moisture loss.[4] By freezing or cooling is expected to be reduced the spoilage bacterial and yeast growth. On the package must be able to withstand low storage temperatures and also present an attractive appearance. The packaging material must be with better barrier standards to oxygen and water vapor, also it should be flexible so enough to make a closure surface contact with flesh. Most important for this package is that packaging film should be capable of lamination or co-extrusion and hermetic sealing.

This kind of meat packing can be:

- Shrink packaging – PVDC/PVC
- Over wraping - PVC
- Vacum pack – mostly used (shell life - 8 mounts at 18 °C) can be used following materials:Polyester, Cellophane, Polyamide, Metalished Poliamide or Etil Vinil acetate ect.

Packing of cooked (thermo processed) meat

Thermally processed meat is preserved and has a long shelf life of over two years. Heat treatment is done above 100°C by applying pressure, in principle such meats are hermetically sealed in rectangular tin containers that are easy to open. [5] Meat products such as sausages, meatballs are packed in bags made of polypropylene, polyethylene, polyvinyl chloride, hydrochloride, etc., with short-term storage at 4°C for 10-12 days.

Other products like Corned Beef, Corned Pork, Gravy, Meat Soups, Liver Sausages, Curried Chicken, Boneless Chicken, etc. are hermetically sealed and boiled for commercial production for long-term storage at room temperature. Metal containers are used for this purpose.[6]

Canned meat has a shelf life of several years at room temperature. For the packaging of these products, tin packaging is usually used, which is coated with sulfur-resistant lacquer on the inside. Shallow graphic treated aluminum cans with internal varnish are also used for packaging some products.

DISCUSSION

In this countru region mostly used and the best-selling meat products are semi-permanent, dry meat products. Most likely it is because of their willingness and easy way of preparing a meal, so because of that people in this country region can do their meal fast and healty, because this kind of meat is truly healthier than any other non-meat food.

For examle from the following few days in the period from May 15-30, 2024, the most selling meat products in the following market were semi-permanent meat products with about 70% of the total sold meat products, while the least sold was fresh meat of any kind with about 5% of the total the meat sold.

Modern time, needs modern solutions, so people need to save their time because of the fast kind of life.

IV. CONCLUSION

A growing demand for processed, packaged, convenient ready-to-eat and preparation meat products, various specialized package profiles are used in the characteristics of the type of processing techniques and storage conditions. From fresh meat to dried meat, from pork to poultry, the purpose of packaging is mainly to make products for customers in the most attractive form while maintaining the quality of the contents.

Plastics are used in every form of packaging such as trays, folds, shrink films, MAP packaging, while plastics in the form of laminates, plain films, folds have major features in carrying the barrier properties and aesthetics of packaging media.

All in all, the use of plastic in the packaging of meat and meat processing and finished products acts as one of the main factors in the growth of the food industry today.

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