4 Production of non-fermented fruit products

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4.1 Introduction

The extraction of juice from fruit is an ancient art dating from the earliest of records, where wine is often mentioned. Fermentation of fruit juice so the alcohol content preserved the fermented juice was one of the earliest forms of food preservation by the human species. Although fermented beverages are dealt with in another chapter, the extraction of fruit juice must be considered a mature technology. With rapid changes taking place in most technologies during the past century, the manufacture of fruit juice has progressed from the farm or cottage industry into the efficient technology of modern food processing.

Throughout the temperate areas of the world, fruits used for the major quantities of juices are citrus (predominantly orange), pome and grape or vine fruits. Some production of stone fruit and berry juices is carried out but only in small quantities. Pineapple dominates tropical fruit juice production, with highly flavoured fruits such as mango, passionfruit and guava becoming more popular as blending juices.

Methods of extracting fruit juices are dependent upon the structure and edible portion of the fruit. Preservation methods include thermal treatments, freezing, chilling, concentration (drying) and, for some clear juices, fine filtration. Juices may be taken apart by removing volatile flavour components, water, bitterness and acidity and then recombined to produce a consistent product. Fruit-derived drink bases may be manufactured from the remaining fruit material after the juice has been extracted.

4.2 Fruit quality

Fruits used for juice manufacture are often those rejected because of the high specifications for the fresh market, or they may be off-cuts from other fruit processes or fruit which is specifically grown for juicing. Juicing is near the bottom of the fruit usage chain, so care must be taken to ensure that only sound material is used (Figure 4.1). Fruit that is infected with moulds, starting to ferment with yeasts or is rotten is not suitable for juicing and must be removed from the processing line, preferably before
washing so that microbial and off-flavour contamination of the juice is prevented.

Fruit maturity is important for optimum flavour, as flavour volatiles are produced near the fully ripe stage. However, if the fruit is allowed to ripen to the stage where senescence begins, the structure of the fruit is degraded and this can cause problems during extraction. For example, pears that are over-ripe form a 'porridge' from which it is almost impossible to extract the juice.

Variety also plays an important part in the quality of the extracted juice. Some varieties are more suitable than others for processing. The classic example of this is the difference between processed Valencia and Navel oranges, with the production of bitter limonin in the Navel juice making it unpalatable. Juices from apples of different varieties may be blended to give the required flavour characteristics.