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Mini-reveiw

RNA interference in agricultural insect pest management: Status and perspectives

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In recent years, RNA interference (RNAi) has emerged as a potential tool to manage the pest population in agricultural fields and storage systems, however so far it has not come up in a big way. RNAi is a basic molecular biology mechanism occurring in all eukaryotic cells wherein a dsRNA (specific to a particular target messenger RNA) is used to inhibit/silence/knockdown gene expression. This dsRNA undergoes nucleolytic cleavage and several modifications to bind the complementary mRNA and induce endo-nucleolytic cleavage or translation repression. This basic molecular biological phenomenon can be exploited to silence the key genes (virulence and disease progression, toxin production, pest-specific key genes) in pests thus challenging their fecundity and survival. This mechanism is suitable for managing most insects (lepidopteran, dipteran, coleopteran, hemipteran, *etc.*) and nematodes. Application of RNAi differs based on the mode of delivery system of dsRNA to the pest. The efficiency and efficacy of RNAi depend upon targeted genes, type of dsRNA produced, length of dsRNA, feeding methods, stability of dsRNA in insect guts, and easy uptake by gut epithelium, *etc*. However, this technology is not utilised up to its full potential and therefore the present review is aimed to assess the possibility of RNAi in agricultural pest control and the way forward.

Keywords: RNA interference (RNAi), Gene silencing, Integrated pest management (IPM), Insect-pest, siRNA, Biological control