The effects of copper additives on the quantity and cell viability of adherent Staphylococcus epidermidis in silicone implants.


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This in vitro study evaluated the antibacterial effect of copper additives in silicone implants. Specimens of a standard silicone material used in breast augmentation and modified copper-loaded silicone specimens were prepared and incubated in a Staphylococcus epidermidis suspension (2 h, 37 degrees C). After the quantification of adhering staphylococci using a biofluorescence assay (Resazurin), the viability of the adhering bacterial cells was quantified by live or dead cell labeling in combination with fluorescence microscopy. In the Resazurin fluorometric quantification, a higher amount of adhering S. epidermidis cells was detected on pure silicone (4612 [2319/7540] relative fluorescence units [rfu]) than on silicone with copper additives (2701 [2158/4153] rfu). Additionally, a significantly higher amount of adhering bacterial cells (5.07% [2.03%/8.93%]) was found for pure silicone than for silicone with copper additives (1.72% [1.26%/2.32%]); (p < 0.001). Calculations from live or dead staining showed that the percentage of dead S. epidermidis cells adhered on pure silicone (52.1%) was significantly lower than on silicone with copper additives (79.7%); (p < 0.001). In vitro, silicone material with copper additives showed antibacterial effects against S. epidermidis. Copper-loaded silicone may prevent bacterial colonization, resulting in lower infection rates of silicone implants.