

## Production of Tropical Fruit Powders Using Spray Drying and Agglomeration Technology

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Dried fruit concentrates contain a high percentage of fruit solids. Scientific studies now show how compounds found in fruit - specifically anthocyanin and phytochemicals - offer a range of functional health benefits. Fruit powders contain many of the essential phytonutrients and anti-oxidants the body needs to remain healthy. They add natural colour and are an excellent addition to dry mixes, confectionery products, nutraceutical products and beverages. Fruit powders may be easily dissolved or blended with other fruit flavours. The final product is delivered as a free-flowing powder which retain a much more natural flavour.

The fruit powder is full flavoured and ideal for inclusion with products or fruit drinks. Dried fruit powders may produce a wealth of exotic flavours, at a very competitive price. The dried fruit powder is easier to transport than purees or fruit juices and also offers easier storage. The advantages of fruit powder include; solubility and reconstitution, cost effectiveness, concentrated taste and flavour, as well as guaranteed minimum shelf life of one year from date of manufacture. Applications of fruit powder include use in instant soups, snacks, bakery, beverage, dairy, candy, ice-cream, baby food, pasta, etc. Spray drying and freeze-drying are the major process employed to produce dry flavourings. Processing of tropical fruit flavours into the powder form enables the industry to diversify products made from these seasonal fruits in order to penetrate international markets. This is in line with the Third National Agricultural Policy (1998-2010), which encourages new product innovations to convert raw materials especially tropical fruits like pink guava, pineapple star fruit and mango to higher value end products.

Good rehydration and retention of aroma and nutrients are essential in dried fruit powders. Glycosidic non-volatile flavour precursors may generate aroma-active volatiles through thermal treatments or acid and enzymic hydrolyses. Commercial enzymes containing high glycosidase activities may enhance the flavour of the pressed juice by the hydrolysis of the glycosidic aroma precursors present in all fruits. A juice concentrate having a good flavour is essential in producing a fruit powder of high quality. Volatile aroma components (about 60 – 80%) can be retained in the dried product by the mechanism of encapsulation. Flavour encapsulation offers many advantages. One of them is that it could retain the volatile compounds and protect the flavour from undesirable interactions with the food and other flavour component. It also guards against light-induced reaction or oxidation to control the release of flavour (Reineccius, 1991). Retention of the volatiles is explained on the basis of the selective diffusion theory. As the drying proceeds, the diffusivity of the aroma components in the dried matrix is reduced more sharply than water diffusivity.

Instant properties of the tropical fruit powder involve its ability to dissolve in water. Each particle has to be wetted, sunk in the liquid, and dissolved. Properties like wettability, sinkability, dispersibility and solubility are of importance for the reconstitution process. The transformation of single particles into porous agglomerates is known as the instantizing process (Masters, 1991). Good rehydration of the spray-dried fruit powders is attributed to the porous structure of the dried particles. The porous structure allows the quick entry of water and subsequent sink, and the dispersion and dissolution of the solids. The agglomeration process changes the characteristics of the powder to such an extent that wetting, sinking, and dispersing are increased to a point where reconstitution occurs quickly.

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