

Insects on *Bt*-cotton: desperate reactions

The article reporting¹ recent evidence of caterpillars feeding on *Bt*-cotton, this provides evidence for survival and successful reproduction of a pestiferous species on *Bt*-cotton. The results of this study were not unexpected; they were anticipated even before the commercial operation of the technology.

An article in *BioSpectrum*² has claimed that resistance has not been determined in the study conducted¹. This is an improper allegation because determining the extent of resistance is not a requisite for determining survival. It is important to understand that the level of resistance is determined among surviving populations for working out future pest man-

agement strategies and not to ascertain survival. The same article speculates that survival may be the result of below-lethal concentrations of toxin produced by some of the *Bt* plants². If this is true, then it is to be noted that the commercial *Bt* plant population comprises of certain individuals producing sub-lethal levels of *Bt* toxin that foster survival of target insects. If this is confirmed, it would prove significant because such plants may increase the probability of producing resistant insect populations. Whatever be the reason, it is ultimately necessary that the farmer is ensured of crop protection against targeted insects. The article¹ suggests that the insurance of

Bt plants against caterpillar pests needs to be revisited throughout the country.

1. Ranjith, M. T., Prabhuraj, A. and Srinivasa, Y. B., *Curr. Sci.*, 2010, **99**, 1602–1606.
2. Koul, R., *BioSpectrum*, Asia Edition; www.biospectrumasia.com/content/1001111ND15187.asp

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Water-free hand wash – how safe is our gut?

Water-free hand sanitizers are on boom and have almost replaced traditional hand washing. Companies are mushrooming with such hand sanitizers that are sold like hot cakes. Advertising agencies have spiked up the market with their eye-catching advertisements. Occasional panic caused by viruses has added to its increased sale. As the hand sanitizer market is growing by leaps and bounds, we need to understand its long-term consequences. The major ingredients of hand sanitizer are water and alcohol. The sanitizer is rubbed between the palms, assuming that 99.9% of the germs are killed. However, one of the most crucial facts is that though the life of bacteria or virus is terminated, their molecular patterns may remain intact. Pathogen associated molecular patterns (PAMPs), which include lipopolysaccharide (LPS), DNA, RNA, lipotechoic acid (LTA), lipoarabinomannan, etc. remain in the hand. When food is eaten with the same hand, the gut gets exposed to these PAMPs, which are the toll-like receptor (TLR) ligands. PAMPs in microgram quantities are known to activate the intestinal epithelial cells/intestinal dendritic cells^{1,2}. Intestinal

epithelial cells are the major barrier between the commensal bacteria and the underlying cells. TLR, its expression and ligation by the TLR ligands in the intestinal epithelial cells determine the status of epithelial cell proliferation, expression of the anti-microbial peptides and maintenance of the homeostasis. If this process is deregulated by exposure to microgram quantities of PAMPs/TLR ligands, it can lead to inflammatory disorders of the bowel. The activation of TLRs and other innate sensing receptors like nucleotide oligomerization domain (NOD), by these PAMPs can lead to a plethora of inflammatory reactions in the gut. There are no data so far to indicate that the important molecules or ligands generated by the pathogen are inactivated by hand sanitizers. Hence the very practice of solely using hand sanitizers can be detrimental in future. The live organism will cause active disease. However, the molecules released after the organisms are dead can also cause chronic inflammatory disease. The improper use of hand sanitizers by diverse age groups of people, especially children and ageing individuals is dangerous! The use of hand-sanitizers has

now become a fashion and without proper monitoring, especially in case of children, can prove detrimental. Proper hand washing cannot be replaced by hand sanitizers³. Though hand sanitizers can be useful in disease management, appropriate hand-washing technique should be advocated. The fact that hand sanitizers cannot replace hand washing should be made clear to the common public.

1. Abreu, M. T., *Nature Rev. Immunol.*, 2010, **10**, 131–144.
2. Yrlid, U. *et al.*, *J. Immunol.*, 2006, **176**, 5205–5212.
3. Jarvis, W. R., *Lancet*, 1994, **344**, 1311–1312.

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