

Taqman real-time polymerase chain reaction for the determination of pork adulteration in meat nuggets

Abstract

A TaqMan real-time polymerase chain reaction was developed for the determination of pork adulteration in nuggets. The assay combined species-specific primers and TaqMan probe to target a 109 bp fragment of swine cytochrome b gene. Specificity test with 10 ng DNA of 11 different meat species yielded a quantification cycle (C_q) between 16.9 and 17.1 for pork, and negative results for other meats. Model experiment using chicken nuggets spiked with pork showed that the assay can quantify 100–0.01% of pork adulteration with a linear correlation (R² of 0.998, PCR efficiency of 91.1%, and relative error less or even 5%). A plot of actual value against real-time PCR-predicted value yielded R² of 0.999, and a very small (0.242) root mean square error of calibration. A strong correlation was found between the partial least square-predicted values and the values determined by real-time PCR. Random analysis of nuggets from pork, beef, chicken, mutton and chevon yielded C_q values between 18.2 and 18.6 for pork nuggets, and negative results for other meat nuggets. Finally, analysis of 27 commercial nuggets from each of the five common meat species revealed the presence of pork in 100%, 3.7%, 7.4%, 3.7% and 0% nuggets of pork, beef, mutton, chevon and chicken, respectively.