

## In this issue

### Recombinant antibodies in tobacco

The use of anti-human chorionic gonadotropin (anti-hCG) as a means to control human fertility has been investigated extensively. To make full commercial use of such work, large-scale expression systems for antibody production are required. Several bacterial, yeast, insect cells and mammalian culture systems had been employed for production of monoclonal antibodies, but a plant-based expression system offers several advantages. Plant-based systems are likely to be economic requiring less capital and manufacturing costs, and might even be more acceptable to some religious conservatives. Plants are eco-friendly, are easily scalable to large throughput, and are less likely to contain endotoxins and viral contaminants. Talwar *et al.* (page 1452) report transient expression of three types of antibodies in tobacco leaves. Preliminary experiments show that the antibodies could also be expressed in spinach and brinjal.

Three different types of immunoglobulin molecules were cloned either in a bacterial expression or in a plant expression vector. The bacterial system was expressed in *E. coli* to make antibody molecules up to 150 µg/l of culture. The plant expression vectors with the cloned insert containing the appropriate immunoglobulin gene were electroporated into *Agrobacterium*, and then the bacteria carrying the constructs were vacuum-infiltrated into *Nicotiana glauca* leaves. Such plant-based system made up to a maximum of 40 mg of antibody per kg of fresh weight of leaves. The recombinant constructs carrying a chimeric antibody (mouse variable domain and human immunoglobulin constant domain) proved effective in binding to hCG in an ELISA assay. Significant reduction in binding of hCG to its cognate receptors on the Leydig cells was also observed in presence of the chimeric antibody.

This work emphasizes the advantages of developing strategies for expressing protein therapeutics in a plant-based system.

S.G.

### Biological control: *Bacillus* for *Curvularia*

Basha and Ulaganathan (page 1457) report an interesting preliminary observation demonstrating chitinolytic activity in an extracellular protein extract obtained from a newly isolated strain of *Bacillus*. This natural isolate of the bacterial strain could colonize the mycelia of fungus *Curvularia lunata*, a known pathogen for human and crops, like sorghum. Bacterial overgrowth on the fungus caused hyphal lysis and cellwall degradation in a dual plate assay. Microscopic examination confirmed the lysis of fungal cell wall in the presence of the bacteria. The bacterial strain also tested positive for chitinase activity on a chitin agar medium plate assay. Further biochemical characterization of the culture filtrate from the natural bacterial strain indicated that a 25 kDa protein factor might be the putative chitinase that might explain the fungicidal activity in this strain of *Bacillus*. Mutant bacterial strains were also generated through nitroso-guanidine mutagenesis and screened for the loss of fungicidal activity. Mutants lacked both the antagonistic activity and the chitinolytic activity. These observations confirmed the presence of a specific extracellular chitinase activity in the natural isolate of *Bacillus*. The results raise the hope for using *Bacillus* as a potential biological control agent of *Curvularia*.

S. G.

### Cyclone in Orissa enhances biological production in Chennai

*karo pous maas, karoba sarbanaas*

—Bengali saying

*Great for some, havoc for others.*

About 16,000 died in the earthquake that hit Kutch in the state of Gujarat in India on 26 January 2001. Another 10,000 died earlier in the super-cyclone that hit the Orissa coast on 29 October 1999. Nothing to reap yet from the havoc in Gujarat, but there is some harvest from the disaster in Orissa. Geologists surmise that certain changes in water currents and cyclonic patterns might improve primary biological production in coastal belts. The havoc in Orissa apparently enhanced biological production in Chennai.

Madhu *et al.* (page 1472) report *in situ* measurements done in the southwestern Bay of Bengal on-board FORV *Sagar Sampada*. Such measurements fill in a void in the oceanic studies on the Bay of Bengal. This study focused on estimating the conductivity-temperature-depth profiles, nutrient availability, primary biological productivity and the content of chlorophyll-*a* and particulate organic carbon (POC). Chlorophyll-*a* was quantitated by UV/visible spectrophotometry after acetone extraction. Primary biological production was estimated by measuring <sup>14</sup>C uptake rates. Samples for these measurements were collected off the southwestern Bay of Bengal coasts before and after the super-cyclone hit Orissa.

Western Arabian sea is always considered more productive than the eastern Bay of Bengal. The authors noted a significant enhancement in biological production, and increased content of POC and chlorophyll-*a* along the coastal waters off Chennai, a part of the southwestern Bay of Bengal. This enhancement is apparently triggered by the super-cyclone in Orissa. Perhaps the worst wind of the century woke the Bay up!

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