

## Vinegar Fermentation Monitoring and Control By Using a Gas Analyzer System

*Solution-adapted equipment for the online detection of alcohol in vinegar fermentations is utilised to automate the production process.*

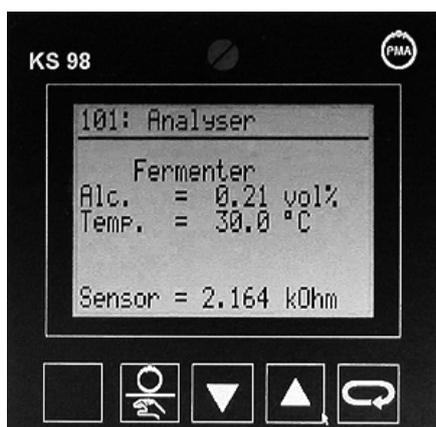
Semi-continuous vinegar fermentation systems depend on steadily available alcohol in the mash, otherwise the fermentation comes to a halt. Monitoring the alcohol content of the fermenting mash therefore plays a vital role. As soon as the residual alcohol content in the fermenter reaches a minimum, the raw vinegar is ejected and fresh alcoholic mash is fed in. This process can be automated to reduce the supervision to a minimum.

The fully automated vinegar fermentation of Vogelbusch uses a sensor-equipped measurement system for online detection of alcohol in the fermenting mash, called GS2E Gas Analyzer. The alcohol concentration is constantly measured during the fermentation process. When it goes down to the adjusted value, automatically one third of the fermenter content is pumped to the ejection tank and the fermenter is refilled with fresh mash.

This automated analyzing system allows monitoring the alcohol content in real time without sampling and analysis by hand. It has been designed for highest flexibility to meet the demands of different raw materials and changing ethanol and vinegar concentrations.

### Application

The processor module of the instrument is installed in vicinity of the vinegar fermenter with a connection to a probe which is placed in the fermentation mash. Alcohol from the mash diffuses into the silicon tube probe and is carried away with the air inside the probe. The detection of alcohol is performed inline by a semiconductor sensor element which is in contact with the alcohol-enriched air passing the probe.



The necessary process values (such as ethanol concentration, temperature and sensor resistance) are locally displayed at the instrument and, for the purpose of process control, converted to a standard current signal and two limit relay contacts which can be used as input signal for any process control system or for visualization and/or documentation.

The system is composed of standard industrial components.

The GS2E Gas Analyzer is easily installed and integrated with existing equipment. It is applicable for any type of fermenter and control system and can also be adapted for other organic solvent vapors.

Similar systems are available from Vogelbusch for application in yeast and alcohol fermentations.