

## **When Nanotechnology meets Agriculture: will it help to improve farming?**

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The United Nations Food and Agriculture Organization estimates that the world population growth will reach 9.1 billion of people in 2050, with a 30% increase compared to that in 2010. In order to satisfy the food demand, a huge global increase in production will be necessary. This represents a major challenge for Agriculture and the whole food supply chain, which have to face such increase in the foreseeable future while keeping it efficient and sustainable. However, farming efficiency relies on massive use of agrochemicals (fertilizers and pesticides) for maintaining crop yields, something that pushes against the sustainability of the system. This negative impact could be minimized through the contribution of Nanotechnology, for example, developing smart delivery systems and nanocarriers for controlled release of agrochemicals<sup>1</sup>. These nanodevices can provide protection for the active substances, helping them to solubilize and penetrate into plant and target organism's tissues<sup>2-4</sup>. This should lead to increased effectiveness of the agrochemicals and, as a consequence, lower doses would be necessary, reducing adverse effect on the environment and side effects on non-target organisms. Nevertheless, special attention must be paid to the kind of nanomaterials to be used, because farming needs massive applications in the fields, and such materials must be biologically and environmentally friendly. In addition, the cost associated with the synthesis and scalability of the process can greatly hinder the implementation of these techniques.