BlueSens

understanding bioprocesses

Automated Bio-Methane Potential (BMP) evaluation system

(ES) Equipements Scientifiques SA - Département Bio-Tests & Industries - 127 rue de Buzenval BP 26 - 92380 Garches
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Understand your bioprocess with BlueSens

It is our philosophy to make bioprocessing as open and user-friendly as possible so the user gets a controlled process with the highest possible process reliability.

01 Measure in the process: no contaminations, continuous readings without interruptions

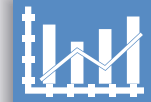
02 Real-time measurement

03 Modular setup: adopt the system to your demands

04 Be sure about the process conditions and highest reproducibility

05 No gas treatment /CO_2 absorption required

06 Automatically monitor all important process parameters (e.g. pH, pO_2, etc. and not only CH_4) and control actuators



07 For all scales

08 Save time & money: no effort during experiments through automated measurement

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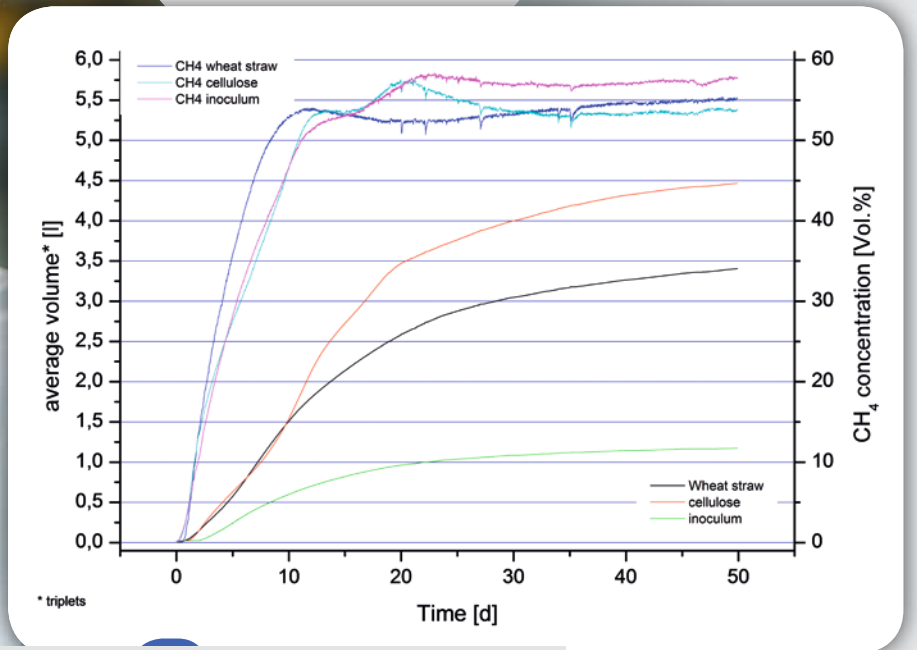
Know and monitor the produced CH_4 volume in real time. Compare the gas yield of different substrates



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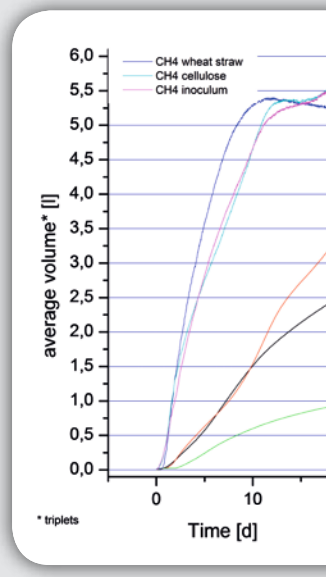
What is the Yieldmaster?

The Yieldmaster is the most advanced automated Bio-Methane potential (BMP) evaluation system. It is consisting of microprocessor controlled infrared-gas sensors, precision volumenometers (MilliGascounter®[1]) and the related BlueVis software for data acquisition and process control. In general the CH_4 sensors are the standard devices of the Yieldmaster. Sensors for other gases (CO, H_2, EtOH for example) can be added optionally.

