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ADHESION AND VIABILITY OF LISTERIA MONOCYTOGENES TO FOOD CONTACT SURFACES

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Microorganism adhesion to food contact surfaces is a major problem in domestic and industrial kitchens and a source of food contamination. *Listeria monocytogenes* is a foodborne pathogen of significant concern in food processing. Initial adhesion is determinant to surface colonization and surface properties such as surface hydrophobicity, charge, and roughness are fundamental in the adhesion process. The aim of this work was to investigate the adhesion ability of ten isolates of *L. monocytogenes* to eight materials commonly used in kitchens: stainless steel 304 (SS 304), marble, granite, glass, a polypropylene from a basin (PPb), a polypropylene from a cutting board (Pcb) and two kinds of silestone (synthetic stone with 94% of quartz), as well as the adhered cell viability. Adhesion assays were performed by incubating the material coupons with a cell suspension of 1.0 x 10^6 cells/ml, during 2 hours at 25°C. The samples were stained with a 0.01% DAPI solution and observed by epifluorescence microscopy. The captured images were analyzed using an automated enumeration software for determining the number of adhered cells. Simultaneously, coupons were observed by Scanning Electron Microscopy (SEM). The adhered cells viability was determined by Colony Forming Units (CFUs). Sessile drop contact angles were measured on cell lawns and on the materials. Roughness and topography were assessed by Atomic Force Microscopy (AFM). The results showed that *L. monocytogenes* adhered in higher extent to granite and marble, followed by SS 304 and beige silestone. Glass and white silestone exhibited an intermediate behaviour, whereas the polymers (Pcb and PPb) were the materials less prone for *L. monocytogenes* adhesion. No direct relation was found between material hydrophobicity and roughness and the ability of bacterial adhesion. Nonetheless, surface topography seemed to play a major role in the adhesion process. The percentage of viable cells adhered to all materials was high (about 90%) with the exception of the two kinds of silestone and marble. This result was expected since silestone has an antimicrobial agent incorporated. An interesting point to be noted is that cells adhered to marble showed less viability despite this material being very prone for *L. monocytogenes* adhesion. The results indicate that polypropylene seems to be the material more advisable to be used as food contacting surfaces minimizing the risks of cross-contamination. However, this conclusion can only be made for new materials. It must be noted that surfaces erosion, as a result of materials ageing, can significantly change the material surface properties and bacterial adhesion. More studies are now being conducted to address this aspect of cross-contamination.