Smart application of surfactants gives sustainable agriculture

June 5 2014

Anton Fagerström at Malmö University, Sweden, has investigated the interaction between the plant's barrier, plant protection products and adjuvants that are added to increase the effect of the plant protection product. The results of this research can be applied to minimise the use of plant protection products in agriculture.

If the agricultural industry is to be competitive and profitable, we need plant protection products that protect the plants against fungal and insect attack. However, plant protection products have a number of negative effects on the environment.

Therefore, to generate a sustainable agriculture, farmers must optimise their use of plant protection products.

"We have known for some time that surfactants, surface-acting agents, reinforce the effect of plant protection products. But we know very little about the underlying mechanisms that affect the plant leaf barrier and thus also uptake of the active substances," comments Anton Fagerström, a researcher at Malmö University, Sweden.

Anton Fagerström's research has focused on the interaction between the cuticle which is the outermost layer of the plant leaf, and plant protection products and surfactants, surface-acting agents that are added to increase the effect of the plant protection product. The barrier that protects the plant and prevents uptake of foreign elements is situated in the cuticle.

"The barrier is highly effective and protects the plant even though it is unbelievably thin.

We have developed a new model to determine how the structure of the barrier changes when surfactants and water are added at various temperatures. This increases our understanding of how surfactants act."

Furthermore, Anton Fagerström has studied cuticle uptake of plant protection products and which properties in a mixture that affect uptake.

In the future, the results of this research could enable selection of the most effective surfactant for a particular plant protection product, and the most effective plant protection product for a particular plant. Thus minimising the amounts of plant protection products used in the agricultural industry.

"The future demands sustainable agriculture that can feed the world's ever-increasing population. To succeed, the research must continue."

More information: Effects of surfactant adjuvants on plant leaf cuticle barrier properties: dspace.mah.se/handle/2043/17029

Provided by Swedish Research Council