	Yieldmaster	Eudiometer
Real time gas analysis in the process: no sampling	✔	✘
Detection of other important gases besides CH_4 possible	✔	+[2]
Optional pH probes connectable	✔	+[2]
Flexible scale	✔	✔
No gas treatment/filtering needed	✔	✘
Software for automated logging and managing of the process	✔	✘
Automated data acquisition of all values	✔	✘
Hazardous substances needed	✘	✔



[1] Registered trademark. The MilliGascounter was developed at the University of Applied Science Hamburg under the leadership of Prof. Dr. Paul Scherer. Visit www.milligascounter.de for further information.
[2] additional equipment needed

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Yieldmaster setup

- **A** Up to 12 CH_4-sensors, other sensors (CO_2, O_2, EtOH, H_2) also addable
- **B** Water bath with integrated thermostat and water level compensation
- **C** Multiplexer BACCom12 with integrated pressure sensor and Counter Box BACCOM12 CB with integrated temperature sensor
- **D** Control unit for magnetic stirrer plate (water proof magnetic stirrer plate is inside the water bath, not shown on image)
- **E** BlueVis software for data logging and process management
- **F** MilliGascounter® with one-way valve
- **G** Stirrer
- **H** Special flow adapter POM with two gas sensors for use with preserving jars
- **I** Heating jacket for standard preserving jars
- **J** Compensating reservoir device
- **K** Control unit for heating jacket

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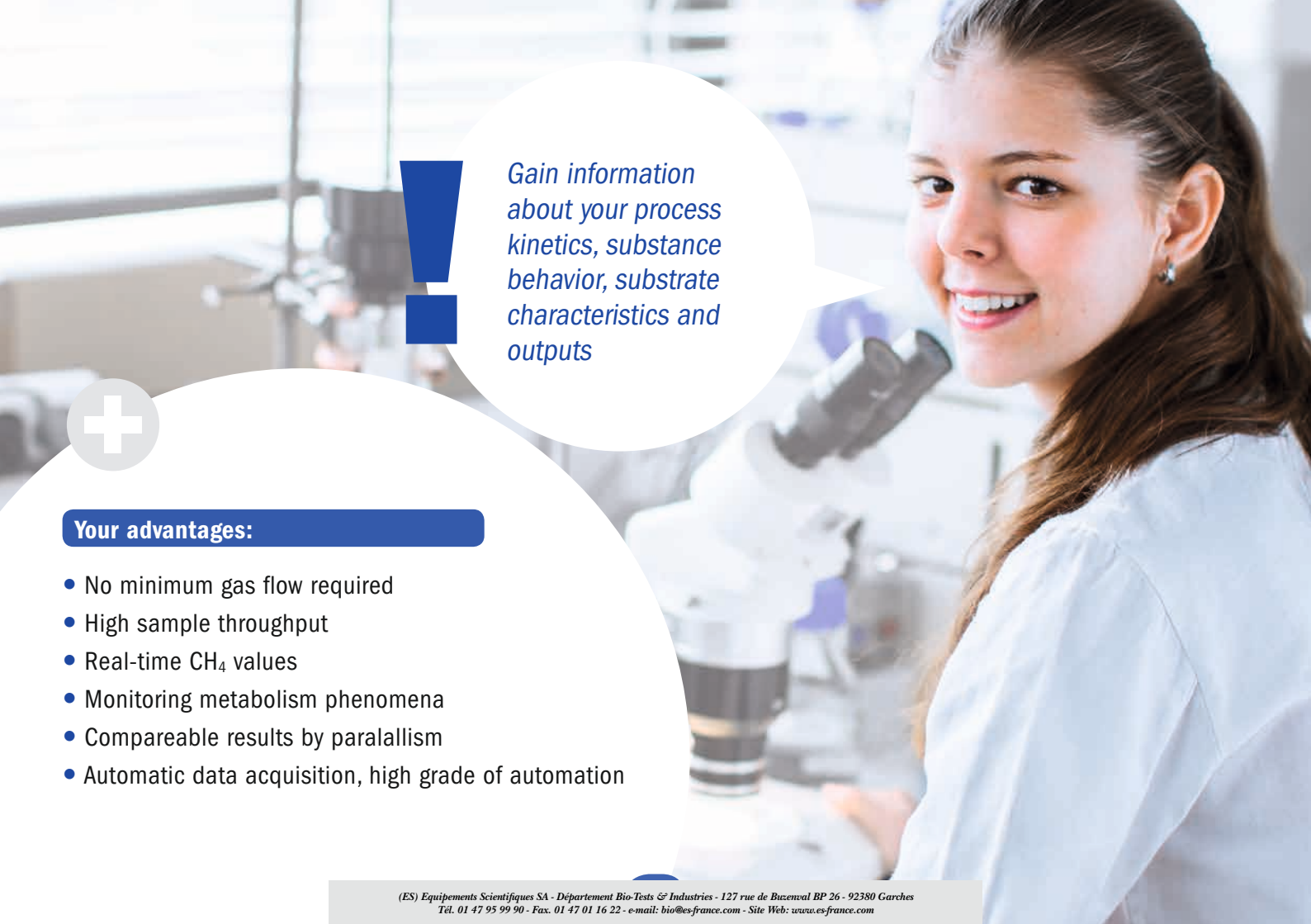

