

Abstract Submitted
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Surface modification of substrates for bacteria and cell culture.

TOM BAEDE, RAYMOND SLADEK, EVA STOFFELS, DEPARTMENT OF BIOMEDICAL ENGINEERING - EINDHOVEN UNIVERSITY OF TECHNOLOGY TEAM — The plasma needle is a medical device that consists of a tungsten wire placed in a tube through which helium flows. A RF voltage frequency of 13.05 MHz is applied to the wire to produce the plasma. The device has a non-thermal effect and is therefore suited for both organic and inorganic surfaces. It was designed to manipulate tissues, but can also be used to modify the bacterial adhesion properties of material surfaces. The surface modification has a number of applications, most notably cell culture and the preventive treatment of caries. The research consists of two sets of experiments. In the first experiments the effect of the plasma treatment on the wettability was studied by means of contact angle measurements. The wettability quantifies the hydrophilic behavior of a surface. Plasma treatment with the plasma needle significantly increased the wettability of the studied materials. The persistence of the wettability change was also examined. For some materials the effect was only temporary. Bacteria are very particular about the surfaces they adhere to and the wettability of the surface plays an important role in their preference. The next set of experiments dealt with the effect of plasma treatment on bacterial adhesion. This effect was measured by comparing the growth rates of *E. coli* and *S. mutans* bacteria that were cultured on both plasma and non-treated surfaces. The effect appears to be species specific.

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