

Effect of Extraction Temperature, Duration and pH on Extractability of Black Tea and Chemical Composition of Extract

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Sri Lanka exports majority of its tea in bulk form. There is a greater market potential for value added products such as instant tea and ready to drink tea. Loss of organoleptic properties associated with fresh black tea, lack of solubility in cold water or haze formation, and high cost of production are main problems associated with manufacture of value added products. Extraction of tea is the first step of manufacturing value added products such as instant tea and ready to drink tea. Extraction conditions affect the extractability and compositions of extract consequently the cost of production and quality. Black tea (BOP grade) was collected from the St.Coombs Tea Factory. Samples were extracted under different combination of extraction temperature (10 °C, 30 °C, 50 °C, 70 °C & 90 °C), pH (2,4,6,8 &10) and duration (10, 20, 40, 80 &160minutes). Volumes of the extracts were recorded and extracts were analyzed for total polyphenol content and for catechins. Extractability of Total polyphenol (TPP), Epicatechin gallate(ECG), Epigallocatechin (EGC) and Total catechin (TC) were significantly higher at pH 2 whereas that of Epicatechin(EC) and Epigallocatechin gallate (EGCG) were significantly higher at the pH 4. C, EC and EGCG were extracted in significantly higher amounts at 10minutes duration whereas higher amount of ECG and TC were extracted at 20minutes duration. TPP and EGC were extracted in significantly higher amounts at 40minutes duration. Extension of the extraction period beyond the 40minutes did not help to increase the extractability of black tea compounds. Catechin was extracted in significantly higher amount at 50°C whereas all other tea constituents were extracted in significantly higher amounts at 90°C. Highest amount of total catechin (1566.06 mg/100 g) was extracted under the extraction conditions of pH 6, duration 40minutes and temperature 90 °C. Therefore it can be concluded that higher amount of tea constituents can be extracted by extracting black tea for 40minutes of duration at 90 °C of extraction temperature with water adjusted to pH 6.

Key words: Extraction, Iced Tea, Total polyphenols