

Students' Annual Seminar

Biomolecular NMR Studies on Plant Protease Inhibitors from *Capsicum annum*

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Developing a peptide based eco-friendly insecticidal agents to control insect pests that adversely affect the agricultural production by destroying the crops or infesting the livestock is a major challenge. The most common Lepidoptera species that cause damage to agriculture sector is *Helicoverpa*. The larval stage of these species can cause a major damage to economically valuable crops such as cotton, tobacco, tomato, corn, sorghum, sunflower, wheat and other pulses. *Helicoverpa* species are polyphagous pests of about 200 plant species. These species are one of the most serious pests in cotton-producing countries (Australia, India and China) causing a major economic loss. Although chemical insecticides are used to control these species, *H. armigera* has developed the resistance to a number of insecticides. Thus, there is an urgent need for the development of eco-friendly insecticidal compounds to control *Helicoverpa*. Recently, it has been reported that peptide based protease inhibitors (PIs) from *Capsicum annum* potently inhibit *H. armigera* gut proteases and also show a significant effect on its larval growth. On the other hand, very little information is currently available about the three-dimensional (3D) structure of CanPIs or the residues that mediate their interaction with insect gut proteases, and very few structural studies have quantitatively compared the activity of different CanPIs. Recently, three recombinant CanPIs (IRD7, IRD9, IRD12) have been found to be very potent inhibitors with specific reference to their (i) stability in proteolytic environment (ii) proteinase inhibition specificities and (iii) inhibitory activity against insect proteinases. Thus, I set out to produce a panel of three recombinant CanPIs, compare their activity *in-vitro* and *in-vivo*, and determine their 3D structure with a view to selecting the best candidate for future development as a bio insecticide proteases. During the last one year, the focus of my research has been mostly on the study of structure and dynamics of plant protease inhibitors (IRD7, IRD9, IRD12), which will be the subject matter of my talk.

Friday, Apr 20th 2018

04:00 PM (Tea/Coffee at 03:00 PM)

Seminar Hall, TIFR-H