

CITRUS ICE CREAM

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The announcement by press and radio of the development at the Florida Agricultural Experiment Station of a successful means of flavoring ice cream with citrus juices resulted in the following editorial comment (6): "Should orange ice cream even distantly approach the popularity of 'chowkit' or 'v'nilla' it would mean a big new outlet for juice and money in the pocket for growers." This would now be a reality if the ice cream consuming pattern at three fountains on the campus of the University of Florida, were repeated over and over again throughout the Nation, for the variegated orange ice cream has been commanding about 10 per cent of total ice cream sales since its introduction October 1, 1952.

There are two very important factors associated with the new variegated citrus ice creams: (a) they possess the fresh fruit flavor of the fruit from which they are prepared and (b) the bright colors of the fruit preparations imbedded in vanilla ice cream give the ice creams added eye-appeal so important in merchandising.

Although many fruits have long been used by ice cream manufacturers for flavoring ice-cream, the citrus fruits have not been among them. This is because of the high acid content which destabilizes milk proteins when citrus juices are used in the conventional flavoring method of producing a homogeneous mixture of the fruit and the ice cream mix during the freezing process. Some ice cream manufacturers, however, have produced a delightful treat for consumers in a combined frozen product that consisted of two layers of vanilla ice cream separated by a layer of orange sherbet. When the orange sherbet was prepared of pure fresh orange juice consumers eagerly accepted this combination. In general, ice cream manufacturers are reluctant to supply such a combination because of major changes in processing arrangements and due to added operational costs.

During the development of the commercial manufacture of ice cream there have been sev-

eral changes with respect to equipment and methods of incorporating fruits and fruit products into ice cream. Among these is the injection principle to produce the variegated-type of fruit flavored ice creams. The fruit injection material is cooked in the process of preparation, and therefore this unique flavoring method has been limited to fruits that possessed palatable flavors after being cooked.

Studies were undertaken to modify the process of producing fruit injection materials. These resulted in a successful arrangement of ingredient blending and heat treatments so that the new development could be announced at the Annual Convention of the International Association of Ice Cream Manufacturers (1). The studies were enlarged and a commercial formula for ingredients established (2). This formula was based on sucrose as the only sweetener. When processing the ingredients into the injection material some problems were encountered. A heavy gumdrop consistency prior to addition of the frozen concentrated orange juice necessitated a careful and thorough blending after small additions of the juice. This required considerable time and a heavy duty agitator. Improper blending resulted in the finished material having a consistency somewhat similar to tapioca pudding.

The investigation was broadened to include studies on sucrose replacements by corn syrup. It was found that up to 50 per cent of the sucrose could be replaced on a solids basis by regular corn syrup or by the high conversion type (5) and a new formula was developed (3, 5). As the original formula included a commercial pectin preparation and later studies were made with pure pectin as the colloid, the new formula specifies the 150 grade pectin.

As this investigation progressed it became apparent that some consideration should be given to a study involving the juice of different varieties of oranges. It would appear to be very desirable to start with "early" oranges, but the season has hardly started. A preliminary study, however, has been made with two types of frozen concentrated orange juice obtained from the Citrus Branch Station. One concentrate was prepared of Hamlin juice and placed into frozen storage in January 1952 and the other was prepared of Temple juice fortified with cold pressed oil from Temple oranges. These were prepared into injection materials

and used to flavor ice cream. They were compared to a "regular" frozen orange concentrate obtained on the local retail market. The latter was typical of the frozen concentrated orange juice used in supplying campus fountains with variegated orange ice cream (4).

No extensive consumer acceptance studies have been conducted but several individuals have made comparisons. Based on the fragmentary observations it would appear that consumers desire a rather high oil content, for the Temple fortified sample was selected by the majority as the most desirable, while the Hamlin sample was always placed last. Such reactions, however, may not be the same if served only one sample so that no direct comparison is possible. Only a detailed study over a rather wide area can provide a sound basis for a final selection. One very important conclusion, however, is justified. Future studies should be directed to the use of juice from "early" oranges to which has been added cold pressed oil. Economically, the use of "early" oranges in ice cream offers a great deal to Florida orange growers and juice processors. Color not being a factor, because color is added to the injection preparation, the juice of "early" oranges when oil is added may prove to be acceptable for flavoring ice cream and thus make possible an earlier start of processing in the concentrate plants.

There is no intention to imply that ice cream manufacturers will be content with an inferior product, for most of them are very quality minded. On the contrary, it is likely that ice cream manufacturers will be interested in a standard of identity for the injection material and certain specifications as to ingredients. This applies bacteriologically as well as chemically. Only results of research will provide the answers.

Thus far studies with the lemon, lime and tangerine frozen products purchased on the retail market would indicate considerable lack of uniformity when these products are processed into injection flavoring materials. It is considered, however, that standards for these

products also would make for uniformity both from the standpoint of the physical properties of the citrus injection materials and that of flavor.

Each of these citrus fruits has a flavor that is compatible with vanilla ice cream to give the combination a "sundae" effect. As obtained on the local market the tangerine concentrate resulted in less flavor than did the others. This may possibly be improved by a higher tangerine oil content. Although the citrus injection materials are rather tart when tasted alone, they seem to give ice cream an invigorating and taste stimulating property that appeals to consumers. Several comments have been received to the effect that the orange ice cream is not so sweet as other fruit ice creams. No doubt tartness is an important attribute in this respect. As the injection material constitutes about 20 per cent by weight of variegated orange ice cream the consumer receives varying amounts of it in different spoonfuls, some containing none or very little and others containing a great deal of the orange preparation. This results in a very tempting taste stimulating eating enjoyment. To be appreciated variegated orange ice cream must be tasted.

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