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Characterization of fruit juices and effect of pasteurization and storage conditions on their microbial, physicochemical, and nutritional quality

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Abstract

Characterization, pasteurization and storage are essential steps in fruit juice processing. Watermelon, pineapple, and mango juices were pasteurized at 80 ± 2 °C and held at different treatment times (1, 2.5, 5, 10, and 15 min). Juice yield, pH, proximate composition, total soluble solids, color, vitamin C, microbial quality, mineral content, enzyme activity (polyphenol oxidase (PPO), and peroxidase (POD)), total phenolic content, and antioxidant capacity were measured during pasteurization and cold storage (4 °C). Results showed that watermelon juice had the highest crude protein, pH, and moisture content, pineapple juice had the highest titratable acidity, vitamin C and mineral content (potassium, calcium, magnesium, manganese, and zinc) and mango juice had the highest juice yield, and total soluble solids. Regardless of the holding time, pasteurization reduced total plate counts and yeast and molds to below detectable limits (1 log CFU/mL). Vitamin C was undetectable in watermelon juice after 10 min of pasteurization compared to mango juice with a 27% reduction. Pasteurization preserved mango juice color, but watermelon juice became less red and more yellow with increasing treatment time. POD was more thermoresistant than PPO and needed a treatment time of at least 5 min to obtain 80% reduction. Storage of more than 9 days negatively affected the watermelon color, total phenolic content and antioxidant capacities of watermelon juice pasteurized at 15 min and vitamin C content of unpasteurized mango juice. Thus, pasteurization and storage affect fruit juice quality depending on the type of fruit and their composition.