Kisan Kavach: A Protective Anti-Pesticide Suit for Farmers

Acute insecticide poisoning affects more than 300 million farmers each year where use of insecticide without a protective gear is a common practice. Organophosphate (OP) and carbamate based-insecticides inhibit acetylcholinesterase (AChE), an enzyme that has a crucial role in both central and peripheral nervous system. AChE inhibition leads to excessive acetylcholine accumulation, which affects muscarinic and nicotinic receptors at synapses.

Inhibition of AChE enzyme due to insecticide exposure causes neurological dysfunction, breathing disorder, paralysis, and death in severe cases. Researchers from iBRIC- Institute of Stem Cell and Regenerative Medicine have developed KISAN KAVACH, a protective anti-insecticide bodysuit for farmers to address the grave problem of insecticide exposure.

They used an Oxime-fabric to develop the bodysuit by covalently attaching silyl-pralidoxime to the cellulose of the fabric. The Oxime-fabric, when stitched as a bodysuit and facemask, efficiently deactivates insecticides (organophosphates and carbamates) upon contact, preventing exposure. The Oxime-fabric prevents insecticide-induced neuronal damage, neuro-muscular dysfunction, and loss of endurance. When tested in mice model, 100% survival rate was observed for repeated insecticide exposure. The Oxime-fabric is washable and reusable for at least 50 cycles, providing an affordable solution to prevent insecticide-induced toxicity and lethality among farmers.