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Extended Abstract

High quality sweet lime juice powder compositions with enhanced realfruit content and stability for food and cosmetic applications

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Fruits are important sources of vitamins and carbohydrates like fibre and sugar. They are low in calories and naturally sweet. Fruits and their juices are good sources of water too. Different fruits contain different vitamins, so it is important to eat a variety of fruits. Citrus fruits have been known to have many benefits both when taken internally and for external applications. Fresh fruit juices typically contain about 85-98% of water. This high-water content places a heavy burden on the packaging, handling, storing and shipping of such juices and has stimulated the development of many processes for the partial or complete dehydration of such juices. There are no or limited availability of real juice as most of the marketed ones have hardly 10-20% real fruit components. Due to the increasing statistics on metabolic diseases like diabetes, cancer, obesity etc., there is also an increased awareness on healthy living that includes majorly the diet and physical activity. Sweet limes come into season mostly during the rainy months from July to August, far before other orange varieties hit the shelves between October through November, and again from November through March. Our approach is that by drying fruit juices and components using innovative technologies we could extend the shelf life from around two weeks up to two years retaining more than 90% of the original nutritional value and makes it logistically simpler. Changing food habits in the country has increased consumption of fruit and fruit products and hence market for fruit juice powder has increased. This technology enables possibility to efficiently send the food not only to local soup kitchens, general market, hospitals and to anyone struggling from malnutrition around the world. Formulations could be enhanced by adding other natural sources of protein and amino acids, vitamins to yield a complete nutrition supplement instant to use.

Lime juice can be prepared and concentrated in large amounts at high rates in the same general manner as for orange and grapefruit juices, using similar equipment. For juice extraction, however, smaller (than usual for oranges) cups are used on one type of extractor, which individually cuts and presses each fruit. Another type of extractor presses and disrupts the entire fruit between rotating converging disks, and the fruit, pulp, and rag mixture are then separated from the juice in a screw press/screen finisher. Single-strength lime juice may be blended with sugars, syrups, water, or carbonated water and bottled in glass or sealed in metal cans. These types of juice products are usually preserved with a small amount of added sulfite or bisulfite. They may remain stable without refrigeration up to a year or longer.

The juice can be concentrated on a thermal accelerated short time evaporator (TASTE), widely used throughout the world citrus processing industries. However, since lime juice containsa higher percentage of organic acids than of carbohydrates, the degree of concentration is determined as grams per liter of acid rather than the degrees Brix (approximate percentage of sugars) commonly used for other citrus concentrates. However, Brix measurements with a commonly available Brixometer remain necessary, to determine the bulk density from which the GPL can be calculated. Computer programs and automated instrumentation provide dependable determinations at a high rate. Most lime concentrates are evaporated to about 400–500 g l^{-1}. The uncorrected, observed, desired Brix value (roughly analogous to the acid concentration desired) must be known since evaporation control is based on in-line Brixometers. The approximate desired Brix value must be determined based on the acid and Brix of the incoming single strength juice, using standard methods.

Lemon and lime juice, which contain citric acid, are used in products such as ceviche, some salad dressings and pickles, but traditional procedures to acidify foods and confer keeping quality and safety usually employ acids of microbial origin. The preserving power of vinegar is due to its high content of ethanoic acid. It is produced by a double fermentation process in which sugar is first converted into ethanol by yeast and a second aerobic stage in which acetic acid bacteria oxidize the ethanol to ethanoic acid. Vinegar can be produced with ethanoic acid concentrations in excess of 10% (most table vinegars would contain 4–5% w/v) and was the strongest acid known in antiquity. Addition of vinegar to a food material can thus considerably reduce its pH, inactivate some of its indigenous microflora and restrict the growth of those that survive.

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