Gain information about your process kinetics, substance behavior, substrate characteristics and outputs

Your advantages:

- No minimum gas flow required
- High sample throughput
- Real-time CH_4 values
- Monitoring metabolism phenomena
- Compareable results by paralallism
- Automatic data acquisition, high grade of automation

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Run your own automated calculations in real-time by integrated math sensors in BlueVis

With BlueVis you can:

- Manage and analyze your process in real-time
- Connect all the sensors, probes and volumenometers
- Control pumps, stirrers and thermostats
- Log, document and visualize all batches

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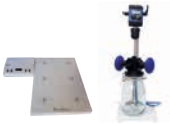
Manage your process with BlueVis

Use the BlueVis software to manage your process. Discover the new BlueVis 4.0 to run, monitor and to control your anaerobic digestion process. With BlueVis you can manage your complete Yieldmaster system. Calculations compliant to VDI 4630 included.

Configure your individual Yieldmaster system

1. Select the relevant gases, you want to measure	CH_4, CO_2, O_2, EtOH, CO, H_2	
2. Select vessel	Vessel flat bottom for magnetic stir bar, various round jars	
3. Select the volumenometer	MilliGascounter*	
4. Select a heating system	Heated water bath or heating jackets	

5. Select a stirring method	Magnetic stirring plate or overhead stirrer	
6. Select additional equipment	pH probes, actuators etc.	
7. Select data transfer	USB, BACCom (Ethernet)	

\+ BlueVis and CounterBox
* requires BACCom CounterBox

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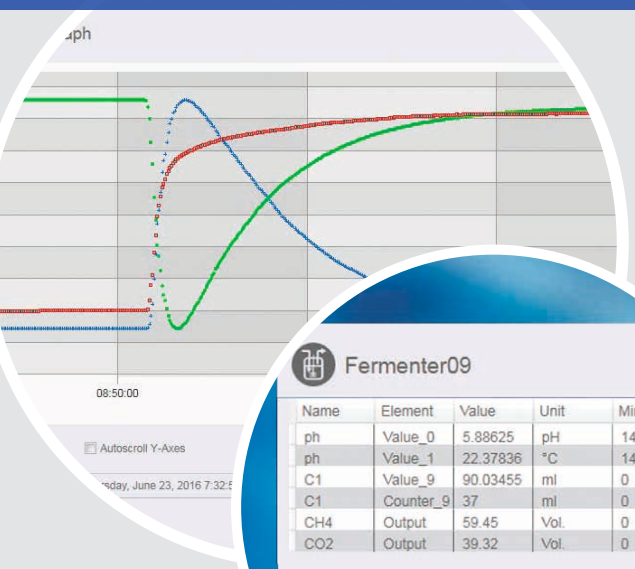
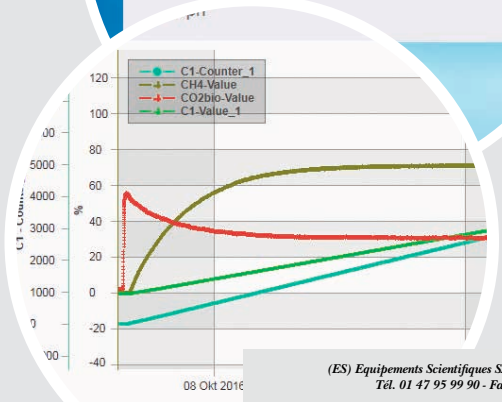
Manage your process with BlueVis





