

# *Case Ready Red Meat—Demand and Technology*

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## Introduction

The demand for case ready red meat is to say the least, at an all time high. Processors and retailers are working together to meet this demand, rapidly deploying resources and programs that will ensure a successful conversion of in-store merchandised products to products that are centrally packaged. The poultry industry successfully made this conversion several years ago, to the point that very little turkey and chicken is fabricated in the retail outlet. In addition, the lamb and veal industries in the U.S. have adopted this model at a level that, on a percentage basis, is much higher than the level currently utilized by the beef and pork industries. In fact, with all of the discussion of case ready red meat in the U.S. and Canada, it is projected that only about 6-8% of the red meat supply in North America is presented in the case ready format.

The goal of this paper is to concentrate on the growth of technology utilized in centrally packaged beef and pork. The discussion of technology will not be inclusive, as there are other technologies employed on a smaller scale or that are currently in development in this rapidly changing field. It will be through this review that we will be able to address some of the key technological challenges that face case ready red meat development with the goal of spurring discussion and thought as to how to overcome these challenges.

## The Demand for Case Ready Red Meat

Central packaging of case ready red meat is not a new concept and has been employed by a certain portion of the

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industry for several years. In the last three years, it is estimated that the amount of centrally packaged case ready meat in the U.S. has doubled (Keith, 2001). The following is a discussion of the factors that have led to the increased demand.

**Shortage of skilled labor at the retail level.** Retailers are faced with a tremendous challenge to continue to find and develop skilled labor to effectively merchandise beef and pork. There are fewer and fewer members of our economy today who chose to obtain the skills necessary to merchandise meat in a retail outlet and are also willing to devote the long hours necessary to this demanding task. Central packaging of red meat offers a solution, as the volume of labor required is lower than in a de-centralized model, and the training issues can be more effectively managed in a central packaging model.

**The changing nature of the retail market.** The retail industry is faced with tremendous pressure to control the overall costs and complexity of the retail outlet. In addition, the schedules of today's retail customer have changed as have the schedules of the retail market. A much larger percentage of the retail meat purchases are occurring outside of the hours that retail meat staffs are employed. Many large retail outlets are now open 24 hours. With these factors, keeping a retail meat counter fully stocked is more difficult today. Central packaging of red meat offers a solution, as the labor and skill level involved to keep the meat case fully stocked is much less with pre-packaged cuts.

## Packaging Formats Commonly Employed Today

### *High Oxygen Packaging*

**Traditional Overwrap.** This widely employed option offers the retailer the look of beef and pork that is merchandised in the retail outlet. In addition, this option is generally the lowest cost to produce from a packaging materials standpoint. Cuts and ground meats are placed in a polystyrene (Styrofoam) tray and overwrapped with film of high oxygen transmission. The most obvious drawback to this option is the relatively short shelf life of this product. Depending on cut and species, the shelf life from time of cutting is generally 5-7 days, which must accommodate distribution and display life. This shelf-life is extended by a matter of 3-7 days (again, depending on species and cut) by placing the trays in a master bag that is commonly flushed with a gas mixture of 80% oxygen and 20% CO<sub>2</sub>. This mixture allows for the sustained presence of

oxymyoglobin while offering the bacteriostatic effects of CO<sub>2</sub>. This high oxygen format is most successfully employed in situations where the distribution time is relatively short.

**Lidded Tray.** The lidded tray offering refers to the placing of a cut or ground meat in a tray with high barrier properties and sealing this tray with a high barrier film. One of the benefits of this packaging option is that it is probably the truest form of case ready offered to retailers today. To elaborate, many of the options employed today are not true “case ready” in that even though the product is cut and packaged prior to arriving at store level, removal of a master bag precludes and in some cases, pricing and dating of the product still need to take place at store level. The lidded tray format, if pre-priced and pre-dated, allows the retailer to simply remove the product from the box or tote and place it in the case. Traditional overwrap packages, if pre-priced and pre-dated, also fall into the category of true “case ready.” However, if packaged in a master bag, still require incremental labor outside of opening boxes and placing product in the case. Some of the drawbacks to this option are that the shelf life is still relatively short (10-16 days, depending on species and cut), a certain amount of “headspace,” or additional gas volume in the package is required, and the cost of barrier trays is generally higher than traditional polystyrene trays that require no headspace.

