Natural Food Flavor Intensity

apricot, peach, and pear nectars studied to determine the sweetness-acid-flavor relationship in a natural food product

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Flavor and sweetness are closely related factors—especially in fruit products—but there exists a level at which added sucrose ceases to enhance the flavor of the product and the relationship between sweetness and flavor is influenced by acidity.

A study to determine sweetness-acid-flavor relationship was conducted with fruit nectars made from Blenheim apricots, Bartlett pears, and Halford cling peaches. All nectars consisted of 55% fruit and 45% water by weight, with no added syrup. The raw fruit was put through a pulper, blended with water and poured into cans. Cooking times were 40 minutes at 210°F for apricot, 32 minutes at 210°F for pear, and 40 minutes at 212°F for the peach nectar.

A laboratory taste panel of 16 to 22 judges, selected for their ability to detect small differences in concentrations of sucrose and acid, evaluated the nectar samples over a period of three months. The samples were always tasted at mid-morning and at room temperature.

When the unsweetened apricot control was compared with apricot nectar containing 4% or 8% sucrose, a highly significant number of responses ascribed more flavor to the sweeter sample. In addition, there was a decided preference for the nectar with the greater amount of sucrose. Although that preference was apparent when the 8% sucrose sample was compared directly with the sample containing 4% sucrose, the difference was not statistically significant.

Addition of organic acids appeared to balance the sweetness and to enhance the flavor of the nectars to a significant degree. The addition of acid to unsweetened nectars unbalanced the sweetness-acid relationship and decreased apparent flavor intensity.

Responses to the addition of both sucrose and acid indicated a significant tendency to ascribe more flavor to the sample with the higher ratio of soluble solids to acid.

In general, sucrose—in the percentages employed in this investigation—enhanced natural apricot flavor. Addition of organic acids increased palatability, especially when accompanied by the addition of sucrose. Preference appeared to be based on sweetness and on acidity as well as on the ratio of these two factors.

When samples containing 4%, 6%, 8% or 10% added sucrose were compared the 8% sucrose sample appeared to be the most flavorful and was preferred most frequently. The intensity of the natural fruit flavor depends on an optimum soluble solids content in proportion to an optimum acidity. For apricot nectar, these optimum values were 16°–18° Brix —specific gravity—for the soluble solids and 0.56%–0.59% acid.

Responses of the judges to sweetened pear nectar show a trend similar to that for the apricot nectar. There was a highly significant degree of accuracy in identification of the sweetest sample in all series, a dislike for the least sweet nectar, association of preference with the most flavorful sample, and correlation of flavor and preference with the soluble solids-acid ratio.

When four samples of peach nectar containing 4%, 6%, 8% and 10% sucrose were presented to the judges the 8% sucrose level was designated as the most flavorful and most liked. However, when samples with sucrose levels of 6%, 8%, 10% and 12% were evaluated, preference shifted toward the 10% level, indicating a tendency toward preference for the second sweetest sample.

The addition of citric acid to sweetened peach nectar samples did not produce a shifting of preference to the sample originally preferred as might be expected. Instead, the judges responded to the acidified nectars in much the same manner as to the unacidified samples, placing them in the same relative order. The samples containing 9% sucrose and acidified with 1.5% acid were the best liked.

In these flavor evaluation tests, the judges associated preference with the sample they considered most flavorful. Apparently, flavor intensity depends on the ratio of optimum soluble solids and optimum acidity. There was a high degree of accuracy in identifying the sweetest sample in all series, and—in general —there was a dislike for the least sweet nectar. Preferred soluble solids-acid ratio for apricot nectar was approximately 30; for pear nectar, 160; and, for peach nectar, 40.

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The above progress report is based on Research Project No. 104.

The Sugar Research Foundation supported the investigation reported here.

GROCERY STORES

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of stores. From 94%–99% of the stores in each of the counties carried these products. From 40–60% of the stores carried dietetic foods and these stores were found to be most common in the metropolitan areas.

Notions and/or drugs were carried almost as commonly in the grocery stores surveyed as were food products. From 91%–93% of the stores carried some of these goods. From 1%–9% had lunch counters. The highest proportion of stores with lunch counters was in Fresno County and the lowest in Alameda County.

All stores in all five counties with seven or more employees carried staple groceries, dairy products, some fruits and vegetables and some meat. The proportions carrying these products were slightly higher in stores with three to six employees than in those with one or two employees. Likewise all the chains and the independents who were affiliated with other independents in cooperative groups carried these goods. The nonaffiliated independents did not carry these goods quite so frequently.

In the case of notions or drugs the proportions of stores in the different counties carrying these goods increased as number of employees increased. They were also carried more frequently by chains than in independent stores. In the metropolitan counties the proportion of stores carrying notions or drugs—or