



SMOKE FLAVORING CHEESE PRODUCTS

INTRODUCTION

In the past, smoke flavor was added to cheese products by contacting the cheese directly with generated smoke. However, direct smoking of cheese had many shortcomings. Chief among those were the lack of flavor and color control due to the great variability in smoke, itself, and the environmental concern about the vaporous effluent from the smokehouse. Smokehouses and smoke generators also require considerable space, attention and maintenance.

BENEFITS OF NATURAL SMOKE FLAVORINGS

Natural smoke flavorings have eliminated many of the shortcomings of the traditional method of directly smoking cheese. Natural smoke flavorings provide greater uniformity of flavor and color without the inconvenience of sawdust handling or smokehouse cleanup. The emission problems of traditional smoking have also been eliminated since the tars, resins and benzpyrene have been removed from natural smoke flavorings by aging and filtration. Red Arrow Products Company has been producing natural smoke flavorings that have served as "standards for the cheese industry" for over 25 years.

LIQUID SMOKE FLAVORINGS

CharSol is the most widely used natural smoke flavoring in the cheese industry today. CharSol is a natural smoke flavoring produced by controlled pyrolysis of hickory or maple and other hardwoods. The smoke is collected in water, aged, filtered and packaged. The resulting natural smoke solution is representative of the entire spectrum of smoke flavors in natural hardwood smoke. CharSol is used in smoke flavoring many natural cheeses and in cold pack cheese products.

Red Arrow Products Company also produces a variety of oil-based natural smoke flavorings which may be used in flavoring pasteurized processed cheese products. CharOil normally yields a ham-fat flavor note in cheese products, while CharOil "B" yields a smoky bacon-like flavor. A variety of dry flavorings which may be incorporated into processed cheese products are also available.

DIRECT ADDITION TO CHEESE

In most cases, the direct addition of CharSol to finished cheese products is limited to processed cheeses, such as cold-pack and pasteurized processed cheese foods or spread. CharSol is generally added to the cheese mass at the end of the melting or blending process, prior to filling. The recommended level of usage for CharSol C-6 in cheese foods and cheese spreads is 0.3-0.5% based on the weight of the cheese.

CharOil and CharOil "B" may also be used in pasteurized processed cheese products. Recommended level of usage is 0.3% based on the weight of the cheese. The CharOil should be blended into the melted cheese mixture after the emulsifying agents are added. Greater or lesser quantities of smoke flavorings may be used depending on the level of smokiness desired.

Dry smoke or grilled flavorings may be added to processed cheese products at a level of 0.5-2.0% based on the weight of the cheese. These flavorings should be added to the cheese mixture along with the salt or other dry ingredients.

SURFACE APPLICATION

CharSol may be applied to the surface of natural cheeses after aging and just prior to waxing or packaging. This method of application works best for direct salted cheeses, such as Colby or Cheddar. It may also be used for brine-salted cheeses, such as Provolone or string cheese, where the cheesemaker cannot afford to tie up a brine tank with smoke-flavored brine solution. In this case, CharSol would be applied to the surface of the cheese after brining is completed and excess brine solution has been drained from the cheese.

In this smoke-flavoring process, small blocks of cheese are simply dipped in a diluted solution of CharSol C-6 Natural Smoke Flavoring. We recommend dipping in a 30-50% CharSol C-6 solution for 15-60 seconds. The intensity of smoke flavor is regulated by the concentration of smoke solution and the length of contact in that smoke solution. A longer contact time will allow for a greater penetration of the smoke flavor into the cheese. After dipping the cheese in the smoke solution, the cheese should be air-dried for 5-10 minutes to allow for penetration of the smoke solution and drying of excess moisture before waxing or packaging.

The color of smoke flavored cheeses will naturally intensify with age. This is a natural browning reaction between the smoke carbonyl compounds and the amino acid groups on the milk proteins. This color reaction is dependent on the time and temperature of storage. Accordingly, on smoke flavored white cheeses, such as Provolone, Mozzarella and string cheese, it is advantageous to keep the cheese cool at all times and be sure to rotate stock properly. This intensification of smoke color is not as obvious on colored cheeses such as Cheddar and Colby.

ADDITION TO BRINE

Provolone and other brine-salted cheeses may be smoke-flavored by adding CharSol directly to the salt solution during brining. CharSol C-6 concentrations in the brine ranging from 0.25-1.00% (v/v) should produce the smoke flavoring and coloring characteristics desired. The color of the finished cheese will be dependent on the concentration of smoke in the brine and the length of brining schedule.

When smoke-flavoring in the brine, we recommend the following:

1. Make sure the cheese remains totally submerged in the liquid smoke-brine solution to insure a uniform flavor and color development on the cheese surface.
2. Devise a method to keep the cheeses from touching one another while in the liquid smoke brine solution to eliminate any streaking or marking effect.
3. When using CharSol instead of traditional vaporous smoking, a wetter surface is obtained and a longer or warmer drying schedule is needed to get the desired surface condition before waxing or packaging.

