

Pyrosequencing analysis of microbial community and food-borne bacteria on restaurant cutting boards collected in Seri Kembangan, Malaysia, and their correlation with grades of food premises

ABSTRACT

This study adopts the pyrosequencing technique to identify bacteria present on 26 kitchen cutting boards collected from different grades of food premises around Seri Kembangan, a city in Malaysia. Pyrosequencing generated 452,401 of total reads of OTUs with an average of 1.4×10^7 bacterial cells/cm². *Proteobacteria*, *Firmicutes* and *Bacteroides* were identified as the most abundant phyla in the samples. Taxonomic richness was generally high with > 1000 operational taxonomic units (OTUs) observed across all samples. The highest appearance frequencies (100%) were OTUs closely related to *Enterobacter* sp., *Enterobacter aerogenes*, *Pseudomonas* sp. and *Pseudomonas putida*. Several OTUs were identified most closely related to known food-borne pathogens, including *Bacillus cereus*, *Cronobacter sakazaki*, *Cronobacter turisensis*, *Escherichia coli*, *E. coli* O157:H7, *Hafnia alvei*, *Kurthia gibsonii*, *Salmonella bongori*, *Salmonella enterica*, *Salmonella paratyphi*, *Salmonella typhi*, *Salmonella typhimurium* and *Yersinia enterocolitica* ranging from 0.005% to 0.68% relative abundance. The condition and grade of the food premises on a three point cleanliness scale did not correlate with the bacterial abundance and type. Regardless of the status and grades, all food premises have the same likelihood to introduce food-borne bacteria from cutting boards to their foods and must always prioritize the correct food handling procedure in order to avoid unwanted outbreak of food-borne illnesses.

Keyword: Pyrosequencing; Kitchen cutting board; Bacterial community analysis; Food-borne bacteria