

# BRILLIANT BIOTECHNOLOGY

## Brilliant Future



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International BioGENEius Challenge  
of Western Australia



BRILLIANT FUTURE

# Western Australia's BioGENEius Regional Finalists



*Oliver Tester with his mentor  
Adj.Assoc. Professor Chris  
Florides of Saturn BioTECH*

Oliver Tester, a 16 year old student from Murdoch College, undertook research on the *“Discovery of Peptide Markers to differentiate and test purity of Subterranean Clover Seed using Proteomic analysis and Mass spectrometry.”*

Subterranean clover is one of the major legume grazing species in Australia. However certain varieties of sub-clover are high in Oestrogen and can cause sheep infertility. It is therefore important to be able to easily test the purity of seed batches and differentiate between varieties. The current method is to grow them out which takes six weeks, it is costly and some varieties have indistinguishable morphological features.

The aim of Oliver's research was to discover enough unique markers within each sub-clover variety to make a simple variety identification and purity test.

This was achieved using proteomic analysis and mass spectrometry techniques to obtain the molecular weights of peptide within the seed. From this graphs were produced showing markers unique to that variety and a library of 'fingerprints' identifying each variety was formed.

The new methods applied through this research project have reduced time to only two days with a high degree of accuracy. This research will now be implemented by the mentor organisation as part of a new subterranean clover seed certification scheme.

*Oliver was mentored by Adj.Assoc. Professor Chris Florides, Managing Director of Saturn BioTECH at Murdoch University. Saturn BioTECH is the Western Australian leader in molecular genetic technologies based at Murdoch University. Saturn BioTECH uses the latest equipment and enabling technologies, such as bioinformatics, robotics etc, to deliver quality, high throughput, molecular genetic and proteomic services to agricultural and related industries.*

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Bindhu Holavanahalli, aged 17, completed her final year studies at Shenton College last year while undertaking research into *"A novel study into the Effect of Post-Harvest Treatments with Sulphur Dioxide and Resveratrol on Gene Expression Patterns of Table Grape Berries"*.

To get from the vine to the consumer, table grapes can be stored for up to five months. This requires the use of preservatives, such as Sulphur Dioxide (currently used in industry) and Resveratrol (a possible alternative, derived from the grape itself). Although the macroscopic effect of these treatments in preserving shelf-life and fruit quality is known, the effect that these treatments have on the molecular interactions of the grape itself are not.

In Bindhu's research, cutting-edge GeneChip technology was used to study how the gene-expression of berries changed when they were treated with either Resveratrol or Sulphur Dioxide. This was monitored

over a period of 56 days, to observe how this expression changed over time.

It was found that Sulphur Dioxide may be fuelling the synthesis of antioxidants in grapes. Resveratrol treated grapes were seen to possibly slow down the grape's metabolism, increasing shelf life. It was also determined that gene expression reached a peak 2 to 3 weeks after treatment, indicating when there may be increased antioxidant activity within the grape.

For the consumer, this may mean that 2 to 3 weeks after treatment is the best time to consume grapes, however, this conclusion can only be firmly drawn after further analysis.



*Bindhu Holavanahalli with her mentor Dr Aneta Ivanova and Yvonne Van Der Ploeg of the ARC Centre of Excellence for Plant Energy Biology*

*Dr Aneta Ivanova of the ARC Centre of Excellence for Plant Energy Biology at the University of Western Australia mentored Bindhu throughout the past year. The principal aim of this Centre is to aid in the discovery and characterization of molecular components and control mechanisms that drive energy metabolism in plant cells. The Centre generates resources and knowledge to improve plant performance, particularly in marginal environments and in response to climate change.*

# Challenge of Western Australia

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