

## Tech-Transfer to GPS Renewable

**ARI 'BioStrawGas':** unleashing the power of microbes to mitigate pollution and extract renewable energy (Rice straw to methane)

### ARI 'BioStrawGas' Technology:

- ✓ Biomethanation of Rice straw without thermo-chemical pretreatment
- ✓ > 300 L Methane/kg VS of rice straw with >50% methane content in biogas
- ✓ High SLR; Low HRT of 15 days
- ✓ Steady-state operation without souring for > 500 days
- ✓ Eco-friendly & cost-effective process



Feed = Rice straw + Nutrient solution + Nitrogen source



*Orpinomyces* sp.

#### Daily feed contains:

1. Rice straw (particle size 2-50 mm)
2. Nutrient solution (To support growth of microbial community)
3. Inorganic nitrogen source (di-Ammonium phosphate)
4. Anaerobic fungal culture (*Orpinomyces* sp., 1% v/v)



Biomethanation of rice straw in anaerobic digesters (60L)

#### REACTOR OPERATIONAL CONDITIONS

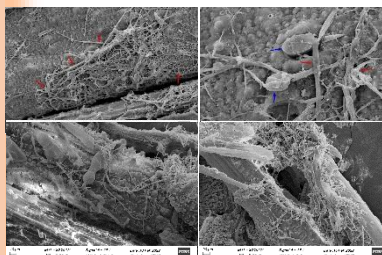
- ❖ Solid loading rate (SLR) = 10.5 %
- ❖ Temperature = 39±1 °C
- ❖ pH = 6.9±0.2
- ❖ C/N ratio = 30:1
- ❖ Hydraulic retention time (HRT) = 15 days

The cow dung slurry as the source of Methanogens in the reactor



#### PERFORMANCE OF THE AD PROCESS

- ❖ Biogas yield = > 600 L / kg VS / day
- ❖ Methane yield = > 300 L / kg VS / day
- ❖ Methane content in biogas = > 50%
- ❖ Volatile solids reduction = > 59%
- ❖ Potential to generate power = 3kWh/kg VS



Colonization of anaerobic fungus on rice straw (SEM image)



Digested slurry