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We are using the Yieldmaster since it's giving us maximum flexibility and reliability

Your advantages:

- Know your process: keep track of all fermenters and compare all yields at a glance
- Be independent: connect different types of sensors and actuators from various brands
- Be sure: have a perfect documented workflow
- Be relaxed: high grade of automation
- Work accordingly to the standard: Calculations compliant to VDI 4630 included

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Datasheet

Data

Sensor	
Principle	CH_4, CO_2: Infrared, Dual wavelength
Measuring range	CH_4: 0 – 100 Vol. %** CO_2: 0-50 Vol.%**
Drift/ Long-term stability	< ± 2% reading / year
Accuracy	CH_4: < 0.2% FS*** ± 3% reading, CO_2: < ± 0.5 % FS*** ± 5% reading
Housing	PA
Dimension/ Weight	80 x 160mm (3.15" x 6.3") D x H / approx. 260 g (0.57 lb)
Materials used for gas contact	Steel 1.4571, Viton, Sapphire, PTFE
Connection	GL 45
General	
Operating temperature	Temperature difference max. 25 °C (45 °F) e.g. 15 - 40 °C (59 – 104 °F)
Operating humidity	0-100% RF
Pressure range	0.8 to 1.3 bar (11.6 to 18.85 psi)
Storage temperature	0 °C to 60 °C (32 – 140 °F),< 75% RF not condensing

Volumenometers

MilliGascounter®*	
Maximum flow	1 ltr./h **
Min. flow (resolution)	3 ml **
Accuracy	± 3%
Min./max. gas inlet pressure	5 mbar/100 mbar (0.07 psi/1.45 psi)

* Registered trademark. The MilliGascounter was developed at the University of Applied Science Hamburg under the leadership of Prof. Dr. Paul Scherer.

Data transfer / Interface

BACCom incl. integrated pressure measurement 0.8 to 1.3 bar (11.6 to 18.85 psi)	
Input	RJ45 for up to 12 sensors
Output	RS232, Ethernet (with BACCom)
Power supply	12V DC, 4A
Dimension/ Weight	205 x 160 x 45 mm (8.07" x 6.3" x 1.77") L x W x H / 600 g (1.32 lb)

CounterBox

incl. integrated temperature and pressure measurement 0.8 to 1.3 bar (11.6 to 18.85 psi)	
Input	Plug connections for up to 12 MilliGascounter®*, USB connector for direct connection to a PC, connection cable to BACCom
Output	USB
Power supply	12V DC, 1A
Dimension/ Weight	205 x 160 x 45 mm (8.07" x 6.3" x 1.77") L x W x H / 600 g (1.32 lb)

Software

BlueVis	
Features	Graphs for concentrations (CH_4, CO_2 etc.) and normalized volume , control and documentation of stirrers, cryostats, probes, pumps etc. and calculations compliant to VDI 4630 included
System requirements	Windows7™ or higher, CPU: I5 Quad-Core, better or equivalent, HDD: 500GB, 8GB RAM, 64bit

** other on request
*** full scale

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