Anaerobic Gas Lift Reactor (AGR)

Title of Product/Process/Design/ Equipment	Anaerobic Gas Lift Reactor (AGR) – High Rate Biomethanation Technology for the Generation of Biogas and Bio-Manure from Poultry Litter
IPR Status Patent/Copyright/Trademark Secured in India/Abroad IPR Details	Technology is patented in India and Abroad Status of patent:India: Granted, 0019DEL2013; 03/01/2013 Abroad: filed, under scrutiny. PT-609/0207NF2012
Application/Uses	Treatment of organic solid waste for the generation of biogas and bio manure Scale operation: 500 kg to 10 tons per day
Salient Technical Features including Competing Features	Low Hydraulic Residence time (HRT) High Volatile Solids Loading Rate (VSLR) High methane yield End to end solution for solid waste management Incorporated with best features of high rate anaerobic digester. Could be designed for the treatment of 500 kg to 10 tons of organic solid waste per day Encompasses novel pre and post processing mechanisms. Advanced digester design: higher biogas production, nutrient rich organic fertilizer generation, low foot print area, semi-automatic plant operation
Level/Scale of Development	Technology is currently at commercial scale Four full scale plants based on AGR Technology are working at Toofran for poultry litter; Bellary, Hubli in Karnataka and Ahmadabad in Gujarat for food waste in India for the generation of biogas and bio manure
Environmental Considerations	Presently, organic waste such as MSW, sewage sludge, poultry litter, cattle manure etc., are being disposed off unscientifically without treatment because of which ground water and air are contaminated and diseases are spreading.The technology is meant for scientific treatment and disposal of organic waste through the generation of renewable energy in the form of biogas and

	bio-manure. It is an environmentally benign method for the reduction of GHG's also.
Status of Commercialization	AGR Technology is tested at pilot scale at CSIR-IICT laboratory and it is scaled up to full scale for the treatment of organic solid waste. AGR Technology is licensed to M/s Ahuja Engineering Services Private Limited (AESPL), Secunderabad. M/s AESPL executes projects on turnkey basis under the technical guidance of CSIR-IICT. Four full scale plants based on AGR Technology have been installed and commissioned (one ton per day) for the generation of biogas and bio manure from organic solid waste (food waste, poultry litter)
Major Raw Materials to be Utilized	Raw materials: segregated wastes like food waste, OFMSW, poultry litter, cattle manure, Seri culture waste etc. Organic solid waste is available free of cost at source Nutrient and micronutrients: Rs.25 per ton
Major Plant Equipment and Machinery Required	Major equipment: Anaerobic digester with accessories, biogas generator with accessories. Minor equipment: Waste crusher/shredder, conveyor arrangement for loading waste into crusher, process pumps, biogas scrubber, biogas balloon, biogas compressor, biogas pressure tank, biogas flare unit/gas blower, accessories etc. Capital cost: INR 30 lakhs for 1 TPD capacity and INR 275 lakhs for 10 TPD capacity
Techno-Economics	Quantity of food waste: 1 ton/day Biogas generation: 150 m3/day Bio-manure generation: 150 kg/day Land area requirement for the plant: 1200 m2 Manpower requirement (semi-skilled): 2 people Biogas can be pipelined and used directly for cooking For combined heat and power- part of biogas can be used for cooking and remaining can be used towards power 150 m3 of Biogas can replace 3 LPG commercial cylinders (19 Kg each) @ INR 1800

	Revenue/day: (3 cylinders x INR1800) = INR 5400/day Revenue/day from Bio-Fertilizer: 150 Kg x INR 1.5 = INR75/day Total Revenue per day: INR 5400 + INR 75 = INR 5475 per day Total Revenue per annum (considering 300 working days): INR 16,42,500 per annum Total operating cost: INR 2,42,500 per annum Net Revenue: INR 14,00,000 per annum Capital cost: INR 30,00,000 Pay back of capital investment: about 2.5 years Distributive biogas plants installed at or close to waste generation source with captive energy consumption will provide plant sustainability, easier scale-up, more scope for multiplication, generate employment
Technology Package	Scale of operation: 500 kg to 10 tons per day Capital cost: INR 20 lakhs for 500 kg capacity per day, INR 30 lakhs for 1 TPD capacity and INR 275 lakhs for 10 TPD capacity

For further information please contact

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