This chapter discusses various types of single and compound ingredients, including spices, seasonings, condiments, sauces, dressings, batters, and breading, as well as curing agents, coatings, and flavorings. Thousands of ingredients are used in food and related industries. Most are categorized as GRAS or food additives, although a few are covered by other legal categories such as “prior-sanctioned” chemicals, that is, used before 1958, when the current law came into being (Al-Mazeedi et al., 2013; Kamaruddin et al., 2012). Some of the critical ingredients and processes from the halal perspective are listed and explained.
BACON BITS

Natural bacon bits are manufactured from real bacon made from pork. Artificial bacon bits are made with plant proteins, generally soy protein, and colored and flavored with other ingredients (Kunert and Herreid, 2002). Although natural bacon bits are not acceptable for halal products, one may use artificial bacon bits as long as the colors, flavors, and other incidental ingredients, as well as the production equipment, are halal approved.

AMINO ACIDS

Many amino acids are used for various technical functions. They are either made synthetically (generally microbially or from starting materials of plant origin) or extracted from natural proteins. One of the most common and questionable amino acids is L-cysteine, which is used in pizza crust, doughnuts, and batters (Jahangir et al., 2016). Natural cysteine is generally obtained from human hair, animal wool, and duck feathers. These days, L-cysteine is also made using sugar as the starting material. L-cysteine from human or animal wool, unless sheep are sheared when they are alive, is not acceptable as halal. However, it is acceptable if made from duck feathers, especially if the ducks have been slaughtered in an Islamic manner. Synthetic L-cysteine is often sold as vegetable grade L-cysteine, which is halal acceptable as long as all the production requirements are properly carried out (Regenstein et al., 2003; Regenstein, 2012).

CIVET OIL

Civet oil is oil extracted from the glands of a cat-like animal called a civet. Civet oil is not accepted as halal (Goldberg, 2012; Jahangir et al., 2016).

LIQUOR

Liquors are alcoholic drinks commonly used in flavors either for taste or aesthetic appeal for people who enjoy drinking liquor. Use of liquor or any alcoholic drinks in preparation of flavorings or batters is not acceptable. One of the possible flavors for fried products or fried batter products is beer batter. Actual beer is used in the production of batter-coated fries, onion rings, or other fried appetizers. Although alcohol is flashed out during the frying process, beer batter still remains unacceptable as halal (Al-Mazeedi et al., 2013; Halal Consumer Group, 2012). This concept is discussed in detail in Chapter 16.

LIQUOR AND WINE EXTRACTS

The flavor industry has now created extracts of different types of wines and liquors to use strictly as flavoring agents. Such extracts may be used in formulating halal products as long as residual alcohol in the extracts is very low, generally less than 0.5%. One must consult the halal-certifying agency and the end user on whether there is a problem with the source (Al-Mazeedi et al., 2013).
FUSEL OIL DERIVATIVES

Some ingredients such as amyl alcohol or isoamyl alcohol are made from by-products of the alcohol industry. These are doubtful to use because of their origin from beverage alcohol and thus, halal agencies in some countries do not approve of the use of such ingredients. An example is tartaric acid from wine.

ENCAPSULATION MATERIALS

Several ingredients such as gelatin, cellulose, shellac (also called “lac resin”), and zein (from corn) are used to encapsulate food ingredients as well as food products. Shellac (derived as an excretion of the lac bug), cellulose, and zein are generally accepted in halal products if properly produced. Gelatin is acceptable only if it is from halal-slaughtered animals or acceptable fish (Al-Mazeedi et al., 2013; Blech, 2008; Regenstein, 2012).

THICKENING, GELLING, TEXTURIZING, AND STABILIZING AGENTS

Thickening and gelling agents have been used for centuries in foods and also pharmaceuticals, cosmetics, and personal care products. They are widely used as thickening, gelling, stabilizing, texturizing, and suspending agents to improve product eating quality, product appeal, consistency, and shelf life. They are also used with food liquids to improve spreadability, binding, hardening, creaminess, freeze thaw stability, crystal control, adhesion, and water binding. Flour, cornstarch, and pectin are some common examples. Most of these materials are derived from plants and seaweeds except for gelatin from animals and some like xanthan and gellan gum are microbial polysaccharides (Jahangir et al., 2016).

Modified starches made from corn, wheat, potato, and tapioca are used to replace other more expensive gums. Even if these materials are of vegetable origin, their production process could involve some steps making use of animal-derived material (e.g., enzymes) from non-halal sources (Al-Mazeedi et al., 2013).

PRODUCTION OF VINEGAR FROM ALCOHOL

Vinegar is more than 90% water so often vinegar is made on-site or nearby from ethanol, generally from grain or petrochemical ethanol. This practice is generally acceptable but should be monitored to maintain the minimal residual alcohol below 0.5%. Note that beverage ethanol is not permitted, for example, wine vinegar or cider vinegar (Kocher et al., 2006; Muslim-ibn-al-Ḥajjaj, 2008).

MINOR INGREDIENTS

Many different GRAS ingredients may be used in food manufacture. They often do not have a function in the final product. All these minor ingredients must be from halal sources and produced in a halal acceptable way as defined and accepted by the halal-certifying agency.
MANUFACTURING OF FOOD PRODUCTS

Manufacturers of some food products may purchase one or more blends from another supplier. This requires that the halal certifier either check both the “blending” operation as well as the original ingredients manufacturers, or obtain acceptable halal certificates for both the ingredients and the blending operation (Aida et al., 2005).

