Role of Ozone on the Washing Process of an Alimentary Fat

Jurado E.; Bailón R.; D. Altmajer ; Vicaria J.M.; Jiménez-Pérez, J.L.
Chemical Engineering Department, Faculty of Sciences, University of Granada.
Granada, Spain

Ozone is an important oxidizing and disinfecting agent which finds a wide variety of applications: drinking-water and wastewater treatment, cleaning and disinfection of industrial facilities and equipments, etc [1]. According to Cardis et al. [2] the use of ozone in washing processes has several advantages such as decreasing washing temperature and reducing the amount of water and detergents needed to achieve a good cleaning performance, thus reducing the volume of effluents to be treated. Some of the hardest residues to remove are the oily ones, and because of that the present work focuses on the effect of ozone on the interfacial properties of an alimentary fat (commercial pork lard). With this aim, two kinds of experiments have been performed: (a) the fat was continuously ozonized at 45ºC for one hour and samples were withdrawn at 0, 30 and 60 minutes to determine the acidity index, interfacial tension (O/W) and detergency; (b) washing tests in the presence of ozone (6 mg/L) were carried out at 45ºC in a continuous flow device [3] which simulates a commercial “Clean-In-Place” msystem. The experimental results show that under our experimental conditions ozone reacts with the fatty soil and probably releases free fatty acids or surface active substances which reduce interfacial tension slightly. However when ozone was continuously bubbled in the washing bath throughout the washing test or the ozonized fat was used as soiling agent, no significant increase in detergency was observed as compared to a control experiment with water and untreated fat.

References.

[1] Beltran, F.J. Ozone reaction kinetics for water and wastewater systems. Lewis Publishers. Boca Raton. 2004.

[2] Cardis, D.; Tapp, C.; Debrum, M.; and Rice, R. G. Ozone: Science and Engineering, 29: 85–99, 2007.

[3] Alameda, E. J.; Bravo, V.; Bailón-Moreno, R.; Núnez-Olea, J.; Vaz, D. A. Industrial & Engineering Chemistry Research, 42: 4303-4310, 2003.