

# Higher methane yields, more profit



FOS/TAC determination in biogas plants  
easy, quick and cost-efficient

## Maximize the methane yields of your biogas plant

02

The FOS/TAC ratio is a widely acknowledged key parameter for monitoring and controlling your biogas plant. If this ratio is not within a window of 0.3 to 0.4, the methane yield drops, along with the efficiency of your operation. In the worst case scenario, the fermentation process in the fermenter can fail, bringing production to a standstill. The Eco Titrator from Metrohm enables easy monitoring of the FOS/TAC ratio – for a continuously optimized methane yield and maximum profit for you.

### The advantages

- Easy: Large touch display and intuitive menu guidance
- Value for money: Swiss quality at a surprisingly low price
- Reliable: 75 years of experience in the development and production of titration instruments
- Service and support on-site: Your local Metrohm representatives will support you with professional service and application know-how

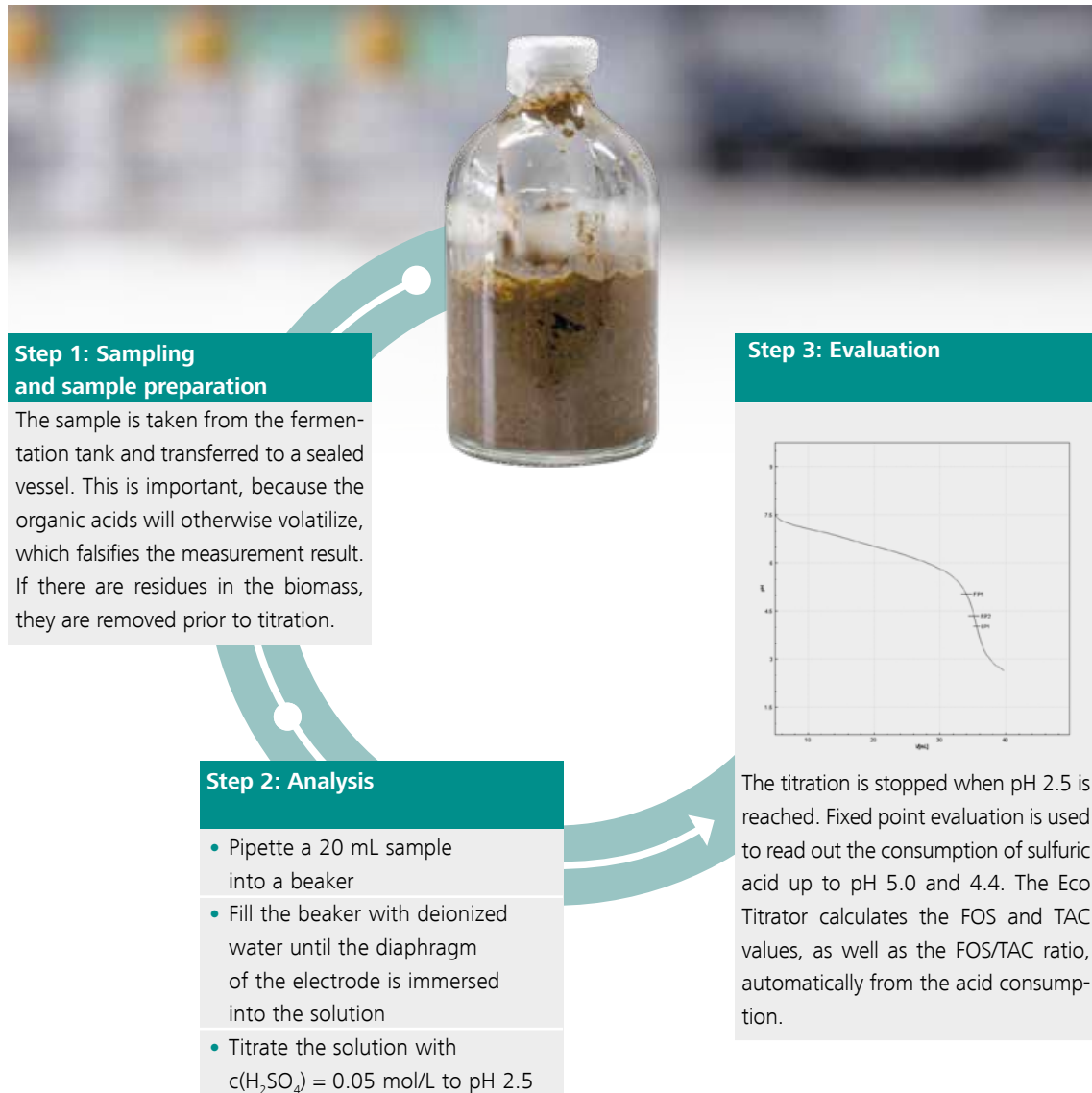


Metrohm provides the method for determining the FOS/TAC value free of charge. Simply load the method via the USB port, enter the specifications of the electrode and titrant and fill the burette – and your Eco Titrator is ready to go. There is also the option of connecting a printer via the USB interface or transferring the measurement results to a USB storage device as a PDF.

# FOS/TAC determination – results obtained in 3 easy steps

## Background

The FOS/TAC value enables fast and easy evaluation of the fermentation in the digester and the biodegradation performance of the microorganisms. In this analysis, the ratio of the highly volatile organic acids (FOS = volatile organic acids) to the calcium oxide reserve (TAC = total inorganic carbonate) is determined. The FOS and TAC values are determined via titration with sulfuric acid.



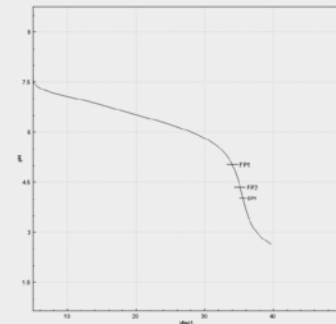
### Step 1: Sampling and sample preparation

The sample is taken from the fermentation tank and transferred to a sealed vessel. This is important, because the organic acids will otherwise volatilize, which falsifies the measurement result. If there are residues in the biomass, they are removed prior to titration.

### Step 2: Analysis

- Pipette a 20 mL sample into a beaker
- Fill the beaker with deionized water until the diaphragm of the electrode is immersed into the solution
- Titrate the solution with  $c(\text{H}_2\text{SO}_4) = 0.05 \text{ mol/L}$  to pH 2.5

### Step 3: Evaluation



The titration is stopped when pH 2.5 is reached. Fixed point evaluation is used to read out the consumption of sulfuric acid up to pH 5.0 and 4.4. The Eco Titrator calculates the FOS and TAC values, as well as the FOS/TAC ratio, automatically from the acid consumption.

## Results of a fivefold determination of the FOS/TAC ratio

Determination number	FOS/TAC ratio
1	0.1061
2	0.1086
3	0.1034
4	0.1030
5	0.1047
Mean value	0.1052
Absolute standard deviation	0.0023
Relative standard deviation	2.16%

## Order numbers

The Eco Titrator Biogas includes everything you need for determining the FOS/TAC value: Titrator, maintenance-free pH-electrode with temperature sensor, buffer solutions and electrolyte solution for the pH electrode.

2.1008.5010      Eco Titrator Biogas

### Optional accessories:

2.142.0100      Thermal printer Q3X

[www.metrohm.com](http://www.metrohm.com)

