COMPOSITION AND FOOD VALUE OF BOTTLED SOFT DRINKS.


CONSUMPTION OF SOFT DRINKS IN RURAL COMMUNITIES.

Nearly all general stores at crossroads and in small villages in the United States carry regularly a stock of bottled soft drinks, frequently designated simply as "sodas." The consumption of these products increases each year, and with the growth of prohibition, it seems probable that their manufacture and distribution will assume very large proportions. In fact, it has been estimated that during the few years just prior to the curtailment of the industry due to war conditions, the sale of soft drinks in the United States amounted annually to over three billion bottles. It is interesting to note that along with rural free delivery, the telephone, individual electric-light plants, and electrical appliances, the dweller in a rural community is able to purchase at the nearest general store a product which a few years ago was obtainable only at soda fountains in towns and cities.

Bottled soft drinks are consumed chiefly for the delectation of the palate and for quenching thirst. The fact that they have some food value is usually not given consideration. In the past the average consumer has known little of the composition of these beverages, and since there are all sorts of bottled soft drinks, good, bad, and indifferent, he has not been in a position to demand a high-grade product. That there is a growing discrimination on the part of the public consuming these products is evidenced in the great improvement in the quality and purity of many of them. It is the purpose of this article to describe briefly the ingredients of some of the standard types of bottled soft drinks, in order that the purchaser may be more critical in his selection, thereby raising still further the standards of some of the manufacturers of these food products.
COMPOSITION OF SOFT DRINKS.

All bottled soft drinks contain water, flavor, sweetening, and carbon dioxide gas. Some contain also one or more of the following ingredients: Color, such as caramel or burnt sugar; acid, usually citric found in lemons, or tartaric found in grapes; and a condiment, such as capsicum or red pepper, cinnamon, allspice, cloves, or nutmeg.

FLAVORS.

The flavors for soft drinks include ginger ale, sarsaparilla, root beer, birch beer, chocolate, cream, colas, cherry, wild cherry, lemon, strawberry, raspberry, orange, pineapple, grape, loganberry, apple, pear, peach, and others less widely distributed. These flavors are of two general types, those which are obtained from natural products, such as the root, bark, leaf, and fruit of plants or trees, and those made in the laboratory by synthesizing or combining two or more chemicals. Examples of the first type, which may be called natural flavors, are ginger extract and ginger oleo-resin, which are obtained from ginger root by maceration and extraction with a solvent such as alcohol, ether, or acetone; lemon oil, obtained by expressing the rind of the lemon; and fruit juices. The demand for the true fruit flavors is increasing, and each year larger quantities of grapes, strawberries, raspberries, etc., are used to supply the soft-drink industry.

The department encourages the use of fruits in the manufacture of bottled beverages, for the reason that grapes, strawberries, raspberries, etc., are highly perishable foods and their use in the form of bottled beverages offers an additional means of conservation of these valuable products, especially the surplus. Of course, large quantities of these fruits are preserved for future use by being canned. If, however, it is possible to develop an additional outlet for utilizing them on an extensive scale, as in the manufacture of bottled soft drinks, the fruit-growing industry will be materially benefited. An interesting example of a recent development in the use of fruit for bottled beverages is the loganberry, which is now quite extensively sold. Grape juice
is a well-known article, but it is believed that there is an opportunity for a further development of a grape extract for use in bottled sodas. When fruits like the strawberry, raspberry, and grapefruit are crushed and the juice expressed, the product obtained is cloudy, due to the presence of very finely divided portions of the fruit cells. If the juice so obtained is clarified by filtration or by treatment with a clarifying agent, such as kaolin, followed by filtration, the quality and intensity of the characteristic flavor of the fruit usually will be found to have been greatly diminished. One reason for the great development of artificially flavored beverages is the difficulty of producing satisfactorily from fruits a clear, transparent beverage that will remain clear and free from sediment upon storage. It is unfortunate that the public has been educated to consider clearness and transparency of bottled beverages as measures of quality, since the turbidity is often an evidence of a true fruit product of superior quality. Beverages made with artificial flavors must be labeled to show they are so made when the product is sold in interstate commerce, thus becoming subject to the provisions of the Federal food and drugs act.

The second type, artificial flavors, is represented chiefly by the products which simulate the odor of cherry, grape, raspberry, strawberry, peach, pear, etc. The chemical composition of these flavors differs from that of the natural products, and they are characterized by a decided ethereal odor, but are deficient in taste.

