



Biotechnology Services

Since its establishment in 2008 as a laboratory serving the advancement of natural rubber (NR) research, the Tun Abdul Razak Research Centre's (TARRC) Biotechnology Unit has continued to build its expertise portfolio which now extends to a broad range of biotechnological areas. Under TARRC's consultancy arm, Rubber Consultants, we can offer specialised services in:

- *plant genomics*
- *plant molecular biology / genetics*
- *plant proteomics*
- *bioinformatics*

A wide range of both routine and specialised techniques are available for nucleic acid and protein studies. We can provide our clients with advice and practical assistance in troubleshooting and results interpretation, as a part of our service.

TARRC's purpose built biotechnology laboratories are equipped with state-of-art instrumentation. Space in these facilities can be rented on a 'bench fee' basis.

TARRC's affiliation with the Malaysian Rubber Board and Ministry of Plantation Industries and Commodities has facilitated numerous collaborations with the biotech industry based in South-East Asia and worldwide. TARRC also has well established partnerships with leading research organisations in Europe.

Main areas of expertise

International Standard Testing

- Protein content determination in NR products:
 - ASTM D5712-10
 - EN 455-3:2006
- Individual allergenic protein content in NR products:
 - ASTM D7427-08
 - In-house developed methods

Accreditation

- Site-wide accreditation to ISO9001
- A number of test methods are approved by UKAS to ISO17025

Biotechnological expertise

- Gene cloning and protein expression in plant or bacteria heterologous systems
- Generation of protein mutants for studies on protein stability and functionality
- Studying protein processing, maturation and targeting using both *in vivo* and *in vitro* approach
- Production of recombinant proteins in E. coli or plant systems such as *Arabidopsis thaliana* and *Nicotiana tabacum*
- ELISA tests
- Protein purification from bacterial cultures or plant tissues and protein characterisation
- 2D electrophoresis and image analysis for proteomic studies

Rubber
Consultants

TESTING • INNOVATION • SOLUTIONS
since 1984

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- Molecular marker development and validation
- Genotyping using range of molecular markers – SNP, SSR, AFLP, RFLP and others
- Genetic mapping
- QTL mapping and its utilisation in Molecular Marker Assisted Selection (MAS) and Molecular Marker Assisted Breeding (MAB)
- Sanger sequencing
- assembly and annotation using combination of NG and Sanger sequencing data
- Gene Expression Analysis
- Bioinformatics

Instrumental platforms

- Low volume, high-precision pipetting platform: Nanodrop II
- Automated nucleic acid purification: QIAcube
- Protein purification, FPLC: AKTAavant
- Analysis of two-dimensional protein gels: Delta2D
- Capillary electrophoresis: Applied Biosystems Prism 3130xl
- Automated electrophoresis system: BioRad Experion
- Fluorescence and absorbance assays:
Labtech LT-4000 Microplate Reader, BioTek Epoch Microplate Spectrophotometer
- Real Time - PCR: Applied Biosystems 7900 HT

Typical areas of work

- Genome sequencing
- Molecular marker development and application
- Gene Expression Analysis
- Lateral flow diagnostics
- Proteomics
- Bioinformatics
- Training of staff in specialised research areas / degree training / mentoring through UK university attachments with experimental work

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