



## MEAT PROCESSING: RESTRUCTURED MEATS

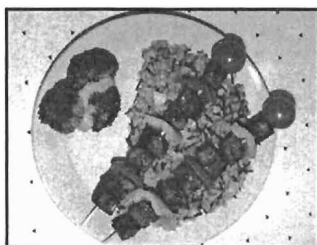
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### Introduction

Current trends show increasing consumer demand for consumer-ready meat products with smaller portion sizes, less fat and salt, as well as being easy and fast to cook.

Unfortunately, only 25% of a carcass yields middle cuts that are normally used for consumer-ready steaks and kebabs. A large part of the carcass is processed into lower value ground products such as hamburger and sausages. Therefore, from a processor's point of view, there is a need for a technology to increase the utilization and value of under-utilized cuts and quality trimmings.

Restructuring has been developed as a method for transforming lower value cuts and quality trimmings into products of higher value. Restructuring has been defined as the use of manufacturing steps to create a consumer-ready product which resembles intact muscle, such as a steak, kebabs, chop or roast.



### **Cubes restructured with Fibrimex™**

Restructuring should not be considered as a replacement for the high quality cuts of steaks and roasts from intact muscle. Rather, it should be considered as a way to expand the potential for muscle foods in the market place.

### Types of Restructuring

Bind in restructured meat products may be achieved through the formation of heat- or cold-set gels.

- 1 Conventional restructured meat products depend upon hot-set binding of meat proteins extracted with the combined effects of salt, phosphate and mechanical action. This technology limits the marketing of the product to either the precooked or frozen state. However, high yields (25% above meat weight) are possible.
- 2 Several cold-set binding systems (Fibrimex™, alginate [SMR], and Activa™) have been developed to meet the demand for restructured meats that can be marketed in the raw, refrigerated state. Fibrimex is the only cold-set binder currently approved for use in Canada. Other cold-set binders can be used if you are exporting to other countries. Activa, alginates and Fibrimex are approved for use in the United States and Japan, however, labeling requirements are somewhat different for each country.

### Procedures for Making Products

Manufacturing hot- or cold-set bound products have many steps in common.

- 1 Particle size reduction
  - 2 Addition of ingredients for binding
  - 3 Mixing of ingredients
  - 4 Forming
  - 5 Allow time for bind formation
- ◆ Particle size reduction is used to break up the muscle structure to improve tenderness or to yield a product with more consistent tenderness. Many different methods can be used to reduce the particle size of meat for use in restructured products. Grinders, flakers, cubers and slicers are just some examples of machines that can be used to

reduce the particle size. Large muscle pieces can also be used but the tenderness and amount of connective tissue present in these pieces affect the tenderness of the finished product more than when particle size is reduced.



### Particle size reduced with grinder

- ◆ Ingredients for binding can be incorporated using various equipment. When using cold-set binders it is important to mix at a slow speed for the minimum time required to get **good dispersion of the product**. Cold-set products must be handled rapidly because if the matrix starts to form before you are finished handling the product, the bind of raw product will be reduced. When making traditional restructured product, mixing time is increased to extract muscle proteins to form the “glue” that holds the product together.

Alginate and a calcium source are added as a powder to the meat mixture. Care must be given to ensure that they are evenly distributed across the product. Fibrimex is added as a protein solution. The temperature of this product must be 27°C for the enzymes to be activated. Activa can be added as either a dry powder or as a rehydrated mixture.



### Alginate powder being incorporated with a mixer

Forming can be done in casings bags or molds. Some cold-set systems can even use pattie machines. If making specialty products with fillings or stuffings, you can also form using stretch film

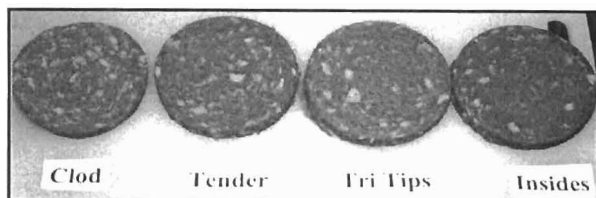


### Product being formed in fibrous casings

- ◆ Cold-set products should be placed in a 4°C cooler for a minimum of 2-8 hours, depending on the binder used. Traditional products will either be cooked or frozen and tempered for slicing or cubing.

### Choosing Meat Ingredients

The saying “garbage in, garbage out” is very appropriate for restructured meat products. The higher quality the trim or cuts you use for your meat source the better the sensory properties of the restructured meat product will be. Some of the higher priced meat sources that you could use are trim from striploin or tenderloin that has been removed during portion cutting of steaks. Some chuck cuts such as the clod or chuck tender can be used to produce a mid range restructured product.



### **Raw restructured beef product made with alginate and different meat cuts**

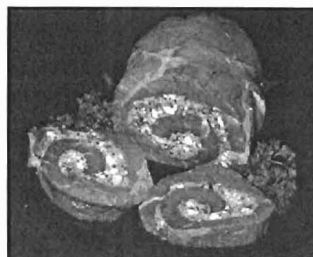
Fat and connective tissue content are important factors to consider when manufacturing restructured products. Large pieces of either connective tissue or fat will make the product unattractive, therefore, it is important to remove as much fat and connective tissue as possible. This is especially important if using chuck or leg cuts.

One factor that greatly affects the amount of trimming necessary is the particle size. If large particles with a grind size  $>8\text{mm}$  or slices of meat are used then it is extremely important that the meat be trimmed very closely. This makes it difficult to utilize fat product. However, the fat can be ground 4 mm or smaller and returned to the meat mixture to help maintain juiciness, especially if the restructured product is to be held for extended times on steam tables or in other heating apparatus.

Meat with colour defects or with poor quality will not be improved with ingredients used for hot- and cold-set binding. Colour problems will be magnified with restructuring especially if particle size is reduced. Meat with colour defects such as pale soft areas or extremely dark patches results in a product that appears blotchy and unappetizing.

Use of previously frozen meat can create problems when using cold-set binders. It is important that the meat be completely thawed and that the drip is drained off or tumbled back into the product before the binders are added. Excess liquid interferes with the binding of most of the cold-set products. This problem is minimal with traditional methods of restructuring.

Recent innovations in cold-set binder technology have created an increased interest in restructured meat products. With a little imagination restructured products can greatly add to your product line without needing new equipment. Also, this technology can be utilized to improve yields on portion cutting of steaks and roasts. Trim that would traditionally have been used for hamburger can now be utilized as a higher quality alternative.



### **Butterflied inside round stuffed with a feta cheese and spinach stuffing, bound with Aactiva on the edges so strings are unnecessary**

Information and samples of the various cold-set binders can be obtained from the manufacturers. Fibrimex™ is the only binder currently approved in Canada and can be obtained from FNA Foods in Calgary, AB. Alginate samples can be obtained from Nutrasweet / Kelco, Chicago, IL. Aactiva is produced by Ajinomoto of Japan but application advice can be obtained from Ajinomoto Applications, Ames, IA. Further information on cold- and hot-set restructuring can be obtained from the Value-Added Beef Program at the University of Saskatchewan, Saskatoon, SK.

#### **For more information contact:**

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