605/E2

A Polymerase Chain Reaction based method to detect wheat adulterations in traditional flour types

B G N D K Somatilaka[1], A K Nanayakkara[2], D Rajapakse[2], S G Senaratne[2*] and N V Chandasekharan[1]

[1]*Department of Chemistry, Faculty of Science, University of Colombo, Colombo 03*
[2]*Industrial Technology Institute, 363, Bauddhaloka Mawatha, Colombo 07*

Wheat flour is the key ingredient in bakery products. Since wheat is imported to fulfill the requirements of the bakery industry, wheat flour is freely available in Sri Lankan markets. Refined wheat flour lacks important vitamins, fiber and ingestion of wheat storage proteins (gluten) could cause coeliac disease in genetically susceptible individuals. The use of traditional flours in cuisines is currently being promoted as they are nutritious, healthy, non-inflammatory and generally home grown. Therefore, they are popular among the health conscious Sri Lankan population. However the poor textural quality of their food products and the limited availability of the traditional flours are some factors that limit their widespread use. To overcome these drawbacks adulteration of traditional flours with wheat flour has been the practice among some traders. Currently in Sri Lanka there is no method to determine wheat adulteration of traditional flours as all share similar properties including the appearance. A solution would be to consider the differences between wheat and the traditional flours at the molecular level. This study was carried out to develop a method to qualitatively detect wheat adulteration in traditional flours by exploiting differences at the DNA level. The detection was based on the gliadin gene sequence found exclusively in the wheat genome. DNA was extracted from samples by a cetyltrimethylammonium bromide (CTAB) based method. Since the DNA quality was suboptimal for the Polymerase Chain Reaction (PCR) the extraction was modified combining the above with a silica based column method which significantly improved the DNA quality. PCR was performed on pure traditional flour samples; *Cicer arietinum* (Chick peas), *Zea maize* (Corn), *Vigna mungo* (Black lentil), *Caryota urens* (Kithul) and *Eleusine coracana* (Kurakkan) suspected of being adulterated with wheat. The analysis was repeated with the same flour samples incorporated with 10% wheat flour and five samples of rice incorporated bread with rice flour: wheat flour ratios of 100:0, 75:25, 50:50, 25:75 and 0:100 respectively. An amplified fragment of 220 bp indicated the presence of wheat flour in the samples. Several different commercially available flour samples (n = 5) were analyzed and wheat adulterations could be detected in two of them; chick peas and kurakkan. The modified CTAB/silica based method had the ability to extract good quality DNA for PCR and it was capable of detecting wheat adulterations in both raw flour and processed foods. This method also shows promise for the development of a quantitative assay to detect the incorporated percentage of wheat in traditional flour samples.

sidsenara@iti.lk Tel: 0112379800 (ext: 496)