



MONITORING OF FERMENTATION LEVEL IN TEA MANUFACTURE BASED ON TEA AROMA USING DIGI-NOSE

Tharaga S.^{1,2}, Wanniarachchi W.K.I.L.³ and Wanniarachchi D.D.C.de S.^{4*}

¹Department of Materials and Mechanical Technology, Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka

²Faculty of Graduate Studies, University of Sri Jayewardenepura, Sri Lanka

³Department of Physics, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Sri Lanka

⁴Instrument Centre, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Sri Lanka
dakshikacw@sjp.ac.lk

Abstract

Tea is a major export product in Sri Lanka. A high price for tea in international markets is obtained if the tea taste, aroma and liquor quality is high. These quality parameters are greatly influenced by the fermentation stage of the manufacturing process. The current practice to detect the optimum fermentation is a human smelling tea particle to notice the appearance of two distinct smell peaks namely, “first nose” and “second nose”. This is a very subjective way of detecting the optimum fermentation level hence difficult to maintain consistency during tea manufacturing. Therefore, this study is focused on the development of an electronic nose (“Digi-Nose”) device to detect the appearance of two distinct smell peaks instead of human detection. An array of Metal Oxide Semiconductor gas sensors are used in this device for this purpose. The device is capable of sniffing the tea aroma as sniffing cycles similar to human breathing throughout the fermentation period. According to the results after signal enhancement, the first nose appeared at 15 minutes and 60 minutes with the MQ3 sensor while the MQ4 detects smell peak around 40-60 minutes. Therefore, this paper demonstrates that the developed Digi-nose is capable of detecting smell peaks during the fermentation stage of black tea.

Keywords: electronic nose, MOS gas sensors, black tea, tea fermentation