## **Tribological Properties of Non-Stick Coatings Used in Bread Baking Process**

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**Abstract :** Anti-sticky coatings based on perfluoroalkoxy (PFA) coatings are widely used in food processing industry especially for bread making. Their tribological performance, such as low friction coefficient, low surface energy and high heat resistance, make them an appropriate choice for anti-sticky coating application in moulds for food processing industry. This study is dedicated to evidence the transfer of contaminants from the coating due to wear and thermal ageing of the mould. The risk of contamination is induced by the damage of the coating by bread crust during the demoulding stage. The study focuses on the wear resistance and potential transfer of perfluorinated polymer from the anti-sticky coating. Friction between perfluorinated coating and bread crust is modeled by a tribological pin-on-disc test. The cellular nature of the bread crust is modeled by a polymer foam. FTIR analysis of the polymer foam after friction allow the evaluation of the transfer from the perfluorinated coating to polymer foam. Influence of thermal ageing on the physical, chemical and wear properties of the coating are also investigated. FTIR spectroscopic results show that the increase of PFA transfer ronto the foam counterface is associated to the decrease of the friction coefficient. Increasing lubrication by film transfer results in the decrease of the friction coefficient. Moreover increasing the friction test parameters conditions (load, speed and sliding distance) also increase the film transfer onto the counterface. Thermal ageing increases the hydrophobic character of the PFA coating and thus also decreases the friction coefficient.

Keywords : fluorobased polymer coatings, FTIR spectroscopy, non-stick food moulds, wear and friction

Conference Title : ICFPE 2016 : International Conference on Food Process Engineering

Conference Location : London, United Kingdom

Conference Dates : September 29-30, 2016