

Rapid Identification of Microorganisms by Fluorescence Microscopy

Hemant Bhatta, E.M. Goldys, Macquarie University, Sydney, 2109 NSW, Australia
(hbhatta@ics.mq.edu.au)

Background:

We have developed an automated reagent-free method for microbial characterization able to distinguish between yeast strains based on intrinsic fluorescence microscopy. The proposed method will provide an alternative to complex, time consuming and/or reagent intensive processes based on biochemical, and physiological criteria, molecular DNA analysis and fluorescence labeling.

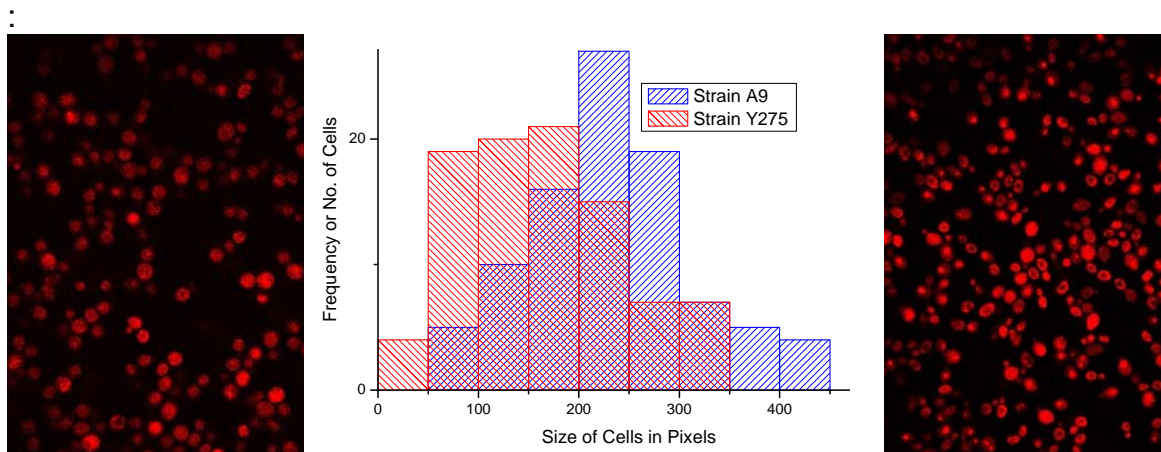
Outcomes:

- Diagnostic method for distinction of yeast strains, including pathogenic yeast
- High throughput technology to automatically analyse cells in cell cultures for the effect of pharmaceutical agents.

Progress to date:

Autofluorescence micrographs of selected yeast strains have been analysed using custom-developed software to gather information about quantitative features such as size, circularity, intensity and texture.

- Specialized statistical tests have been applied to capture statistically meaningful differences between the strains.
- Major differences between selected strains were found.
- First results on identifying mixed cultures show accuracy of 5%



Fluorescence image of yeast cells strain A9 (left) and Y275 (right). The middle picture shows the histogram of the size distribution of the two strains. Statistical methods have been applied to differentiate the distributions.

Funding is sought to:

- **extend this study to other types of microorganisms and/or**
- **effect of pharmaceuticals on cell cultures.**

Timeline:

Potential timeline for solving new problems in this area depends on the complexity of mathematics and the approach, but for specific problems could be no longer than several months.