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Fate of prions in soils : comparative studies of structural changes of N-truncated and full length ovine PrP induced by adsorption on clays by FTIR spectroscopy

M. Revault (1), H. Rezaei (2), H. Quiquampoix (3), J. Grosclaude (2) and **S. Noinville** (1)

(1) CNRS-Université Pierre et Marie Curie, LADIR, Thiais, France.

(2) INRA, VIM, Jouy-en-Josas, France.

(3) INRA-ENSAM, Montpellier, France.

(sylvie.noinville@glvt-cnrs.fr / Fax: 33 149 781 118 / Phone: 33 149 781 292)

Studying the mechanism of retention of ovine prion protein in soils will tackle the environmental aspect of potential dissemination of scrapie infectious agent. The conformational transition from the monomeric cellular prion protein PrP^C in α-helical structure into the aggregated β-sheet-rich multimer PrP^{SC} is supposed to be responsible for the so-called prion diseases. It is commonly admitted that the recombinant PrP could serve as model of conversion of the normal prion protein PrP^C. Fundamentally, the interaction of proteins with surfaces either fluid or solid involves both protein binding and unfolding. Our goal in studying protein adsorption is to determine the nature and the amplitude of the structural changes occurring during non-specific adsorption. The protein-clay interaction depends on several parameters such as protein hydration, net charge, charge distribution on the protein surface. FTIR spectroscopy is well-suited to probe structural changes of proteins at a molecular level at aqueous/solid interfaces. The conformational states of the full-length as well as the N-truncated ovine PrP adsorbed on the electronegative clay surface are compared to its solvated state in deuterated buffer in the pD range 3.5-9, using FTIR spectroscopy.