The Formulation Challenge of Designing Enhanced Biodelivery and Performance into Crop Protection Suspension Formulations

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Effective biodelivery of active ingredients is key to their performance and the design of the formulation plays a highly important role in this. This is the challenge the Formulation Scientist faces in designing high performance crop protection products.

Many modern active ingredients are often designed to be mobile in plants which require the active ingredients to penetrate through the waxy cuticle layer of the leaf to be effective. However, these active ingredients commonly exist as crystalline solids with low solubilities and high melting points from which plant uptake is limited. Innovative formulation solutions such as suspo-emulsions (SE) and oil dispersions (OD) specifically containing adjuvants for enhanced biodelivery are required to overcome this limitation. These innovative solutions challenge our traditional understandings and give new insights into the processes important for formulation enhanced biodelivery. The formulation design has to encompass several requirements including high spray retention on the crop and to engineer deposit microstructures on the leaf that maximise the association between the a.i. particles and adjuvants for optimum uptake all in a package without compromising the product stability of 2 to 4 years.

The presentation will illustrate these aspects with a series of studies and examples of how knowledge of these can allow the Formulation Scientist to design advanced formulations with enhanced performance.