Seminars of the DSCM

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NMR analysis protocol for the analysis of paint formulations containing insecticides

After the discussion, Dr. Aiello will talk about her own experience on preparing a successful Marie Curie Individual Fellowship application

Abstract
Malaria, Zika virus, dengue fever and yellow fever are mosquito transmitted diseases for which vaccines either do not exists or are not widely available. Prevention control is the main way to reduce their spread, and the use of insecticides constitutes one of the key measures recommended by World Health Organisation. New innovative methods of bringing the insects into contact with the insecticides include the development of insecticidal paint with the advantage of safer application, targeted dosing and significantly reduced risk of collateral damage to humans and the environment. This project will address some of the challenges in developing these types of paint.

Pyrethroids are one of the best insecticides for public health use, but they suffer from stability issues mainly related to the occurrence of hydrolysis and photodegradation. These phenomena particularly affect the stereochemical integrity of pyrethroids and little is known about how to preserve their activity in paint formulations. Taking into consideration the strong correlation between enantiomeric composition and biologically activity of pyrethroids, accurate quantitation of the enantiomeric composition is critical. The aim of this project is to generate robust methods for a better understanding of the fate of insecticides in complex matrices like paint. Once the nature of the degradation products and the related mechanisms are clear, the formulation can be adjusted to minimize the occurrence of degradation or enhance active ingredient protection. The analysis of the degradation processes and the interaction/stability studies are best performed in-situ avoiding potentially invasive extraction sample preparation steps, so the powerful tools of advanced NMR spectroscopy will be exploited to characterize these phenomena.