Anaerobic Biomass Activity Tests

The methane production activity of anaerobic sludges is related to the history of the sludge, the biomass yield from the wastewater the sludge has been treating, the fraction of methanogens, and the presence of toxic substances. Best performance can be achieved from an anaerobic treatment plant if the operator measures the Specific Methanogenic Activity (SMA) of the biomass contained within the sludge. The SMA is measured by placing a known amount of biomass in a serum bottle, adding a known amount of substrate – usually acetic acid or ethanol – to the bottle in concentrations sufficient to cause maximum biomass activity, and measuring the resulting methane. The SMA is expressed as the COD equivalent of the methane production rate per gram of volatile solids, or gm COD/gm VSS/d. An example of an SMA measurement for a sludge removed from an anaerobic treatment process is shown in the figure below. The upper figure shows methane production measured over a three day period using a Challenge AER-200 aerobic/anaerobic respirometer. The lower figure shows the calculated specific methane production rate. The maximum specific methane production rate represents the SMA for this sludge sample. MAs between 1.0 and 2.0 indicate a highly active biomass.