Evaluation of Two DNA Extraction Methods for Minimal Porcine (Pork) Detection in Halal Food Sample Mixture Using Taqman Real-time PCR Technique

Authors : Duaa Mughal, Syeda Areeba Nadeem, Shakil Ahmed, Ishtiaq Ahmed Khan

Abstract: The identification of porcine DNA in Halal food items is critical to ensuring compliance with dietary restrictions and religious beliefs. In Islam, Porcine is prohibited as clearly mentioned in Quran (Surah Al-Bagrah, Ayat 173). The purpose of this study was to compare two DNA extraction procedures for detecting 0.001% of porcine DNA in processed Halal food sample mixtures containing chicken, camel, veal, turkey and goat meat using the TagMan Real-Time PCR technology. In this research, two different commercial kit protocols were compared. The processed sample mixtures were prepared by spiking known concentration of porcine DNA to non-porcine food matrices. Afterwards, TaqMan Real-Time PCR technique was used to target a particular porcine gene from the extracted DNA samples, which was quantified after extraction. The results of the amplification were evaluated for sensitivity, specificity, and reproducibility. The results of the study demonstrated that two DNA extraction techniques can detect 0.01% of porcine DNA in mixture of Halal food samples. However, as compared to the alternative approach, Eurofins| GeneScan GeneSpin DNA Isolation kit showed more effective sensitivity and specificity. Furthermore, the commercial kit-based approach showed great repeatability with minimal variance across repeats. Quantification of DNA was done by using fluorometric assay. In conclusion, the comparison of DNA extraction methods for detecting porcine DNA in Halal food sample mixes using the TaqMan Real-Time PCR technology reveals that the commercial kit-based approach outperforms the other methods in terms of sensitivity, specificity, and repeatability. This research helps to promote the development of reliable and standardized techniques for detecting porcine DNA in Halal food items, religious conformity and assuring nutritional.

Keywords : real time PCR (qPCR), DNA extraction, porcine DNA, halal food authentication, religious conformity **Conference Title :** ICBB 2024 : International Conference on Biotechnology and Bioengineering

Conference Location : Istanbul, Türkiye

Conference Dates : February 12-13, 2024