Detecting of Sugar Adulteration in Black Tea and Its Impact on Quality Parameters

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Ceylon tea is considered as the world's finest black tea, in terms of quality. However, the issue of tea being adulterated with sugar has been prevalent for some time. Sugar adulteration is basically done to enhance the colour properties of tea in order to fetch higher prices. Therefore, development of a simple method to detect sugar adulteration in tea is timely needed. Hence, this study was conducted to develop a rapid method to detect sugar adulteration in black tea and to evaluate the quality parameters in sugar adulterated black tea. Three batches of black tea samples were prepared from TRI 2025 clone grown at St Coombs Estate, Sri Lanka, by adding different sugar levels of 0 g, 2 g, 4 g, 8 g, and 16 g per 1kg (Trial 1), and 0 g, 10 g, 20 g and 30 g per 1kg (Trial 2) of withered tea leaves, during the 1st rolling, using a miniature environment control manufacturing (ECM) system. Sugar adulteration in black tea cannot be identified by using both quantitative and qualitative Benedict's test, Strip method and Sensory evaluation technique. Phenol-sulfuric method and anthrone method showed increasing pattern of spectrophotometer reading with increasing of adulterated sugar levels in black tea. Sugar adulterated black tea samples showed reduction in antioxidant and total phenolic contents compared to the sugar unadulterated black tea samples. There was also no significant difference between moisture content with increasing sugar levels ($p>0.05$). But there was an increasing pattern in moisture content in all sugar adulterated levels when storage time is increased. Phenol-sulfuric method and anthrone method can be recommended to detect sugar adulteration. Sugar is a constituent which naturally occurs in tea brew. Hence baseline data for inherent sugar content should be established for different seasons and regions.

Keywords: Sugar adulteration, Anthrone, Antioxidant, Black tea, Phenol-sulfuric, Polyphenol