

Hyped-up hopes for hairy roots as biofactories

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Scientists are reporting an advance towards tapping the immense potential of 'hairy roots' as natural factories to produce medicines, food flavorings and other commercial products. Their study is scheduled for the November/December issue of *ACS' Biotechnology Progress*.

The new research makes use of structures formed by a common soil bacterium that infects plants and incorporates its own DNA into the plant's genome. By inserting a specific gene into the bacterium, researchers can integrate that gene into the host's DNA.

Eventually, the host plant develops a system of fuzzy roots near the site of the infection. These so-called 'hairy roots' can be grown in cell cultures that churn out the product of the inserted gene -- a natural-product based or a protein-based drug, for instance -- with a stability and productivity not possible with most other plant cell cultures.

In the new study, Ka-Yiu San and colleagues point out that scientists have long wanted to harness the production prowess of hairy roots for industry, but first needed to determine the long-term stability of genetically-altered roots.

They report maintaining growth of a transgenic hairy root culture for more than 4.5 years. At the outset, they infected a species of periwinkle with a hairy root bacterium carrying a gene encoding a fluorescent protein. Through this process they were able to generate transgenic hairy roots that contain the fluorescent protein.

By transferring root tips into fresh liquid every four weeks, the researchers created a root culture that was genetically stable throughout that period, glowing appropriately in response to a special chemical signal. The integrated DNA also remained unaltered throughout the experiment. "This observation has important implications for the use of hairy root cultures in industrial applications," the report states.

Source: American Chemical Society

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