ABSTRACT

Different DNA based methods have been designed to detect the presence of non-basmati rice in basmati rice, but they pose certain limitations. In this study, the difference of betaine aldehyde dehdrogenase-2 gene (BAD-2) between basmati and non-basmati rice i.e. 8bp deletion and 3 single nucleotide polymorphism is exploited to develop a SYBR Green I based real time PCR method for detection and quantification of adulteration of basmati rice. The genomic DNA of both rice varieties i.e. basmati and non-basmati was extracted based on Dellaporta derived method with slight modifications. The extracted genomic DNA was then purified using Novagen kit. PCR primers have been designed based on sequence of BAD-2 gene of non-basmati rice. Conventional PCR was performed to check and determine the specificity of the primers. After determining the specificity of BAD-2 gene based primers, the real time PCR was conducted to develop a standard curve of non-basmati rice. The BAD-2 gene based primers binds to only non-basmati rice, and produce fluorescence upon amplification, leading to the detection of its presence. To validate and authenticate the process of adulteration detection, the real time PCR of admixed rice samples prepared by mixing the basmati and non basmati rice varieties in different proportions, and rice samples obtained from local market of Lahore was performed. The calculated concentration of non-basmati rice obtained from real time PCR data were used to calculate percent adulteration of non-basmati rice in basmati rice. The percentage adulteration of non basmati in unknown basmati rice from sample 1 through 5 is 0.05%,72.06%,10.73%,8.7%,0.34% respectively. The technique is reported as an efficient and sensitive method to determine the level of adulteration up to 0.05%.