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THE INFLUENCE OF SURFACE TREATMENT ON FOOD FOULING

Saikhwan, P.¹, Geddert, T.², Augustin, W.², Scholl, S.², Paterson, W.R.¹ & Wilson, D.I.¹

¹ *Department of Chemical Engineering, Pembroke Street, Cambridge, CB2 3RA, UK*

² *Institute for Chemical and Thermal Process Engineering, Technical University of Braunschweig, Langer Kamp 7, D-38110, Braunschweig, Germany*

ABSTRACT

The use of surface modification of stainless steels to enhance the cleanability of surfaces soiled during the processing of foods has been investigated using the technique of fluid dynamic gauging (FDG). A baked tomato paste (mostly protein) was used as a model food soil to assess the effect of different surface treatments on 316T stainless steel. The surfaces studied were uncoated 316, a sol-gel, treatment, diamond-like carbon (DLC), its variants (SICON[®] and SICAN). Initially these surfaces were characterized according to their roughness and wettability. The extent of ageing was quantified by comparing the wettability after 10-12 tests. FDG testing, where the soil remains immersed in a liquid, indicated changes in removal mechanism with surface energy. Surface modification reduced the adhesive interaction between the surface and deposit, to the extent that surface energies of 22-26 mN m⁻¹ resulted in simple detachment (adhesive failure) of the deposit from the surface. No significant effect of surface roughness was observed in the range 72 nm < *Ra* < 700 nm, as measured by AFM. The modification techniques exhibited different stabilities towards fouling and cleaning cycles.

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