Vanilla differs from both of these types in that vanillin, which is one of the ingredients of the vanilla extract as obtained from the vanilla bean, can be synthesized or manufactured. The artificial vanillin is used very largely in the manufacture of cream sodas. The Federal food and drugs act requires that beverages made with artificial flavors must be so labeled.

Usually two or more flavors are combined to give the desired bouquet. For example, ginger ale frequently contains lime juice or oil of limes, orange, etc., in addition to extract of ginger.

The flavoring ingredients used in soft drinks are but slightly soluble in water, but easily soluble in alcohol.
Moreover, the water solution of most of the extracts readily deteriorates. Consequently, the extracts employed by the bottler are similar to the concentrated extracts used in cooking, and contain a rather high percentage of alcohol. However, but a very small quantity of extract is contained in the finished beverage, the percentage of alcohol present being proportionally small. Usually, it amounts to only a few tenths of 1 per cent by volume.

**SWEETENING.**

Prior to the war almost all of the sweetening in soft drinks was ordinary white granulated sugar. As increased demands were made on the sugar supply, bottlers turned for relief to so-called sugar substitutes, such as corn sirup or glucose, corn sugar or commercial dextrose, maltose sirup, refiners’ sirup, and honey. The department encouraged the use of these substitutes for sugar as a war measure, and it has been estimated that at least 50,000 tons of sugar annually could thus be saved without materially lessening the food value of these beverages. It is probable that some of these sugar substitutes in combination with sugar will be used regularly in certain types of soft drinks, especially root beer, sarsaparilla, and similar heavy-flavored beverages, since an increased “body” with less sweetness is desirable in many of these beverages. The Federal food and drugs act requires that when sweetening ingredients other than ordinary sugar are used in soft drinks, their presence should be plainly stated on the label.

Because of their content of sweetening, high-grade beverages have a greater food value than most people realize. Such products as ginger ale, the phosphate drinks, lemon sours, and grape soda contain from three-fourths to one and one-half ounces of sugar per half-pint bottle, while sarsaparilla, root beer, etc., contain from one-half to three-fourths ounce of sugar per half-pint bottle. Thus, an 8-ounce bottle of a sweet ginger ale contains 1 ounce of sugar, which is approximately twice the sugar ration per meal under war conditions, when the amount was restricted to 3 pounds of sugar for 90 meals. When glucose, honey, etc., replace part of the sugar, relatively larger proportions are
used to obtain the desired degree of sweetness, and the food value of the beverage is increased proportionally.

As a rule, children prefer sweeter soft drinks than the adult consumer of these products. Too much sweetening tends to mask the delicate flavors of ginger ale, lemon sour, etc., and, therefore, is not favored by those with a discriminating taste. Herein lies the advantage of the sugar substitutes. Larger quantities can be used, thus securing the "body," a most desirable quality, without making the product distastefully sweet. At the same time, the food value of the beverage is maintained or increased.

**Carbon Dioxide Gas.**

Most bottled soft drinks are effervescent—that is, when first uncapped, the liquid bubbles and froths. This property is due to the impregnation under pressure or at reduced temperature of the mixture of water, sirup, flavor, etc., with carbon dioxide gas. Carbon dioxide is obtained in various ways, such as burning coke or limestone, and by the action of an acid on a carbonate such as soda ash. Contrary to a belief more or less prevalent, the raw products used in the manufacture of carbon dioxide—that is, the coke, limestone, acid, or soda ash—are not present in the bottled beverage. Only the gas itself is used, and this gas in bottled soda water is a wholesome product, identical with the carbon dioxide which occurs naturally in large quantities in certain mineral springs in the United States. Springs of this type are highly prized for their effervescent properties, and at some the escaping gas is collected, compressed, and used for carbonating soft drinks and mineral waters. The carbon dioxide, from whatever source obtained, is purified, and usually converted into a liquid by means of increased pressure and decreased temperature. It is then placed in stout steel cylinders and shipped to the bottler. When the stop cock on the steel cylinder is opened, the gas is evolved, being converted from a liquid to a gaseous state by the release of pressure. The gaseous pressure in bottled soft drinks usually varies from 40 to 80 pounds per square inch.

