

A Koch Equipment White Paper



1414 West 29th Street
Kansas City, MO 64108
816.753.2150
www.kochequipment.com

How Bowl Cutters Improve Product Quality and Increase Profits

Published by Koch Equipment LLC

May 8, 2007



Introduction

The purpose of this document is to educate meat processors and sausage makers about the advantages of using a bowl cutter to emulsify, coarse chop, or fine chop products such as bologna, hot dogs, brats, kielbasa, summer sausage, snack sticks, or any European style sausage.

Problem Statement

In spite of the fact that many meat processors and sausage makers want to remain competitive and take their business to the next level by increasing their productivity and product quality, some still utilize a grind/mix/regrind process to produce their meat and sausage products. Not only is this process time consuming, processors are also missing an opportunity to extract protein from their meat mixtures so they can produce high-quality, value-added products.

Solution

Bowl cutting offers benefits far beyond grind/mix/regrind systems, including:

- **Reduced labor costs** – bowl cutting takes half the time of grind/mix/regrind process
- **Improved product quality** – bowl cutting extracts up to 92% available protein. Protein is the binder for water and fat in your product. One pound of properly extracted protein binds four pounds of fat and/or moisture through the cook process. The result is a firmer or snappier, more flavorful product with improved particle definition, better color during shelf-life, and a “clean cut” with no smear.
- **Increased profits** – maximum protein extraction translates to increased binding and weight retention, which equals less cookout and increased yields. Bowl cutting also enables product line expansion—from emulsified products to summer sausages and snack sticks using least-cost formulations.

Below is a cost comparison between a mix/grind/regrind system and a bowl cutter utilizing protein extraction. Due to the differences in the amount of added moisture and shrink during the cook process, bowl cutting results in a 17% decrease in product cost.

GRINDER INGREDIENT COST	BOWL CUTTER INGREDIENT COST
100-lbs. meat - \$150.00	100-lbs. meat - \$150.00
12-lbs. water - \$ 1.00	30-lbs. water - \$ 1.00
2.5-lbs. salt - \$0.50	2.5-lbs. salt - \$0.50
1.5-lbs. misc. - \$7.20	1.5-lbs. misc. - \$7.20
Total batch: 116-lbs. - \$158.70	Total batch: 134-lbs. - \$158.70
Grinder nets 101-lbs. finished product	Bowl cutter nets 123-lbs. finished product

Savings of \$.28 per pound or 17%

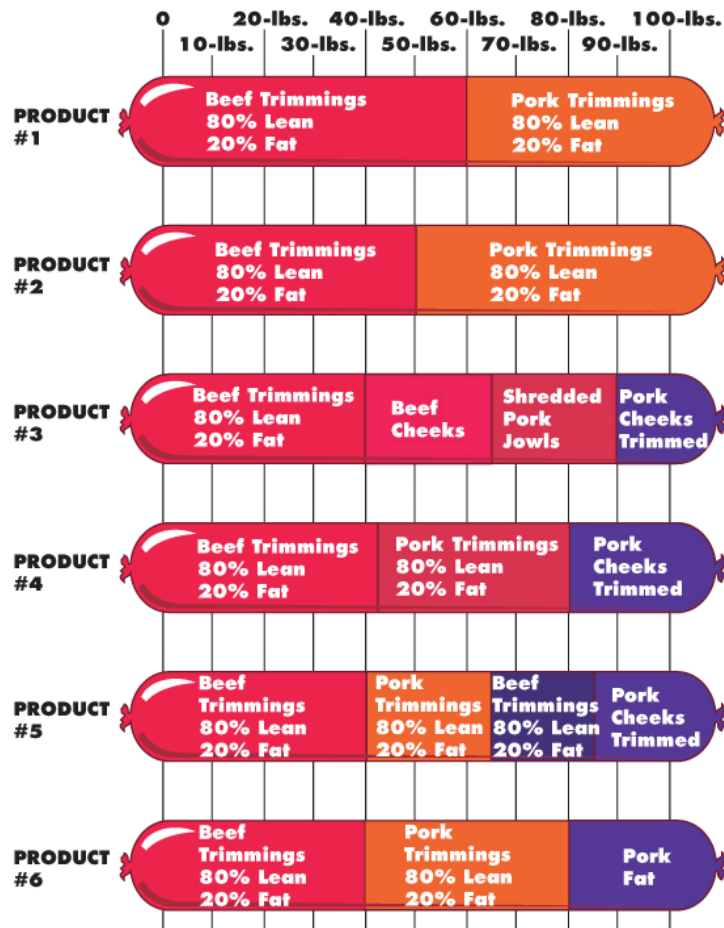
Implementation

There are hundreds of products that can be produced in a bowl cutter. Some more common products include:

