

DEPOSITION OF FUNCTIONAL ACTIVES ON TEXTILE SURFACES

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Functional actives is a term that is widely used in the fabric care industry and it refers to substances that can deposit on a substrate providing beneficial properties. It is known in the literature that the deposition profile of an active can vary depending on the nature of the material, the delivery system, the substrate, the presence of competitive phenomena, pH, temperature and ionic strength [1, 2].

The aim of this work is to gain mechanistic understanding on the on-fabric deposition of hydrophobic actives during a washing cycle and the development of a representative deposition model.

Detecting the deposition of actives depends on the chemical structure of the active. During this research, a range of analytical techniques was utilized, namely UV-Vis spectroscopy, streaming potential and particle size measurements to assess bulk properties and surface-active behaviour. Single surfactant systems allow for better deposition and retention of an insoluble, hydrophobic molecule than mixed surfactant systems (Figure 1) due to the higher critical micelle concentration of the system (CMC) (~20-50ppm vs ~7ppm) [3]. Absence of micelles cannot lead to the solubilisation of the active, whereas plethora of micelles seems to be inhibiting the deposition. Efficient deposition occurs with surfactant concentrations close to the CMC. Furthermore, positively charged carriers such as Zwitterionic in its cationic form, will allow for better deposition due to the electrostatic forces between the fabric and surfactant micelles. In some cases, active adsorption is enhanced by water hardness due to calcium bridging between the micelles and the cotton fibres. From this study it was concluded that the deposition of hydrophobic actives depends on numerous factors such as: the CMC of the system, emulsifying capacity of the surfactant for the given active, presence of ions, charge, pH and substrate type. The impact of each of these factors is assessed single variably.

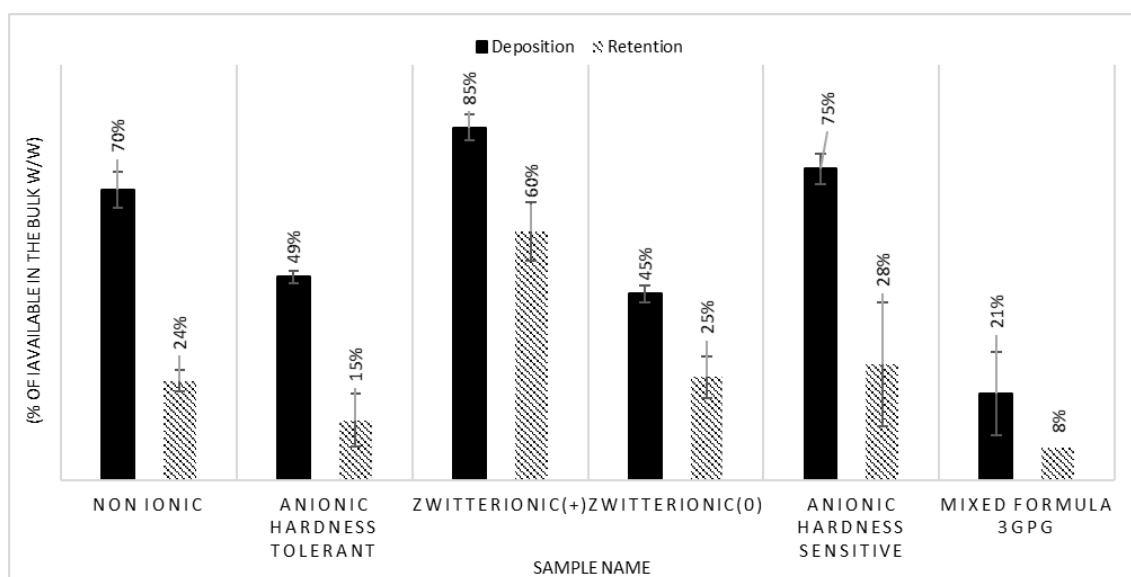


Figure 1. Deposition of a small hydrophobic active on cotton with different surfactant systems, as assessed via UV-Vis.

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[3] S. Obendorf, H. Liu, K. Tan, M. Leonard, T. Young, and M. Incorvia, *Adsorption of Aroma Chemicals on Cotton Fabric in Different Aqueous Environments. Journ of Surf and Detergents*, 2008, 12(1), 43-58.