ELEMENTS OF FOOD TECHNOLOGY

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Other Methods of Preparing Table Olives.—A large number of different techniques of preparing olives for table use are known to exist in addition to the above three major commercial procedures. Olives are often pitted, stuffed, chopped and spiced, and packed in fancy packs. Most olive growing districts prepare special local olive products which vary widely in degree of bitterness, salt content, and the kinds and amounts of acid and spices, etc. They are usually destined for sale in bulk at nearby markets or for home use.

The use of carbonate salts or ash solutions is one of the methods of debittering. At times, the olives are brined without any pretreatment or only after soaking them in water which is changed at intervals. Such olives will ferment slowly, staying bitter for up to 1 year.

A rapid method of debittering olives consists of beating each olive lightly by hand or machine in such a manner that the peel remains intact while the inner fruit meat is injured. When such fruit is soaked in water and covered with salt brine or mixed with dry salt it will be edible within a few days. Although their appearance is blemished, such olives are in considerable demand in Mediterranean countries.

Half ripe and ripe olives are often prepared for local consumption by using dry salt rather than a salt solution. Slowly-dissolving ordinary coarse salt or rock salt is placed in alternate layers with the olives or mixed with the fruit. The salt gradually extracts the liquid from the olives, debittering and shrivelling them. The practice of adding different spices and aromatic herbs such as anise, oregano, etc., differs widely from region to region.

Producers of black olives are also familiar with techniques for the improvement of color in the finished products. Fruit harvested before it reaches full maturity and which is still yellowish to red in color can reach a color intensity similar to that of ripe olives by the addition of iron salts. Such salts are either included as accidental impurities of the rock salt or by intentional additions. This is often fortified with or followed by the addition of mordants such as gallic or tannic acid.

The Greek Calamata variety is generally prepared by cutting the fruit longitudinally and soaking it for 5-8 days in a 2% salt brine to debitter it. Then it is soaked in vinegar for 1-2 days, graded, and packed in fresh brine (6-8% NaCl) together with a top layer of a neutral oil.

Some local Greek and Turkish varieties are known to exist which lose their bitterness while still on the tree. Such olives can be preserved at low brine concentrations as sweet olives.

There also exist different, newer methods of preparing table olives, but these are, as yet, mostly still on an experimental scale. In one of these methods the bitter principle is removed from the olives rapidly by the use of hot water or hot lye solutions which cause a partial breakdown of the olive peel. Such olives can be debittered and preserved by brining, acidification, and pasteurization within hours after harvesting.

Products manufactured from the whole olive have, by contrast, no competitor and the industry has been widely diversified. The development of the industry in California may perhaps be taken as an indicator of future trends. Over 90% of the California olive crop is converted into table olives and only blemished, small fruit is crushed for oil.

It appears that olive oil and, even more so, table olives, which have belonged for generations to the basic foods of the Mediterranean population, are becoming increasingly a luxury product in countries with a high standard of living.

SALAD DRESSING

George C. Rimnac

Salad dressings can be considered those products added to and eaten with vegetable, fruit, meat, fish, and seafood salads although their consumption is not restricted to this application. Major other uses include spreading on bread for sandwiches or simply as a bread spread. Also, various cold and hot recipes including baking contain salad dressings as ingredients. Mayonnaise has been used even for cosmetic purposes.

More specifically (excepting certain low calorie or diet types), salad dressings essentially contain oil and vinegar which are used together with eggs (yolks or whole), sugar, salt, spices, and other food ingredients to develop the desired identity. They can be spoon-type or liquid, homogenized or multiphased. In the United States, three have been defined by Standards of Identity. Products outside of the prescribed standards may not carry the description Mayonnaise, French, or Salad Dressing. Instead, they are designated as a particular dressing and must declare ingredients on the label. Currently, standardized products are declaring ingredients at the option of some manufacturers. Similar standards legislation, with modification, has been enacted in many other countries. The volume of salad dressings produced in the United States is in excess of 200 million gallons per year. Mayonnaise and Salad Dressing account for more than 85 and 70 million gallons, respectively.

Mayonnaise

Mayonnaise is a semisolid food emulsion of edible vegetable oil, egg yolk or whole egg, a vinegar, lemon and/or lime juice, with one or more of the following: salt, a sweetener, mustard, paprika or other spice, monosodium glutamate, and other suitable food seasonings. The U.S. product contains not less than 65% of edible vegetable oil. Standards of Identity or particular regulations, depending on the country, may provide additional restrictions or definitions.

A mayonnaise emulsion is an oil-in-water type. Egg is the emulsifying agent. Vinegar and salt are the principal bacteriological preservatives.

