Nanosensors for agricultural pest management

Deepa Bhagat, Principal Scientist (Organic Chemistry), ICAR-NBAIR, Bangalore
N. Bakthavatsalam, Director, ICAR-NBAIR, Bangalore
A.N. Shylesha, HOD & Principal Scientist, ICAR-NBAIR, Bangalore

Abstract (300 word limit)

About 20-40% of crop yields are lost due to plant pests every year. In particular, *Helicoverpa armigera* (Hubner) and *Bactrocera oleae* pests are known to infect more than 150 crops across the world. A recent approach for the effective insect pest detection can be achieved using Nanosensors. Nanosensors are nanoscale devices that are used to detect certain species of pests. *Artificial Intelligence in agriculture* has brought an agriculture revolution by improving the crop yield. In this line we have developed a silicon dioxide-based microelectro-mechanical system (MEMS) sensor for the selective pest female sex pheromones detection of *Helicoverpa armigera* and *Bactrocera oleae*. The products developed are easy, cost-efficient, reusable, and eco-friendly. These systems are resourceful to farmers for the early detection of pests and preventive measures can be taken for crop protection, and in turn overcome reduction in the food production.

Recent Publications (minimum 5)

1. Moitra, P., Bhagat, D., Kamble, V. B., Umarji, A. M., Pratap, R., & Bhattacharya, S. (2021). First example of engineered β-cyclodextrinylated MEMS devices for volatile pheromone sensing of olive fruit pests. *Biosensors and Bioelectronics*, *173*, 112728.
2. Bhattacharya, S., Moitra, P., Bhagat, D., & Pratap, R. (2017). Selective Detection of Female Sex Pheromone of *Helicoverpa armigera* by an Eminent Surface Functionalized Template.
3. Moitra, P., Bhagat, D., Pratap, R. and Bhattacharya, S., 2016. A novel bio-engineering approach to generate an eminent surface-functionalized template for selective detection of female sex pheromone of Helicoverpa armigera. *Scientific reports*, *6*(1), pp.1-12.



Biography (150 word limit)

Dr Deepa Bhagat is working as Principal Scientist at ICAR-NBAIR. She acquired Ph.D in Organic Chemistry in 2005. She joined as Scientist in ICAR-ARS18.11.1999. She received Prestigious Gandhian Young Technology Innovation award in 2017. She had used state-of-the-art technology to evolve gel-based carriers known as nanogels that carry pheromones. New innovation, slow release formulations of pheromones adsorbed in nanogel, are practical, thermostable and low-cost environment-friendly method of pest management. Synthesized pesticide sensors, oxalate and urea sensors, pheromone sensors and virus sensors for the early detection. She also has expertise in nanofertilisers like zinc thymole and chitosan for source activity and growth in plants. First report on nanosensor for early detection of *Bactrocera olea* and *Helicoverpa armigera*. She has authored more than 30 papers in International journals and delivered more than 70 talks in various International and National conferences and seminars. She has more than twelve National and International patents.

Email: Deepa.Bhagat@icar.gov.in

Notes/Comments: Speaker