**Color.**

Nearly all bottled soft drinks are colored artificially. Ginger ale, sarsaparilla, root beer, birch beer, chocolate, and
colas ordinarily are colored with caramel, which is made by carefully heating sugar or glucose. As a rule vanilla, or as it is frequently called cream or club soda, is uncolored. The other drinks are generally colored with one of the permitted dyes. Naphthol yellow or tartrazine, which gives a yellow color, is ordinarily used in lemon sour; amaranth, ponceau, or erythrosine, in cherry, strawberry, raspberry, etc. Certain dyes, such as those already mentioned, may be used in food which is shipped in interstate commerce, provided they do not conceal inferiority and their presence is plainly declared on the label of the product.

ACID.

Many soft drinks, like ginger ale, the colas, cherry, lemon, strawberry, raspberry, orange, pineapple, grape, and phosphate, contain the fruit acids, citric or tartaric. The mineral acids are also used, phosphoric frequently, and sulphuric and hydrochloric acids to a smaller extent. Certain beverages, however, such as sarsaparilla, root beer, birch beer, chocolate, and vanilla, contain no acid, and are classified as belonging to the nonacid group of soft drinks. The fruit acids, citric and tartaric, occur naturally in various fruits, imparting to them their tartness. It is considered permissible to add pure fruit acids to beverages, thus simulating the fruit after which the beverage is named. Sulphuric and hydrochloric acids, however, do not occur naturally in fruits or fruit juices, and, in the opinion of the writers, they should not be used to contribute tartness or sourness to soft drinks. The quantity of citric acid added depends upon the flavor, and the quantity of sugar used, but is approximately from one to three grains to the half-pint bottle.

By increasing the amount of acid added, the quantity of sugar can be increased, thus imparting "body" or viscosity to the beverage without increasing the apparent sweetness.

CONDIMENTS.

One of the chief condiments added to soft drinks is capsicum or red pepper, a minute quantity of which is added to ginger ale to increase its pungency. In the process of rendering ginger extract soluble in water or sugar solution,
much of the natural heat of the ginger is lost; consequently, it is customary to reinforce the ginger extract with an extract of capsicum or of some other member of the pepper family. Some ginger ale, however, has no added capsicum, the process of manufacture being such that more of the natural heat is retained, or the natural ginger flavor is reinforced by supplementary flavors. Other condiments sometimes used in ginger ale are nutmeg, cinnamon, cloves, allspice, etc. In like manner, such beverages as sarsaparilla may contain various kinds of spices or condiments designed to render them appetizing.

BOTTLING SOFT DRINKS.

Where soft drinks are bottled on a large scale, the sanitary precautions taken are usually excellent. This is especially the case where beverages are aged—that is, manufactured and stored to develop and improve quality. When this procedure is carried out, it is essential that the product be bottled in a clean manner; otherwise, a loss, due to spoilage, occurs through the development of "flat sours," "ropiness," "sediment," etc.

Where soft drinks are manufactured in a small way for immediate consumption, however, the sanitary conditions are not always the best, and in some cases they are deplorably filthy. The sirup and filling rooms may easily become dirty from the spilling of sirup and extracts, which attract flies and other insects. Proper precautions in washing bottles are not always taken, nor is the water used for preparing the sirups and for filling the bottles always pure. Modern machinery for preparing food products of this sort for the market has been perfected to such an extent that there is little excuse for offering for sale an insanitary article. A belief is more or less current that carbon dioxide gas preserves bottled soft drinks from fermenting and souring. While this is to a certain extent true, carbon dioxide can not be depended upon to overcome or neutralize insanitary conditions in the bottling house. The sanitary quality of bottled soft drinks shipped in interstate commerce is subject to regulation under the Federal food and drugs act.
High-grade bottled soft drinks enable the dweller in rural communities to enjoy a food product which a few years ago was obtainable only in towns and cities, directly from soda fountains.

Flavors and condiments, well-known household articles, are used in soft drinks, and are of a varied nature designed to make the product attractive to the taste.

In addition to being delectable, soft drinks have food value, due sometimes to their content of sweetening ingredient, which amounts to from 5 to 12 per cent of the total weight of the beverage, and, in some cases, to the fruit extracts which they contain.

The quality of bottled soft drinks depends largely upon the demand made by discriminating consumers. Some knowledge of the composition and preparation of these products for the market, as set forth in this article, should enable the average consumer to ask for only high-grade beverages.

The annual consumption of bottled soft drinks in the United States prior to war restrictions in production is estimated as about three billion bottles.

It is estimated that over 10,000 establishments, employing about 75,000 people, are engaged in the bottling of soft drinks in the United States.