A prototype formula could contain:

	%
Vegetable oil (liquid)	80.00
Egg yolk	7.00
Vinegar (4½% acid)	9.40
Sugar	1.50
Salt	1.50
Mustard	0.50
White pepper	0.10
	100.00

Mayonnaise can be manufactured a number of ways, but all consist of using beating or dispersing equipment in some stage of the process to disperse the oil.

For many years, production of mayonnaise was with the planetary mixer. This was a mechanical adaptation and elaboration of the chef's wire wisk and bowl: (1) Add water, egg, and dry ingredients to bowl and agitate to mix and disperse. (2) Agitate rapidly and slowly pour in oil. (Rate of addition should be no greater than the capacity of the machine to disperse.) (3) On completion of addition of oil, gently pour in vinegar under intermediate agitation. (4) On complete mixing of all ingredients, fill into jars and cap.

Manufacturers have refined the foregoing method to improve the texture and uniformity of their finished product. This is accomplished by the employment from a selection of available colloidalizing or homogenizing machines and systems for the semicontinuous and continuous production of mayonnaise.

Mayonnaise is packaged in glass and in plastic wide-mouth jars, tubes, sachets, and individual portion cups. Jar closures are either screw cap or vacuum.

Salad Dressing

Salad dresing is a semisolid combination of mayonnaise and a cooked (or partially cooked) starch paste base. In the United States, the Standards of Identity limit a salad dressing to contain not less than 30% by weight of vegetable oil nor an egg yolk solids content less than the equivalent provided by 4% by weight of liquid egg yolks. Food starches, tapioca, and wheat and rye flours may be used singly or in combination. Optional ingredients include citric acid and emulsifiers of the vegetable gum, pectin, Irish moss, and methyl cellulose variety. As with other food products, each manufacturer has developed a formula and process to suit his requirements.

Starch base may be prepared by combining starch or a blend of starches with water, vinegar, and one or more of the following optional ingredients: sugar, dextrose, corn syrup, honey, other approved sweeteners, mustard, paprika, salt, monosodium glutamate, spices and/or citric acid, plus optional emulsifiers within the defined limits.

The mixture of slurry is then cooked by any of various methods to a desirable consistency.

Mayonnaise and starch base can be combined in a planetary mixer or other suitable device. Filling and capping are as for mayonnaise.

Liquid Dressings

The liquid or pourable dressings include the French Dressings. They may be separable or homogenized. Oil content of French Dressings according to U.S. Standards of Identity may be no less than 35% by weight. If they contain egg or any of a number of listed emulsifiers (vegetable gum, propylene glycol esters of alginic acid, methyl cellulose, pectin, xanthan gum, etc.), the total content can be no more than 0.75% by weight. French Dressings may contain catsup, tomato paste, sherry wine, sugar, salt, spices, monosodium glutamate, and other natural ingredients.

Separable liquid dressings are merchandised as products with distinct proportions of oil and aqueous phases or as very "home-made" appearing. Homogenized dressings are produced by passing the mixture through a homogenizer or other colloidalizing machine. Nonseparability is generally obtained by employing a combination of mechanical and ingredient (stabilizer-emulsifier) techniques.

Specialty Dressings

There are specialty semisolid or liquid dressings not covered by Standards of Identity. Among them will be Sandwich Spread, Tartar Sauce, Thousand Island, Blue and other cheese, Green Goddess, Russian, Italian, Low Calorie, Diet, and others. Specialty dressings may also be merchandised refrigerated or nonrefrigerated.

Ingredients

General.—For those salad products covered by Standards of Identity or similar legislation, the allowable ingredients are specifically listed by the particular governmental agency. Some ingredients, such as spices, may be grouped under one heading in the ingredient clause. Antioxidants or sequestering agents may be used in some countries and not in others. It is not the purpose here to list all of the possibilities, but merely to provide an overview of major ingredients used.

Oils.—The choice of oil is governed by quality, local preference, and the economics of availability. Among these are soy bean, cottonseed, sunflower, and corn. As the technology of refining and deodorization improves, the number of oils used grows. Oils can be used singly or in combination. In certain cases and applications, winterization of the oil is necessary to protect emulsion stability in fluctuating temperatures.

Eggs.—Eggs are used as whole, yolk, or a blend of the two. They may be stored frozen prior to use or used in dried form. Salted or unsalted eggs may be used. Legislation requiring pasteurization of eggs for Salmonella control has been enacted in a number of countries. In products such as mayonnaise where egg is a prominent ingredient, some countries specify minimum requirements.

Vinegar.—Flavored and "spirit" vinegars are used singly or in combinations. The primary function of vinegar is preservation. The secondary is flavor. In the United States, vinegars can be diluted to no less than 2½% acidity before being used in mayonnaise.

Citric Acid.—As an "optional" acidifier, citric acid can be used at no greater concentration than 25% (as acetic) of the total weight of acid in U.S. mayonnaise.