#### *Low Oxygen Packaging*

**Vacuum Packaging.** Vacuum packaging is the most obvious means to offer a case ready solution. However, due to the fact that consumers are much less familiar with buying meat that is displayed in the deoxymyoglobin state, the offering of case ready meat solutions in a vacuum package is primarily limited to pork, offal and some specialty meat products such as marinated and seasoned cuts. Large scale offerings of centrally vacuum packaged beef steaks, roasts and ground beef was a concept that has been attempted in the past, with minimal success. However, processors continue to offer many items, especially pork ribs, backribs and tenderloins in a vacuum package that offers convenience to the retailer and a unit size that is acceptable to the consumer.

**ActivTech™.** The Pactiv Corporation has developed and offers an innovative low oxygen solution for processors and retailers. Conventional polystyrene trays with high oxygen permeable film are placed individually or in master bags and flushed with a mixture of CO<sub>2</sub> and nitrogen. In addition, an oxygen scavenger that has been activated to rapidly consume residual oxygen in the tray and in the package is included in the master bag or sleeve. This system results in far superior shelf life to high oxygen packaging. Pork packaged in this format is successfully achieving 21 to 28 days shelf life. This option is more commonly applied to products that have to undergo more extensive distribution than is required in circumstances that employ high oxygen formats. The obvious drawback to this system is incremental cost of utilizing the activated oxygen scavenger. However, this cost can be offset by the gains in shelf life.

**CapTech™.** Patented technology of the Securefresh Corporation, this system was implemented first by the New

Zealand and Australian lamb and veal industries. Cuts and ground meat are placed in a polystyrene or plastic tray and wrapped with high oxygen permeable film. The trays are placed in a master bag and the bags are fully vacuumized before introduction of CO<sub>2</sub>. An oxygen scavenger is also employed by these systems, but due to the fact that the amount of oxygen is so low in these bags, the capacity of the scavengers required is much lower than in systems that do not employ a full vacuum. Again, the true advantage of this system over high oxygen systems is the long shelf life that can be achieved (21-28 days). The drawback to the system is the need for a more expensive plastic tray, or the use of “open cell” foam trays, which allow for the more rapid depletion of oxygen during the vacuum phase.

### **Key Technological Challenges**

Processors, equipment and packaging suppliers and retailers have worked and researched extensively to develop successful case ready programs today. The overall goal is to produce the safest, highest quality product that will meet the distribution demands of a particular customer, while keeping costs at such a level that will allow for competitive pricing in the protein market.

To conclude this paper, it is important to identify what these authors feel are the most limiting factors in the production of high quality case ready red meats. Certainly, maintenance of a safe product is the most important challenge and with proper controls at critical processes, proper cold chain management, source verification, employee practices and training, the case ready industry can continually produce a safe product. The most common areas of opportunity for a case ready supplier are adherence to product specifications, packaging integrity and order accuracy. All of these factors are operational and can be addressed. As we consider the shelf life of case ready products, many consider bacterial deterioration to be the limiting factor. Certainly, if proper cold chain management, raw material selection or packaging integrity is not followed, bacterial deterioration will be the limiting factor.

However, assuming that these factors are being properly addressed, the most limiting factor in the quality of case ready red meats is color stability. Two pork chops or steaks, in the same package, from the same muscle, with similar product color at the time of cutting, can differ in the time that elapses before the formation of metmyoglobin by a matter of days. It is the opinion of these authors that we need to better understand the characteristics inherent to muscle that impact color stability. Reducing the variation of muscle color stability will dramatically improve the overall quality of case ready red meat.

In addition, as we consider low oxygen systems, the ability of myoglobin to bloom in a rapid time frame upon introduction of a high oxygen environment is a critical challenge. It is essential that oxygen be removed as rapidly as possible in the initial packaging in order for the “re-bloom” to be rapid and complete. This is a critical challenge to low oxygen programs. The inherent ability of muscle to rapidly convert to

deoxymyoglobin in the initial low oxygen packaging and then rapidly convert back to oxymyoglobin upon introduction of oxygen is a critical limiting factor of these systems.

In conclusion, the case ready red meat industry has grown rapidly and will continue to grow at an unparalleled pace. It is important that researchers understand the types of tech-

nologies utilized in these systems in order to more completely and precisely address current and future technological issues.

## References

Keith, H. 2001 Case Ready or Not? Proc. of Ann. Meat Conf., Charlotte, NC, April 23-24. American Meat Institute, Washington, D.C.