Halal Production
Requirements for
Dairy Products

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The dairy products industry produces a vast number of products ranging from fresh milk to ice creams and frozen desserts. Dairy is one of the oldest food industries. Cheese, which has been produced for about 5000 years, is one of the classical fabricated foods in the human diet (Fox et al., 2000). A wealth of information is available on all aspects of milk and dairy processing; however, the processors generally do not take into account the needs of the Muslim consumer. It is appropriate to mention that producing halal products is very similar to producing kosher products, although halal requirements are a bit simpler. Therefore, most kosher dairy products can easily be halal certified (“dual certified”) and some that are not kosher can still be halal. For a comparative analysis between kosher and halal, the reader is encouraged to consult Chapter 25.

There are two main types of dairy cattle in the world: the buffalo in South Asia and parts of Africa, and the cow in the rest of the world. There are other minor milk sources such as goats, sheep, mares, and camels. In this chapter, milk means cow’s
Milk, although the processing of milk from other kinds of animals, particularly buffalo, is similar to cow’s milk.

**Milk in the Quran**

Milk is one of the recommended foods for Muslims. It is considered pure and palatable for drinkers (Pickthall, 1994):

> And lo! In the cattle there is a lesson for you. We give you to drink of that which is in their bellies, from between the refuse and the blood, pure milk palatable to the drinkers.

*Chapter XVI, Verse 66*

Milk is almost a complete food. It provides nourishment, minerals, vitamins, and protein. There are so many different types of dairy products that the halal issues vary from simple to complex.

**Milk: Whole, Low-Fat, Skim, and Flavored**

In the U.S., milk is generally fortified with vitamins A and D. Some vitamin A comes from shark oil. These may present some halal issues. (Please see Chapter 10 on fish and seafood.) To make these vitamins soluble in milk, they are mixed with or standardized with emulsifiers such as polysorbates. Other functional ingredients can also be added to increase the stability and shelf life of milk. Polysorbates are fatty chemicals that can be made from vegetable oils or from animal fats. For producing halal milk, these emulsifiers and other functional ingredients must be from halal sources such as plant oils. Some dairies use gelatin as a thickener when making chocolate and other flavored milks. This is another critical ingredient that must be halal for halal certification (Karim and Bhat, 2008; Shariff and Lah, 2014).

**Cream, Half and Half, and Butter**

Mono- and di-glycerides are sometimes added to these products to prevent the fat phase from separating from the water phase. Both animal- and vegetable-derived mono-glycerides are available, so must be checked for its halal status.

**Dry Milk Powder and Nonfat Dry Milk Powder**

These are heat-processed, dehydrated milk powders. Normally no other ingredients are added to them. However, the spray drier must not have run any haram products. Properly cleaning a spray drier is very difficult, so it is recommended that the equipment be dedicated for only halal production. These are products, when kosher, are therefore acceptable for Muslims.

**Cheeses**

There are many different types of cheeses, and they are processed using different methods and different ingredients. Cottage cheese, for example, may be made by
curdling milk with acid, which makes it a halal-suitable process. Other cheeses such as mozzarella, cheddar, and colby are made use milk-curdling enzymes and bacterial cultures. Bacterial cultures are generally halal, as long as the media they are grown in are halal, but enzymes can come from many different sources, as explained in Chapter 13. One must make sure that enzymes are halal suitable. Some cheeses are ripened or aged by using bacterial cultures, molds, or enzymes. Cheeses processed with enzymes are more complex and might contain some objectionable ingredients. Transgenically produced enzymes are not only permitted but are preferred for use in the production of halal foods. For example, bovine rennet produced from calves that have not been slaughtered according to Muslim requirements is not acceptable to most Muslims, whereas chymosin (the main enzymes found in rennet) produced microbially through transcription from the bovine chymosin genes is universally accepted by Muslims, as long as the standardizing ingredients and media in which they were raised contain no haram ingredients nor has the fermenter been previously with haram ingredients without receiving a halal-approved cleaning (Cowan et al., 2001). (Note: Because most of these products are almost always kosher, these requirements are routinely met. However, in the absence of a kosher certification, a more comprehensive halal inspection will be necessary.)

Enzymes are a major area of concern for halal cheese production. Several enzymes are obtained from pigs, which are haram. Some enzymes are also derived from calves or other permitted animals, but if these animals are not halal slaughtered the enzymes are not acceptable for halal cheese production (Al-Mazeedi et al., 2013). For enzyme manufacturers there is an opportunity to capture the halal market by making enzymes such as lipase through genetic engineering. However, if the gene is transferred from a pig, it will not be acceptable (Khattak et al., 2011; Riaz, 2000a). An interesting question is if one sequenced the pig gene and then produced a synthetic gene that is halal, would it be accepted? Muslim jurists have not ruled on this at the time this book was being completed, although a few Muslim writers have suggested that it, too, would be unacceptable.

**Anticaking Agents**

Shredded cheese might contain anticaking agents such as animal or vegetable stearates. These ingredients should be from halal sources.

