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Presence of coagulase-negative *Staphylococcus* in dairy products

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Abstract

Species within the genus *Staphylococcus* produce various virulence factors, including staphylococcal enterotoxins. Because of their production of enterotoxins, *Staphylococcus* is the third most common pathogen responsible for outbreaks of food poisoning worldwide. Whereas *Staphylococcus aureus*, a coagulase-positive *Staphylococcus*, is the leading cause of these outbreaks, coagulase-negative staphylococci (CNS) species are also present in food and are able to produce enterotoxins. More specifically, such CNS species have been linked with dairy-related food poisoning outbreaks. However, to date, no research investigating CNS species in New Zealand and their presence in food has been reported. This study therefore sets out to isolate, identify and characterise CNS from New Zealand milk and dairy products, and to evaluate their toxin-producing potential. The results from this study showed that MALDI-TOF MS is a rapid, reliable and accurate method for identifying CNS definitively to the genus level and, on most occasions, to the species level in dairy products and is therefore a potential alternative to the traditional phenotypic, such as commercial identification kits, and genotypic, such as sequencing, methods that are currently used. Of the 42 isolates analysed, none of the CNS isolates tested produced enterotoxin *in vitro*, however, 2 isolates were found to possess an enterotoxin gene. This shows a low propensity for CNS isolates in New Zealand dairy products to be a food safety risk.

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Abbreviations

BHI	brain heart infusion broth
bp	base pair
BP	Baird–Parker agar
CFU/mL	colony forming units per millilitres
CNS	coagulase-negative <i>Staphylococcus</i> /staphylococci
CPS	coagulase-positive <i>Staphylococcus</i> /staphylococci
DNA	deoxyribonucleic acid
DNase	deoxyribonuclease
kb	kilobase
kDa	kilodalton
MALDI–TOF MS	matrix-assisted laser desorption ionisation–time of flight mass spectrometry
MSP	main spectrum
m/z	mass to charge ratio
PCR	polymerase chain reaction
RAPD	randomly amplified polymorphic DNA
RNA	ribonucleic acid
rRNA	ribosomal ribonucleic acid
<i>rpoB</i>	a gene that encodes the β -subunit of RNA polymerase
SAGs	superantigens
SE(s)	staphylococcal enterotoxin(s)
SEL(s)	staphylococcal-enterotoxin-like superantigens
<i>sodA</i>	a gene that encodes the manganese-dependent superoxide dismutase
subsp.	subspecies
spp.	species
TSA	tryptone soy agar
TSB	tryptone soy broth
TSST-1	toxic shock syndrome toxin 1
<i>tuf</i>	a gene that encodes the elongation factor Tu

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