

# SAS SNDP Yogam College, Konni

## Report of Innovation and Entrepreneurship Centre 2023-24

An Innovation and Entrepreneurship Centre is functioning in the college as per the guidelines of Kerala Start Up Mission. It was established in January 2022 followed by the inspection from Kerala Start Up Mission. The College is a subhub of the Business Incubation and Innovation Centre (BIIC) of Mahatma Gandhi University. The nodal officers are Dr. Indu C Nair, Professor, Department of Biotechnology and Jijith V S, Assistant Professor, Department of Computer Science. There is an advisory council comprising Principal, all the heads of the department and staff advisor of students.

The students are actively engaged in IEDC.

- An MoU was signed by the Registrar of Mahatma Gandhi University and the Principal, SAS SNDP Yogam College, Konni for encouraging innovation ecosystems.



- The ideas submitted by two PG students (MSc Biotechnology) was screened for presentation by YIP



## “Scale up of fermentative production of PHA” (2022-23)

The grant availed through RINP, MG University, Kerala Start Up Mission was utilized to design a bioreactor (PL: Dr. Indu C Nair).

The overutilisation of synthetic plastics has been degenerating the environment. To attain the UN goals of sustainability, it is essential to avoid synthetic plastics as far as possible. PHB is an ideal biodegradable plastic with biological origin. But the rate of industrial PHB production does not meet the high demands of PHB. Lack of suitable bioreactor designs, ideal microbial strains and expensive raw materials make the industrial production expensive. The present study focuses on the design and construction of a prototype fermenter for the production of PHB by a novel microbial strain. Also an attempt was made to evaluate the feasibility in using the orange peels as the cheap substrate for PHB production.

### Summary of project activities and work progress

- \*Design and Construction of an Airlift Fermenter for the production of PHB
- \*Isolation and identification of an active bacterial strain for the PHB production
- \*Optimization of carbon, nitrogen sources, incubation time and pH for maximum PHB production
- \*Determination of the Yield coefficients in the production of PHB
- \*Evaluation of the PHB production using banana peels and orange peels as cheap natural source

### Significant results and achievements

An airlift fermenter was designed for the microbial production of PHB. The construction was done with the help of ICUBO Designs, Adisankara TBI, Kalady. Meanwhile, screening for PHB production using already isolated strains and novel isolates were done in the lab. The PHB production was confirmed by Fluorescent staining with Nile BLUE and FTIR. Maximum yield of PHB was given by *Cellulomonas uda* Uk2 at optimised conditions of 100g/L glucose as carbon source at

pH 7 with an incubation period of 24 hrs. The limiting concentration of nitrogen source was 10g/L ammonium sulfate. The product yield per substrate was calculated as: The yield coefficient of PHB produced at lab scale with respect to biomass was 0.511g/g and with respect to the substrate it was 0.9787g/g.

Using the novel isolate, PHB production was carried out in the prototype fermenter. As an inexpensive carbon source, orange peels were evaluated for the PHB production and promising results were obtained.

### Overall deliverables of the project

- Constructed an Airlift Prototype fermenter for PHB production
- Identified a suitable strain, *Cellulomonas uda* Uk2 for PHB production
- Optimisation of the production conditions
- Production using orange peels as a cheap source for fermentation





Attending Demo Day with the fermenter designed at CET, Tvm 12-08-2023. Dr Indu C Nair and Unnikrishnan B(II MSc Biotechnology)



Recycling of used bottles by MSc Biotechnology students as a microventure



A one day Training was attended by IEDC Nodal Officer Dr Indu C Nair, Business Innovation and Incubation Centre, M G University. 14-11-2023.