Lemon and Lime Juice.—Similar dilution requirements of no less than 2½% acidity apply to these juices when used in U.S. mayonnaises. The base material may be fresh juice, canned, concentrated, frozen, or dried.

Others.—Sugar, honey, dextrose, corn syrup, invert sugar, nondiastatic maltose syrup, and glucose are used as sweeteners.

Salt.

Mustard, paprika, spices, spice oils, and spice extracts.

Monosodium glutamate.

Food starches, tapioca flour, wheat flour, and rye flour for U.S. Standards of Identity Salad Dressings.

In the manufacture of specialty dressings many approved food ingredients not listed for the standardized products are used. These include pickle relishes, cheeses, other emulsifiers and stabilizers, flavors, and colors.

Details of the U.S. Mayonnaise, Salad Dressing, and French Dressing Standards of Identity are published by the United States Department of Health, Education and Welfare.

WORCESTERSHIRE SAUCE

W. Wallace Ryan

"Worcestershire Sauce," is now a generic term for a type of food condiment the basic idea for which originally came from India.

To be the genuine article it should include vinegar, molasses, sugar, soy, anchovies, tamarinds, eschalots, garlic, onions, and salt. Spices and flavoring are added (type not divulged), and water is added to bring the whole to a specific gravity in the range of 1.130 with total solids of approximately 30% by weight.

The ingredients are then allowed to mature and ferment over a long period of time, with occasional agitation for proper blending. Unless this time element is followed the product will never attain the proper bouquet and flavor.

Once the ingredients have been allowed to mature they are processed by pressing and straining through a mesh screen which allows some of the insoluble solid to pass through. The presence of such insoluble solids is essential to the product although they precipitate and must be redispersed into the liquid by shaking before using. The final product must be pasteurized to stop further fermentation. If this is not done, the flavor will deteriorate and become rancid although the sauce itself will not prove harmful.

Properly prepared worcestershire sauce will appear as a very dark, almost black, liquid with about 25% visible sediment of slightly lighter color. When these solids are dispersed throughout the liquid the sauce has a dark brown opaque appearance. The volatile oils of the sauce give off a very aromatic, appetizing scent, and to the taste it is tangy, spicy, and with a slight indication of bitter/sweetness.

Made from all natural products without artificial sweeteners, coloring or other additives, it is a sauce for all seasons and practically all foods. While generally associated with meats and gravies, it is added as a seasoning very effectively to tomato products, soft cheeses, egg dishes, soups, and salad dressing.

HOT PEPPER SAUCE

Edward M. Simmons

Hot sauce or pepper sauce is the generic name for a large family of bottled condiments produced by many manufacturers in the United States and through the world. The hot peppers, usually varieties of *Capsicum annum* and *C. frutescens*, give the products their heat and flavor characteristics and the vinegar is the liquid medium. Oil of Capsaicin in these peppers is the active ingredient.

Manufacturing processes vary, however; in most, the hot peppers are either ground and used fresh or stored whole in brine for several months until needed. Salt and vinegar are added to the ground peppers and the mixture is run through processing machines to remove the seeds. The end-product, a stable suspension, is then bottled. The red color of the products usually comes from the red peppers themselves; however, in some instances, artificial coloring is added. Individual products vary widely in specifications, however, most products fall in the following ranges:

Total solids	4.0-10.0
Salt as NaCl	1.0- 6.0
Acidity as acetic acid	4.0- 9.0
pH	3.0- 3.2

Hot peppers may be grown in most of the southern United States. Most commercial production is from the states of Louisiana, Texas, and California. Perhaps the best known product in this category is Tabasco pepper sauce, made by McIlhenny Company of Avery Island, Louisiana and marketed internationally. In the Tabasco pepper sauce process, the fresh red peppers are selected by hand by harvest workers and ground the same day. A small amount of salt is added to the ground peppers which are then packed into oak barrels. The barrels are placed in aging warehouses for a minimum of 3 yr. After the aging period has been completed, the ground peppers are mixed with 100-grain distilled vinegar and the mixture stirred for 4 weeks. The seeds and pepper skins are then removed mechanically and the end-product bottled. No artificial coloring is added to pepper sauce.

SUMMARY

Flavor is of paramount importance in determining the acceptability of what we eat and drink. As we have seen, the mere ingestion of the correct balance of proteins, carbohydrates, fats, salts, and vitamins, if not adequately flavorful, does not long satisfy the human appetite, for food has both a social and a nutritional function in which flavor plays a major part. The components of our diet may be classified into those items which are highly nutritious but lacking in intrinsic flavor until cooked and those items which have little or no nutritional value but possess strong flavoring properties.

The culinary art is aimed at blending these components into a dish which is at once attractive to the eye and appetizing to the palate.