- Hot Dogs
 - Bologna
 - Pre-Cooked Bratwurst
 - Luncheon Loaves
 - Beef Sticks
 - Kielbasa Sausage
 - Summer Sausage
 - Pâté
- Cooked Salami
 - Fresh Sausage
 - Salami
 - Polish Sausage
 - Chorizo
 - Boudin
 - Barbecue Pork and Beef
 - Pepperoni

The following are examples of least-cost formulations:

Least-Cost Meat Formulation Examples



Fine Emulsion Formula

(Meat temperature 36 to 38°F)

60-lbs. 80/20 beef, ground 1/8-in.
20-lbs. 80/20 pork, ground 1/8-in.
20-lbs. 50/50 pork, ground 1/8-in.
4-oz. 6.25% sodium nitrite
2-lbs. salt
8-oz. dextrose
4-oz. phosphate blend
7/8-oz. sodium eythorobate
25-lbs. flaked ice
7-oz. ground white pepper
3-oz. paprika 120 astor
1-oz. coriander
1-oz. onion powder

Calculated composition 10% shrink:

Moisture	62.0
Fat	18.9
Protein	14.5

Properties:

% Collagen (maximum 35)	22.1
Bind Points (minimum 1.8)	3.7
Color Points (minimum 2)	5.6

Fine Emulsion Manufacturing Procedure

You are working with two types of protein at this point: salt soluble and water soluble. Beef has the highest percentage of protein available.

- Place 60-lbs. of beef into the bowl cutter on low speed.
- Add salt, nitrite, dextrose, phosphate blend, and one-third of the total flaked ice.
- Cut on high speed approximately 15 revolutions.
- Add another third of the flaked ice and 80/20 pork and cut approximately 10 revolutions until meat starts to show a good protein extraction. The consistency of the product should be fine and have a shiny surface appearance.
- Add remaining flaked ice to drive the meat temperature down before adding the fat pork.
- Add the 50/50 pork, all spices and sodium eythorobate.

Reducing the temperature allows the extracted proteins (mainly myosin) to encapsulate the fat molecules thus holding them in suspension. Otherwise, you run the risk of smearing or fat separating during the cook process (i.e., fat caps).

Coarse Emulsion Formula

(Meat temperature 36 to 38°F)

20-lbs. 80/20 beef, ground 1/2-in.
30-lbs. 80/20 pork, ground 3/8-in.
20-lbs. 80/20 pork, ground 1/8-in.
30-lbs. 50/50 pork, ground 3/16-in.
4-oz. 6.25% sodium nitrite
2-lbs. salt
8 oz. dextrose
4-oz. phosphate blend
7/8-oz. sodium erythorbate
15-lbs. flaked ice
1 ½-oz. celery seed, ground
1 ½-oz. coriander
4-oz. garlic powder
2-oz. nutmeg
5-oz. ground white pepper
Black pepper, coarse ground (optional)

Coarse Emulsion Manufacturing Procedure

The emulsion base for this sausage will be 20% of the meat total. This manufacturing procedure provides the benefit of properly extracted protein in a coarse sausage with particle definition from the various sizes of meat up to the ½-in. cut beef (shine through the casings for eye appeal).

- Place the 20-lbs. of 80/20 1/8-in. ground pork into the bowl cutter on low speed.
- Add salt, nitrite, dextrose, phosphate blend, and half of the flaked ice.
- Cut on high speed approximately 10 to 15 revolutions.
- Add the remaining flaked ice and cut until a fine emulsion and a shiny appearance is realized.
- While cutting on slow speed, add dextrose, all spices, and sodium erythorbate.
- Allow 2 to 3 bowl revolutions until all is well distributed.
- Add 80/20 ½-in. ground beef, 80/20 3/8-in. pork and 50/50 3/16-in. pork.
- Cut until desired particle definition is obtained.
- Transfer to stuffer.

NOTE: It is not necessary to pre-grind material before placing in bowl cutter. However, pre-grinding does remove a predominance of bone chips, gristle, and sinew providing clean meat to further process.



Base Emulsion Manufacturing Procedure

(Meat temperature 36 to 38°F)

A base emulsion program simplifies inventory control and reduces inventory costs without sacrificing product variety or quality.

25-lbs. 85% lean beef trimmings

25-lbs. 75% lean pork trimmings

25-lbs. skinned pork jowls

25-lbs. flaked ice

Note: 100-lbs. raw materials = 35.5% fat in material and 26.52% fat in emulsion blend

1-lb. salt

2-oz. 6.25 sodium nitrite

4-oz. phosphate blend

Under refrigeration, this emulsion will last up to seven days.

- Calculate the percentage of emulsion to coarse material adding balance of salt, cure, and spices.
- Cut together until desired particle definition is obtained.
- Transfer to stuffer.

Summary

We have a variety of solid stainless steel bowl cutters with bowl capacities ranging from 40 to 130 liters to reduce your labor costs, improve production, and expand your product line. You will experience reduced grinding time, clean up time, and labor costs by using a Koch bowl cutter.