**Preservatives**

All preservatives and mold inhibitors should be from halal sources. The preservatives can be proprietary mixtures of natamycin, sodium benzoates, calcium propionates, and other compounds, which may contain emulsifiers from animal sources, and so can be a concern for Muslim consumers.

The above ingredients, especially enzymes, not only affect the status of cheeses but also have a major impact on cheese by-products such as whey. Because whey contains a considerable number of enzymes, Muslim consumers are concerned about foods containing whey (Riaz, 2000b), that is, it needs to have appropriate supervision. At this time, food grade whey in the U.S. is almost always kosher and at this
time there is no information to suggest that such whey is not also halal (Chaudry et al., 2000).

**WHEY, WHEY PROTEIN CONCENTRATE, WHEY PROTEIN ISOLATE, AND LACTOSE**

These are by-products of the cheese making process used in a myriad of food products ranging from baked goods to frozen desserts. These ingredients are further processed into powders from liquid whey. Usually, nothing further is added to whey after it is drained to make cheese; therefore, if the cheese manufactured is halal, then liquid whey and ingredients from whey, such as whey powder, whey protein concentrate, whey protein isolate, and lactose, are also halal, as long as the drying equipment is halal.

**CULTURED MILK, SOUR CREAM, AND YOGURT**

These are compounded, cultured, and further processed milk products. Ingredients such as gelatin, emulsifiers, flavorings, stabilizers, and colors can be added to these products for various functional properties. Gelatin is one of the most widely used ingredients in yogurt. Halal gelatin is now available, as are other halal-texturizing ingredients, including pectin, carrageenan, and modified starches, which are suitable as gelatin replacements (Anir et al., 2008; Chaudry et al., 2000; Karim and Bhat 2008).

**ICE CREAM AND FROZEN DESSERTS**

Ice cream and frozen desserts are complex food systems requiring dozens of different ingredients to manufacture them. There are several possibilities for doubtful ingredients being incorporated into ice cream and frozen desserts, but the three ingredients that present the greatest difficulties are gelatin, flavors, and emulsifiers.

To make natural vanilla ice cream, a company must use natural vanilla flavor, which by its “standard of identity” must contain at least 35% alcohol. Even when this alcohol is diluted down to its use level, the final ice cream may contain from 0.2% to 0.5% alcohol. Other flavors, which are uniquely liquor flavors, such as rum, might contain even higher amounts of alcohol. One must decrease the amount of alcohol in these products to the minimum level needed to provide the technical effects desired from that particular ingredient. The final alcohol content of the finished products should be lowered to less than 0.1% according to the standard of IFANCA. Manufacturers will have to check with other certifiers to determine their standard. A dried vanilla has been prepared and it might substitute for all or some of the alcohol containing vanilla (Cullen-Innis, 2005).

Halal gelatin and halal marshmallows are now available for companies that wish to formulate ice cream products with those ingredients (Karim and Bhat, 2008; Shah and Yusuf, 2014). Flavors that have a connotation related to alcoholic beverage can be formulated from nonalcoholic extracts of natural flavors or by the use of synthetic ingredients, such as rum flavor. However, Muslim consumers may have some hesitation in using such products.
HALAL CONTROL POINTS IN CHEESE MAKING

Cheese making generally is a dedicated process for each type of cheese and there are very few chances of cross contamination. It also is a fixed process, requiring few changes, if any, during the year. Figures 11.1 and 11.2 give the halal control points (HCP) for dairy technology.

HCP1: Raw Milk

In the U.S., all milk is cow’s milk unless specified otherwise; for example, cheese is also made from sheep and goat’s milk. Other sources of milk may be used as long as they come from a halal animal and are maintained as halal. In the U.S., cow’s milk is highly regulated and so it is probably a safe assumption that it is really cow’s milk and that it is safe and wholesome if part of the commercial milk supply. Artisan operations not part of the Class A milk program in the U.S. probably need to be checked.

HCP2: Additions of Ingredients (Enzymes, Cultures, and Colors)

This is the most critical point in cheese manufacture because enzymes used can be from haram or halal animals as well as from microorganisms. For universal acceptance, enzymes should be of microbial or plant origin and other ingredients should be free from doubtful ingredients. All ingredients need to be checked that they are not from animals that are not halal or that were not slaughtered halal. The use of these ingredients should be properly documented.

One must consider not only the primary ingredient, but also potential processing aids that might be added to the main ingredient to standardize or stabilize it.

HCP3: Aging

After the cheese is processed and ready to be stored for aging or ripening, mold and bacteria can be applied to its surface to be incorporated internally. Preservative such as sorbates, propionates, or natamycin can also be applied where cheese is ripened without added cultures to inhibit mold growth. All these specialized chemicals must conform to halal guidelines.
Finally, packaging must be clean and halal acceptable. Labels should have clear halal markings. It is advisable to use the description microbial enzymes if microbial enzymes are used so that Muslim consumers are reassured.
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FIGURE 11.2 Halal control points (HCP) in creamy salad dressing.
REFERENCES


