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# *Staphylococcus aureus* encoding *icaA* isolated from food of animal origin and clinical samples

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**Objectives** *Staphylococcus aureus* is the first bacterium implicated in nosocomial infections due to its capacity to form biofilm. Biofilms are complex microbial communities attached to a surface and embedded in an extracellular matrix. This ability is regulated by the expression of the polysaccharide intracellular adhesion (PIA) which mediates cell to cell adhesion. PIA is found to be mediated by the products of a gene locus comprising four intercellular adhesion (*ica*ADBC) genes that are organized in an operon structure. This work investigates the virulence properties of *S. aureus* strains encoding *ica*A isolated from food samples and human clinical specimens such as the enterotoxin(s) genes, Panton-Valentine Leukocidin (PVL) toxins, antibiotic susceptibilities and the ecological origin.

**Methods** 395 *S. aureus* strains isolated from milk and cheese produced in Apulia region (South Italy) and 88 *S. aureus* strains isolated from human clinical specimens were collected during the years 2011-2013. Genomic DNA was extracted from overnight culture of *S. aureus* by boiling and examined for the presence of *ica*A gene. Isolates encoding *ica*A were investigated for the detection of the staphylococcal enteroroxin(s) genes (*sea*, *seb*, *sec*, *sed*, *see*, *seg, seh, sei,* sej*, sem, sen, seo*) and PVL-encoding gene (*lukF-PV* and *lukS-PV*) by PCR. The antibiotic resistance profile was tested using the disc agar diffusion method on Mueller-Hinton (Kirby-Bauer). The ecological origin of *S. aureus* strains isolated from food samples, was determined by biotyping in according to the Devriese method.

**Results** Overall out of 395 strains isolated from food samples, 297 (75,2%) were found to be positive for *ica*A. Among these strains, 13,5% encoded *sec* and 12,5% *sed* associated to *sej*, 40% resulted susceptible and 5,9% showed multidrug resistance proprieties (MDR). Non host-specific (NHS) biotype results to be the most representative (27,3%). For 88 strains isolated from human clinical specimens, 70 (79,5%) carried *ica*A gene. 43 (61,4%) of them harbored enterotoxin(s) genes, 11,4% resulted susceptible and 34,6% were multiresistant. Furthermore all analyzed strains lacked the PVL-encoding gene.

**Conclusion** In this study *ica*A gene has high occurrence and comparable percentage in food samples and clinical specimens. In fact there is no significant difference between the two groups of analyzed samples. Furthermore the biofilm formation increases multidrug resistance especially in human isolates and reduce the host immune response. The prevalence of NHS biotype in food samples shows a cross contamination along food chain due to the presence of food handlers as principal source of contamination. In terms of risk analysis, it is very important a better sanitary education to prevent nosocomial infections and foodborne diseases. Further studies are required to better elucidate the mechanisms and steps of contamination. (Work supported by **IZSPB 07/09)**