



In-situ characterization of fouling layers: which tool for which measurement?

Patrick Loulergue^{a,b,c,*}, Cédric André^d, Didier Laux^d, Jean-Yves Ferrandis^d,
Christelle Guigui^{a,b,c}, Corinne Cabassud^{a,b,c}

^aUniversité de Toulouse; INSA, UPS, INP; LISBP, 135 Avenue de Rangueil, F-31077 Toulouse, France

Tel. +33561559783; Fax: +33561559760; email: patrick.loulergue@insa-toulouse.fr

^bINRA, UMR792 Ingénierie des Systèmes Biologiques et des Procédés, F-31400 Toulouse, France

^cCNRS, UMR5504, F-31400 Toulouse, France

^dUniversité Montpellier II. Place Eugène Bataillon, IES, institut d'Electronique du Sud. CC082, 34095 FRANCE

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ABSTRACT

In the last decade, a number of methods have been developed for the in-situ characterization of fouling layers formed in confined geometry. Laser sheet at grazing incidence and ultrasonic time domain reflectometry are relevant methods to measure fouling layer thickness. However, these two methods have never been used simultaneously during the same filtration run. The objective of this study was to compare values measured by both methods. After validation of the thicknesses given by each method on an especially designed calibrated gauge, measurements were made simultaneously by both methods on porous fouling layers formed on two membranes with different permeabilities. The results show that, in the case of a compact fouling layer, the thicknesses given by the two methods are the same. However, for more porous layers, such as concentration polarization layers, thicknesses differ, although the growth kinetics is identical. Thus, laser sheet at grazing incidence and ultrasonic time domain reflectometry are two complementary methods to determine fouling layer thickness and/or its growth kinetics according to operating conditions.

Keywords: Particle deposit; In-situ measurement; Ultrasonic Time Domain Reflectometry; Structural properties; Laser Sheet at Grazing Incidence; Bulk suspension/deposit interface

*Corresponding author.