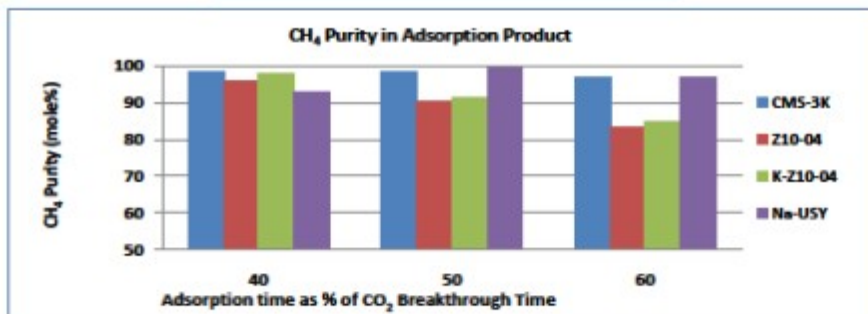
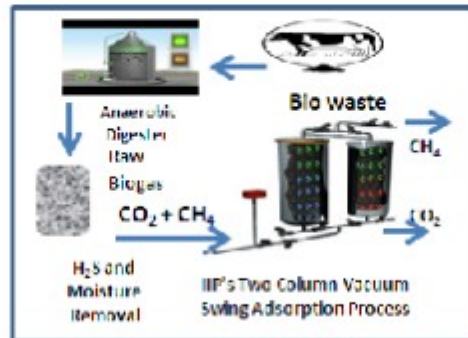


**Development of Vacuum Swing Adsorption (VSA) Process for Biogas Up-gradation to Pipeline Quality Fuel from Raw Biogas**



**Pressure/Vacuum Swing Adsorption (PVSA) Process for Biogas Up gradation**

**Brief of the Technology**

Biogas is one of the renewable energy sources with favorable CO<sub>2</sub> balance. It can be formed by biological transformation of large variety of organic wastes. It primarily consists of methane (CH<sub>4</sub>), carbon dioxide (CO<sub>2</sub>) and small amounts of H<sub>2</sub>S and water. The typical composition of bio-gas is Methane (CH<sub>4</sub>): (55-65%); Carbon Dioxide (CO<sub>2</sub>): 35-45%; Hydrogen Sulfide (H<sub>2</sub>S): 0-3%; Moisture (Saturated). The bio-gas needs to be upgraded to increase its calorific value (Bio-gas: 21.5 MJ/m<sup>3</sup> vis a vis Natural gas: 35.8 MJ/m<sup>3</sup>); to improve flame speed (Bio-gas: 25 cm/s vis a vis LPG: 38 cm/s) and also to remove toxic