

# A Visit to Bio-Cosmetics Facility of SIRIM Berhad, Shah Alam

CHEMICAL ENGINEERING TECHNICAL DIVISION



by Engr. Dr Chong Chien Hwa

A group consisting of 20 IEM members and non-members, accompanied by Engr. Dr Chong Chien Hwa (committee member) and Ms. Kek Mei Tzy (secretariat) from Chemical Engineering Technical Division (CETD) recently visited SIRIM Berhad's Bio-Cosmetics Facility in Shah Alam. The highlight of the day was the visit to the Polyhydroxylalkanoate (PHA) Bioplastic pilot plant.

SIRIM Berhad has been operating in Malaysia for over 40 years. The mission of the company is to be among the best in the world in terms of quality and technology, with particular emphasis on nanotechnology, biotechnology, renewable energy, metrology, automotive component and green materials.



*Dr Ahmad Hazri bin Ab. Rashid explaining to the participants about the products produced by SIRIM*

As Malaysia is rich in natural resources and biodiversity, SIRIM Berhad's biotechnology division spearheads research in the industrial biotechnology and bio-cosmetic. Its team of experienced scientists and engineers led by Dr Ahmad Hazri b. Ab. Rashid, General Manager of Industrial Biotechnology Research Centre, assist entrepreneurs in developing products that are safe for both the environment and society. The bio-cosmetics programme is one of the research programmes under the Industrial Biotechnology Center. Natural product research for bioactive metabolites, bio-based chemicals, cosmeceuticals and nutraceuticals are conducted.

The research and development activities as well as services conducted by SIRIM include extraction and purification, standardisation, profiling, identification of actives, biological activity studies, safety and biocompatibility



*Extraction and fermentation pilot plant*



*Cosmetic good manufacturing practice (GMP) pilot plant*

evaluations, in-vitro and in-vivo product efficacy studies, product formulation and delivery technology.

This visit provided the participants with some insight on the bio-cosmetics research and testing conducted by SIRIM Berhad in ensuring that the products meet the safety standards. The visit included viewing of complete laboratory facilities available at the Centre to develop cosmetic and topical products starting from laboratory scale to pilot production. The visited facilities included the extraction and purification laboratories, the safety and biocompatibility laboratory, the product formulation laboratory, the extraction and fermentation pilot plant facilities, a Cosmetic "Good Manufacturing Practice (GMP)" pilot plant and the fully-automated PHA Bioplastic pilot plant.

The PHA Bioplastic pilot plant produces versatile biodegradable plastic materials from crude palm kernel oil and palm oil mill effluent with a capacity of 2,000 litres. The strain to produce PHA was developed and palm oil mill effluents are converted to organic acid, which is then fermented to produce bioplastic material.

**BIOREACTOR (MODEL-BB-SIRIM)**

**Purpose:** Bioreactor for fermentation and multi-enzyme reaction

**Possible Product:** Bio-Plastic, Carotenoid, enzyme etc.

**Capacity:** 50 Liter to 2000 Liter

**Operation Mode:** Semi-Automatic or Fully Automatic

**TECHNICAL SPECIFICATION:**

Stainless steel material: Weld grade (316L)

Surface finished: up to mirror grade (0.05µm)

Heating and cooling system: Jacketed or Coil type

Mixer (stirrer): Double shafts

Stirrer speed (rpm): Variable

Flow: FAC, 4/3W (3 phase)

Sensor: Temperature, Pressure, pH, Foam

Control system: Central and individual unit

OSHA approved pressure vessel with mechanical seal system

Special sparging system

Model	Size / Capacity (L)	Power (kW)
BR10-SIRIM	10	1.0
BR20-SIRIM	20	1.2
BR50-SIRIM	50	2.0
BR100-SIRIM	100	3.0
BR200-SIRIM	200	3.0
BR500-SIRIM	500	5.0
BR1000-SIRIM	1000	10.0
BR2000-SIRIM	2000	15.0

*Fully automated PHA bioplastic pilot plant*

At the end of the session, a token of appreciation was presented to Dr Zanariah Ujang, Head of Marketing and Sales Section Research and Technology Development Division by session chairperson, Engr. Dr Chong Chien Hwa. ■