Preserving a world favourite flavor

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(PhysOrg.com) -- It's one of the world's two best-loved flavors and demand for it is increasing all the time but now its future in the global food industry could be more secure, thanks to research at The University of Nottingham's Malaysia campus.

Vanillin is a compound that comes from the vanilla bean, the 'fruit' of the flowering vanilla orchid. The orchid is a tropical, climbing vine originally cultivated by ancient Central American civilisations such as the Aztecs and is now grown worldwide with Madagascar, Indonesia and China by far the biggest producers.

The uniquely scented flavour of vanilla is second only to chocolate in popularity on the world's palate. It's also the second most expensive spice after saffron. But highly labour intensive cultivation methods and the plant's temperamental life cycle and propagation mean production on a global scale is struggling to keep up with the increasing demand for the product.

Scientists in the School of Biosciences on the University's Malaysia campus (UNMC) are working to create new and robust methods for the cloning of some economic species and some rare species of the orchid through tissue culture. The research is concentrating on the most common cultivated vanilla orchid, Vanilla planifolia, a perennial which produces the pods from which the natural vanillin is extracted.

Traditionally the vanilla orchid is propagated by stem cuttings but this method is labor intensive, time-consuming and not economical because taking cuttings can cause the retardation of the mother plant and a reduction in yield. Tissue culture or 'cloning' of a high quality parent plant from somatic (non-reproductive) cells offers a viable and simple method for the large scale commercial production of vanilla plants, but the technique has a current flaw which the scientists are hoping to overcome.

Problems arise when variations occur in the 'sub-clones' of one parental line, creating 'off-types' which are not of the same quality as the parent plant. It can be costly if a high percentage of the micropropagated sub-clones are off-types that have to be scrapped.

The scientists have been awarded a Fundamental Research grant (FRGS) from the Malaysian Ministry of Higher Education to use DNA marker systems to investigate how these mutations occur. Such marker systems have been widely used to detect the genetic similarities and differences in micro-propagated material in various plants and are simple, quick and cost-effective for routine application.

The research is being carried out by Dr. Peter Alderson and Dr. Chin Chiew Foan in the School of Biosciences, UNMC.

Dr. Chin Chiew Foan said: "Our research will help to provide a tool for tracking abnormality of growth occurring in tissue culture and will also

attempt to understand how such abnormalities can occur after a number of cycles of subculturing in tissue culture. Currently, we are developing a tool that will explore the internal RNA sequence region to detect sequence variations. Our initial results indicate that some variability of DNA fragments exists among the tissue culture samples under study. We are sending these DNA fragments for sequencing to reveal the level of mutations that has taken place."

The funding is for two years and will meet the costs of a Graduate Research Assistant as well as other research staff. To date, this is the first study investigating the possible occurrence of genetic variants of Vanilla planifolia through these types of regeneration protocols. Findings from the study will provide useful guidance on the suitability of tissue culture protocols for long term use for vanilla regeneration without risk of genetic instability.

Provided by University of Nottingham