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"How nanotechnology could help to achieve zero hunger goal"

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Abstract:

There is more than enough food produced today to feed every last one. Ending hunger, achieving food security and promoting sustainable agriculture, is one of FAO's (Food and Agriculture Organization) 17 Goals for 2030 Agenda. It is clear that achieving this ambitious goal requires a multiactor, multidisciplinary and sinergic alliance approach in which nanotechnologies play a fundamental role. In the world of today we no longer speak of IoT but IoF (internet of Food) intended as from farm to fork strategy.. In many countries globally, strategies are being established to adhere to these practices which also have their origin in the concept of circular economy. As researchers, each of us is called to contribute to achieve this important goal for our planet. **BC MOS: Bacterial Based cellulose MOS** sensors is a new generation of sensors that has deep nature roots, and starts from the concept of biocompatibility. Cellulose is the most abundant nanostructured polymer on the planet and acidobacteria microorganisms which have a very high interest in the agri-food field due to the important transformations carried out and also their ability to produce cellulose. *Komagataiebacter spp.* type strain, which was selected as cellulose producer, was isolated from Chinese blueberry vinegar. Bacterial cellulose (BC) is a bio-compatible and 100% biodegradable material, which not only has less than zero impact with regard to production and operation, but also because it reduces certain waste from the food industry that are used as feed for the cellulose producer strains, and will be used as a device to preserve quality, safety and reduce waste. Furthermore technological limitations are often encountered in the use of MOS sensors, linked to the high power consumption and the high sensitivity towards some classes of volatile compounds (saturation problem). The use of BC as support for the sensor allows to activate the sensing material throughout the UV-light, reducing the power consumption and add a remarkable feature to this new generation of sensors since the 3D funzionalized structure of the BC acts as a selective filter to targeted volatile compounds, enhancing the sensing properties. The developed sensor using AI algorithms will be able to recognize the volatile fingerprint of a food matrix informing of safety, origin or identity in less than a minute. Actively supporting FAO's goals.

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