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ASSESSING THE CLEANING OF UNHYGIENIC GEOMETRIES IN THE FOOD INDUSTRY USING COMPUTATIONAL FLUID DYNAMICS (CFD)

Konstantia Asteriadou^{1*}, Tony Hasting², Mike Bird³ & John Melrose⁴

¹*Unilever R&D Vlaardingen, The Netherlands*

²*Tony Hasting Consulting, UK*

³*Chemical Engineering Dep University of Bath, UK*

⁴*Unilever R&D Colworth House, UK*

ABSTRACT

Ideally, in the food industry, production lines are run for extended periods before cleaning. This, of course has as a prerequisite that the equipment and the line are hygienically designed and installed. This implies that there are no stagnation areas, or crevices and other parts of the flow domain that might cause entrapment of the product, leading to bacterial growth and product contamination. However, unhygienic geometries are often encountered in practice requiring more frequent cleaning, higher operating costs and reduced production efficiencies. This work demonstrates some modelling results validated with experimental work. CFD has been used to assess the cleaning of a T-junction and the predictions validated using electrical conductivity measurements of a salt solution of known concentration before and after cleaning with deionised water. Comparison gives acceptable qualitative agreement with finite volume based calculations that involved both steady state and transient conditions. This offers the potential for predictive models that will incorporate bacterial kinetics under processing conditions.