ABSTRACT

Fruits and fruit-based products comprise abundant bioactive compounds valuable to human health and may reduce the risk of disease by beneficially targeting body functions. Consequently, these fruits are used in varying proportions as ingredients in functional foods. The market sectors for fruit juices have been growing at a fast pace. The widening market of these products has led to speculation that they may contain artificial aromas, adulterated and mislabeled. Fruits are relatively easy to authenticate morphologically when intact and fresh. However, the act of processing them into juice gives rise to the possibility of substitution with cheaper products. For this reason, processed food product authentication is primarily significant for consumers; industries, and regulatory agencies. Effective, reliable, and rapid food authentication methods are valuable tools for the identification of natural fruit pulp in reconstituted fruit juices to ensure juice quality and safety hence mitigating adulteration and fraud. Molecular-based methods have recently acquired immense priority for their ability to pick food material sources at any stage along the food supply chain. The study focused on DNA isolation from raw and reconstituted fruit juices. The study aimed to validate an appropriate DNA isolation protocol specifically for processed fruit juices. It describes an innovative experimental methodology that efficiently extracts, amplifies, and identifies natural fruit juice pulp by utilizing universal biomarkers to test for the quality and authenticity of natural fruit pulps in reconstituted fruit juices in Kenyan markets. Two genomic DNA extraction protocols; CTAB and SDS were tested for the isolation of DNA from processed fruit juices. The CTAB and SDS methods were able to recover genomic DNA of high quality and purity appropriate for application in various PCR analyses with few limitations in the CTAB protocol. The concentration of the DNA was determined using the Nano-drop spectrophotometer in ng/µL by calculating the absorbance at wavelengths (A260/A280: A260/A230). The quality of the extracted DNA was evaluated on 0.8% agarose gel electrophoresis stained with lul ethidium bromide and observation of bands integrity was done in a UV-trans-illuminator machine (Quantum ST4, France). PCR amplification was done using universal primers (rbcL-650 bp, psbA-323 bp) that target the plant chloroplast genome). DNA extracted from the SDS method exhibited robustness and ease during the PCR amplification process. The amplified bands' quality and integrity were evaluated on 1.5% agarose gel stained with 1 ng/L ethidium bromide. From the results obtained, the SDS protocol emerged as the best for extracting high-quantity and amplifiable DNA.

KEYWORDS;

Adulteration, Molecular markers, Fruit Juice, Food Safety, Quality, Protocol, DNA, SDS, CTAB