ID 814

Simultaneous Detection of Bovine and Porcine DNA in Gelatine-based Products Using Species-Specific Duplex PCR

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Gelatine is a frequently utilized ingredient in many industries and is commonly sourced from bovine and porcine tissues. Authenticating gelatine is of utmost importance to ensure it meets religious and cultural requirements, ensuring consumer well-being, addressing ethical concerns, and upholding transparency in the process. This paper outlines the simultaneous detection of the bovine or porcine origin of gelatine-based matrices like pharmaceutical capsule shells, gelatine powder, jelly cups, and pudding. available in the local market. Gelatine, a highly processed material contains a trace amount of fragmented DNA. Hence, DNA extraction was performed using the 200mg small fragment protocol of DNeasymericon food kit (50), Qiagen (REF 69514) which is designed to extract DNA from highly processed materials. Amplification of extracted DNA was done using conventional duplex PCR with the aid of bovine (251bp) and porcine (289bp) species-specific oligonucleotide primers. The PCR products were analyzed on a 2% Agarose gel. The electrophoresis results showed that out of seven samples tested, four gelatine-based products showed positive bands for both bovine and porcine, while the remaining samples showed bands only for porcine. This study demonstrates the effectiveness of the duplex PCR method in rapidly and accurately determining the source of gelatine in gelatine-based matrices due to their higher sensitivity, cost-effectiveness, and specificity, providing a reliable solution for ensuring transparency and consumer confidence. Thus, further studies will be conducted with an increased sample number to ensure the repeatability of the data.

Keywords: *gelatine, DNA extraction, duplex PCR, bovine, porcine*