SPICES AND SEASONING BLENDS

Spices and seasonings are single botanical ingredients or a dry blend of many different ingredients. Seasoning manufacturers may use any of the food ingredients available to them whether they are of vegetable or animal origin.

There are two considerations in making halal seasoning blends. The first is the composition of the blends. All components should be halal suitable. Non-certified animal-based ingredients should not be used in halal blends. The second consideration is cross-contamination from the equipment. Halal blends should be manufactured on thoroughly cleaned equipment or in dedicated mixers. Minor ingredients such as an encapsulating agent, anti-dusting agent, and free-flow agent must also be halal suitable (Al-Mazeedi et al., 2013).

CONDIMENTS, DRESSINGS, AND SAUCES

These are generally pourable or spoonable liquid products. Some of them can contain bacon bits, gelatin, wine, or complex flavorings. For halal production, such non-halal ingredients must not be included in the formulations. The product should be made on clean equipment.

BATTERS, BREADINGS, AND BREADCRUMBS

Batters, breading, and breadcrumb manufacturing has evolved into a specialized manufacturing process.

L-cysteine is used to modify the texture of batter or breading coatings and must be halal acceptable. Alcoholic beverages are also prohibited.

FLAVORINGS

Flavors and flavorings are some of the most complex ingredients used in the food industry. Under U.S. regulations (FDA, 2002), individual components of a flavor need not be declared to customers. The flavor industry is exempt from revealing such information (which is considered to be proprietary) as long as the component ingredients of a flavor are either on an FDA or Flavor and Extract Manufacturers Association (FEMA) list.

Two groups of ingredients are of special concern to formulators of halal products: (1) unique flavoring agents such as civet oil and (2) ingredients of alcoholic origin. As a general guideline, ingredients of animal origin should be avoided in the development of flavorings unless those ingredients are halal certified (Aris et al., 2012;
Jahangir et al., 2016). It is permissible to use industrial ethanol for extracting flavors or dissolving them. However, the amount of alcohol should be reduced to less than 0.5% in the final flavoring product. Certain countries or customers require lower allowances or even the total absence of any ethanol for products brought into their countries. Some countries do not permit fuel oil derivatives. It is advisable for formulators to work with their client companies and certifying agencies to determine the exact requirements of a certain company or country (Jamaludin, 2013).

### CHEESE FLAVORS

Dairy ingredients should be derived from processes that use either microbial enzymes or halal-certified animal enzymes.

### MEAT FLAVORS

Meat and poultry ingredients should only be from animals slaughtered according to halal requirements.

### SMOKE FLAVORS AND GRILL FLAVORS

Halal concerns include the use of animal oils as a base for smoke and grill flavors or the use of emulsifiers from animal sources.

### COLORANTS

Colors have been used in foods since antiquity (Francis, 1999). Historically, colors have been used not only to make food look appealing but also as adulterants to hide defects. Colors can be synthetic such as FD&C-certified colors, where water-soluble ones are called dyes and oil-soluble ones are called lakes. Colors can also be natural or organic, such as fruit and vegetable extracts. Potential halal concern are materials such as shellac (lac resin), octopus ink, and squid ink. Inorganic colors are not a concern except like all ingredients there is a need to assure halal appropriate processing. Some of the other ingredients believed to be used in colors such as gelatin are halal sensitive (Al-Mazeedi et al., 2013).

### CURING AGENTS

Curing agents, which are used for making sausage products, are specialized blends of salt, nitrites, and some other ingredients such as sodium ascorbate, sodium erythorbate, citric acid, and propylene glycol. They are generally halal suitable. However, one should make sure that they are made on clean equipment and questionable ingredients are not incorporated into them.

### FRUIT AND VEGETABLE COATINGS

Animal-based ingredients must be avoided. Particularly upsetting to Muslim consumers is the use of any haram ingredients for the coating of fruits and vegetables.
sold in the fresh produce section. The Nutritional Labeling and Education Act of 1990 contains specific provisions that require the packer to identify the source of components in any such coating and put it on the outside carton. Supermarkets and other retailers are required by law to have an easily visible sign indicating that fruits and vegetables in their store might have been treated with such coatings. Although vegetable and mineral ingredients used for this purpose are halal, the coating formulators must avoid doubtful ingredients such as beef tallow and gelatin, or haram ingredients such as lard (Syahariza et al., 2005). Halal consumers are encouraged to look at the required sign in the supermarket, and if not found, ask the management to be in compliance with these U.S. regulations.

**DAIRY INGREDIENTS**

Ingredients such as dry milk powder, which are heat-processed, are suitable for halal manufacturing. Ingredients such as whey powders, lactose, whey protein isolates, and concentrates produced with the use of enzymes are questionable if the source of enzymes is unknown. To make these ingredients halal, producers must use microbial enzymes or enzymes from halal-slaughtered animal sources. Most certifying agencies require that dairy ingredients made with enzymes be halal certified (Al-Mazeedi et al., 2013; Regenstein, 2012). As many of these materials are spray-dried, it is also important that the spray-drier and other equipment used be halal compliant.

**SUMMARY**

This chapter covered some ingredients of concern to the Muslim consumer. A more detailed listing appears in the appendices. Use of E-numbers rather than chemical names is common in Europe and Asian countries. Appendix B lists food ingredients with their E-designation and halal, haram, or doubtful status, and Appendix C lists ingredients and their halal, haram, or doubtful status.

**REFERENCES**