When smoke-flavoring cheese in brine applications, the cheese proteins react with the flavoring components in the smoke-brine solutions. Gradually the flavor level is depleted and unless the brine is replenished with added smoke flavoring, the resulting cheese will not develop the desired smoked flavor and color as obtained with fresh smoke-brine solutions.

To monitor the level of liquid smoke in smoke-brine solutions, we have found the smoke phenols to be the best indicator of flavor intensity. The tyrosine method for tannins and lignins (Standard Methods for Examination of Water and Wastewater, 14th Ed., pp 607-608, Amer. Pub. Health Assoc., Washington, D.C.) is a very effective procedure for measuring smoke phenols. The Hach Company, P.O. Box 389, Loveland, CO 80539 has set up this method in a simple test kit form (Model TA-3) that most plant personnel could use without significant problems. This procedure could then be used to determine the rate of depletion of smoke phenols in the smoke-brine solution and would indicate when additional CharSol is needed to maintain a consistent smoke level in the brine.

DIRECT ADDITION TO MILK

Research has shown that CharSol may be added directly to the milk used in manufacturing cheese at levels up to 0.4% (v/v), without appreciably affecting the cheese starter bacteria. There have been several reports that smoke flavorings did retard the ripening process slightly in Cheddar varieties of cheese.

The primary advantage of adding liquid smoke to the milk used for cheesemaking is that the smoke flavor is uniformly distributed throughout the natural cheese. However, the liquid smoke flavor also carries through into the whey and whey cream, thus limiting the use of those byproducts.

The optimum level of CharSol C-6 to be added to the milk, for cheesemaking is 0.1-0.2% (v/v). The titratable acidity of the milk after adding liquid smoke should not exceed 0.20%. Cheese produced by this application method exhibits a slightly higher water-binding capacity. However, there is no significant difference in the body of the cheese when compared to a control with no added liquid smoke. This method of application is best suited for colored natural cheese varieties since the smoke flavoring does color the curd slightly and gives a light tan color to white curd varieties, such as Mozzarella and Provolone.

If liquid smoke is added to the milk for cheesemaking, we recommend either using mixed strain starters or testing all single strain starters for susceptibility to inhibition by the liquid smoke. A simple starter activity test could be used for such evaluations.

APPROVALS AND LABELING

The provision for use of natural smoke flavorings in cheese and cheese products is covered in Part 133 of Chapter I of Title 21 of the Code of Federal Regulations (Food and Drugs). The specific standards of identity that allow for the use of natural smoke flavorings are:

<u>Variety of Cheese</u>	<u>Code of Federal Regulations</u>
Cold-pack cheese	21 CFR 133.123
Cold-pack cheese food	21 CFR 133.124
Pasteurized process cheese	21 CFR 133.169
Pasteurized process cheese food	21 CFR 133.173
Pasteurized process cheese spread	21 CFR 133.179
Spiced, flavored standardized cheeses	21 CFR 133.193

Except as provided for in the standards for cold-pack and pasteurized process cheeses, a smoke flavored standardized cheese must conform to the applicable definition, standard of identity and requirements for label statement of optional ingredients prescribed for that specific natural cheese variety. The name of the smoke flavored cheese shall include in addition to the varietal name of the natural cheese, a declaration of the natural smoke flavor as follows:

“Natural Smoke Flavored (variety) Cheese”

“Hickory Smoke Flavored (variety) Cheese”

The letters in “Natural Smoke Flavored” shall be not less than one-half the height of letters used in the varietal name of the cheese product.

In the ingredient listing for cheese foods and cheese spread, the CharSol or CharOil would be listed as “natural smoke flavoring” or “hickory smoke flavoring” in the ingredient listings.

CharSol and CharOil are certified as kosher flavorings. Copies of the letter of certification will be provided upon request.

OTHER FACTORS

When CharSol is stored, a small amount of resinous material may naturally form on the bottom or sides of the container. These resins are due to the reaction of some of the organic constituents in the smoke flavor solution that are marginally soluble in the water base. These polymeric materials do not significantly affect the flavor of CharSol or the usefulness of the CharSol solution. However, we do recommend storage under cool conditions to retard this reaction as much as possible. We also recommend filtering aqueous smoke solutions, whenever possible, to remove any polymerized material and eliminate spotting or streaking of the finished cheese.

A REAL VALUE

CharSol and CharOil Natural Smoke Flavorings provide you with the “finishing touch” for your high quality cheese products. These natural smoke flavorings can assure you of uniformity of color and flavor, batch after batch. With the proper use of these flavorings, you can save time and labor with ease of application.

Red Arrow Products Company Inc. has been the leader in natural smoke flavorings for the past 25 years. We have developed the most extensive line of natural smoke flavorings available to the meat and food industries. We continue to provide research and technical development in many areas of smoke application to food products. If you have a specific technical question on smoke application to cheese or cheese products, please call our dairy technologist for the latest recommendations.

WRITE OR CALL FOR FURTHER INFORMATION

