

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202531129753 A

(19) INDIA

(22) Date of filing of Application :21/12/2025

(43) Publication Date : 09/01/2026

(54) Title of the invention : ALGAE-ENRICHED SENSOR-ENABLED SMART BIOGAS DIGESTER SYSTEM FOR ENHANCED METHANE GENERATION

(51) International classification	:C12M 1/107, C12M 1/34, C12M 1/00, C02F 11/04, C12M 1/36	(71) <b>Name of Applicant :</b> 1) <b>Brainware University, Kolkata</b> Address of Applicant :398, Ramkrishnapur Rd, Near Jagadighata Market, Barasat, Kolkata, West Bengal 700125 West Bengal India
(31) Priority Document No	:NA	(72) <b>Name of Inventor :</b>
(32) Priority Date	:NA	1) <b>Mr. Dipankar Das</b>
(33) Name of priority country	:NA	2) <b>Dr. Sriparna De</b>
(86) International Application No	:	3) <b>Ms. Shamayeta Sarkar</b>
Filing Date	:01/01/1900	4) <b>Mr. Ranit Majumdar</b>
(87) International Publication No	: NA	5) <b>Mr. Pritam Das</b>
(61) Patent of Addition to Application Number	:NA	6) <b>Mr. Krishna Chandra Maity</b>
Filing Date	:NA	7) <b>Mr. Palash Koley</b>
(62) Divisional to Application Number	:NA	8) <b>Mr. Nirvik Hati</b>
Filing Date	:NA	9) <b>Mr. Shibam Dutta</b>

(57) Abstract :

The present invention provides an algae-enriched, sensor-enabled smart biogas digester system designed to enhance methane production through the integration of nutrient-optimised microalgae cultivation and real-time process monitoring. The system utilises microalgal biomass cultivated in ASNIII, BG11, or mixed nutrient media and combines it with cow dung and kitchen waste in an optimised ratio for efficient anaerobic digestion. A cylindrical digester equipped with pH, temperature, moisture, and multi-gas sensors maintains ideal mesophilic conditions and continuously evaluates gas composition, enabling improved methane purity. A floating dome mechanism provides intuitive visual indication of biogas volume generation. By synergising biological optimisation with advanced sensing technologies, the invention delivers higher methane yield, improved process stability, and sustainable waste-to-energy conversion suitable for household, agricultural, and decentralised renewable energy applications. Accompanied Drawing [FIG. 1]

No. of Pages : 21 No. of Claims : 10