Abstract

Green tea is an elixir of life due to its immense contribution towards human health. It is the storage house of anti-oxidants, which protect us from various diseases given that recommended quality and quantity of it is ingested. The quality of tea is assessed normally based on the amount of the phenolic compounds viz. caffeine, gallic acid, epicatechin, catechin, gallic acid, epicatechin gallate, epigallocatechin gallate, theaflavin, etc. present in tea. These compounds are primarily responsible for variation in the taste and flavor of tea. Therefore, determination of the taste-affecting compounds is of utmost necessity. To achieve this aim and to determine only selective compounds which affect the quality of tea, the molecularly imprinted polymer technique has been adopted. Molecular imprinting is a technique to polymerize around a template molecule and remove the template after polymerization.The thesis portrays the development of three electrodes, specific for green tea chemicals, by employing MIP technology. The utilization of MIP enables the detection of a specific target molecule in the analyte. The first molecule that has been chosen for detection in tea is the caffeine molecule. The second molecule that has been chosen is gallic acid (GA). GA serves as a strong anti-oxidant and is the only free phenolic acid present in tea. The third molecule that has been chosen is epicatechin (EC) (C15H14O6) is the most significant bioactive compound amongst all, as takes part in the race of serving tea as a quality health beverage. The epicatechin sensitive electrode has been developed in two ways for cost-effectiveness. A markable reduction in cost has been observed using a dummy template (quercetin) for the detection of EC. All the electrodes developed in this work is established to be repeatable, selective, and reproducible, with approximately three-month's stability. Additionally, a three electrode potentiostat have been developed. The performance of the developed potentiostat has been initially tested with the caffeine electrode.