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Jobst Technologies GmbH, a Germany based private company located in Freiburg's Biotech park, is unrivalled competence leader in bioanalytical monitoring applications with OEM products in clinical routine and biotechnology as well as with his own products for R& D applications. B2B contract development together with participation in EC research projects provides permanent extension of the company's technology and product portfolio.

Jobst Technologies is a technology orientated enterprise offering its core competencies in the overlap between micro systems technology, (bio)electrochemical analytics, and microfluidics both as service and products to his customers.

Low flow rate multi-parameter monitoring at nanoliter volumes is one outstanding specialty the company offers (see Figure 1).
The microsytem based complete monitoring solutions comprise of (bio)sensor arrays, microfluidics, electronics, and software.

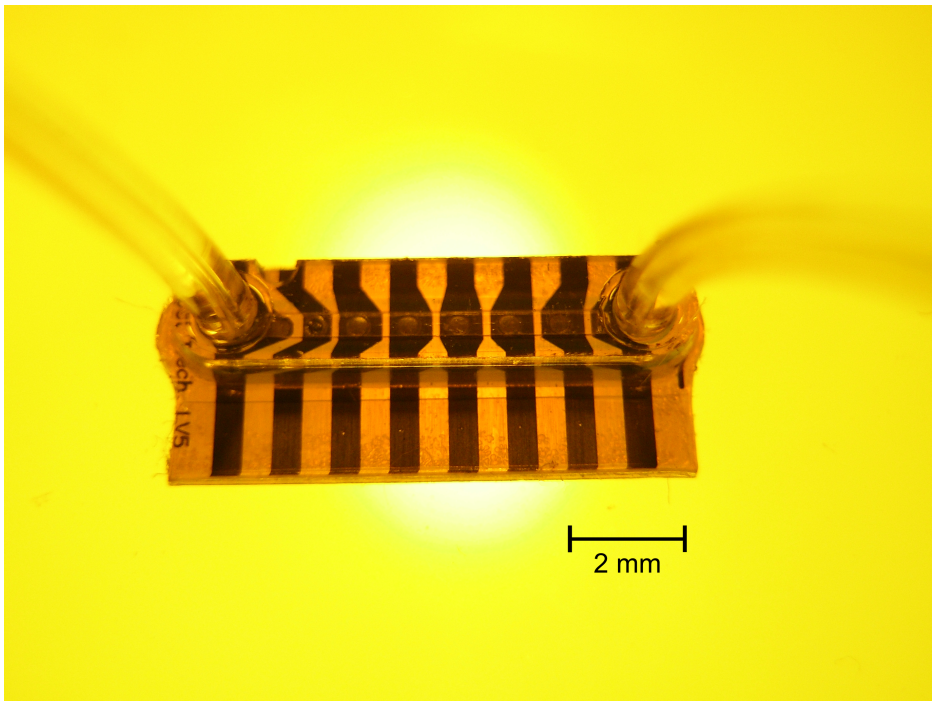

Figure 1: Multi-parameter monitoring with biosensors in nanoliter volume at low flow rate is one outstanding specialty of Jobst Technology. The nano liter device measures simultaneously glucose, lactate /pyruvate, glutamine, and glutamate

The expanding product portfolio encompasses biosensors for glucose, pyruvate, glutamate, glutamine, and lactate and sensors for cell adhesion, methanol, hydrogen peroxide, ethanol, and oxygen. The products are intended for clinical applications in the intensive clinical care unit, for cell culture monitoring in biotechnology, and for environmental monitoring.

Additional activities are contract research and development for medical device manufacturers as well as product development for life science applications.

The company is partner in international and national research projects in the fields of multi-parameter monitoring for applications like drug screening or in cancer research.

Simultaneous multianalyte monitoring

For simultaneous measurement of glucose, lactate, glutamine, and glutamate a biosensor array is implemented in a micro flow-system with nanoliter volume (Figure 1). The biosensors with no crosstalking and high long term stability were produced by modifying the electrochemical transducers and utilizing photopatternable enzyme membranes. The activity optimum of all biosensors in the array is in the neutral pH range allowing therefore direct and simultaneous monitoring of glutamine together with glucose, lactate, and glutamate (Figure 2 and Figure 3 a-d). The measurement shown in Figure 2 started with a mixture of 5 mM glucose, 2mM lactate, 1 mM glutamine, and 0.2 mM glutamate (µM scala on the right side). To demonstrate the independency of the biosensor signals each kind of biosensor was addressed subsequently with its analyte in the concentration, which was used in the mixture before. The use of appropriate miniaturization technology leads to mass producible devices for in vivo and ex vivo applications in whole blood and fermentation broth.

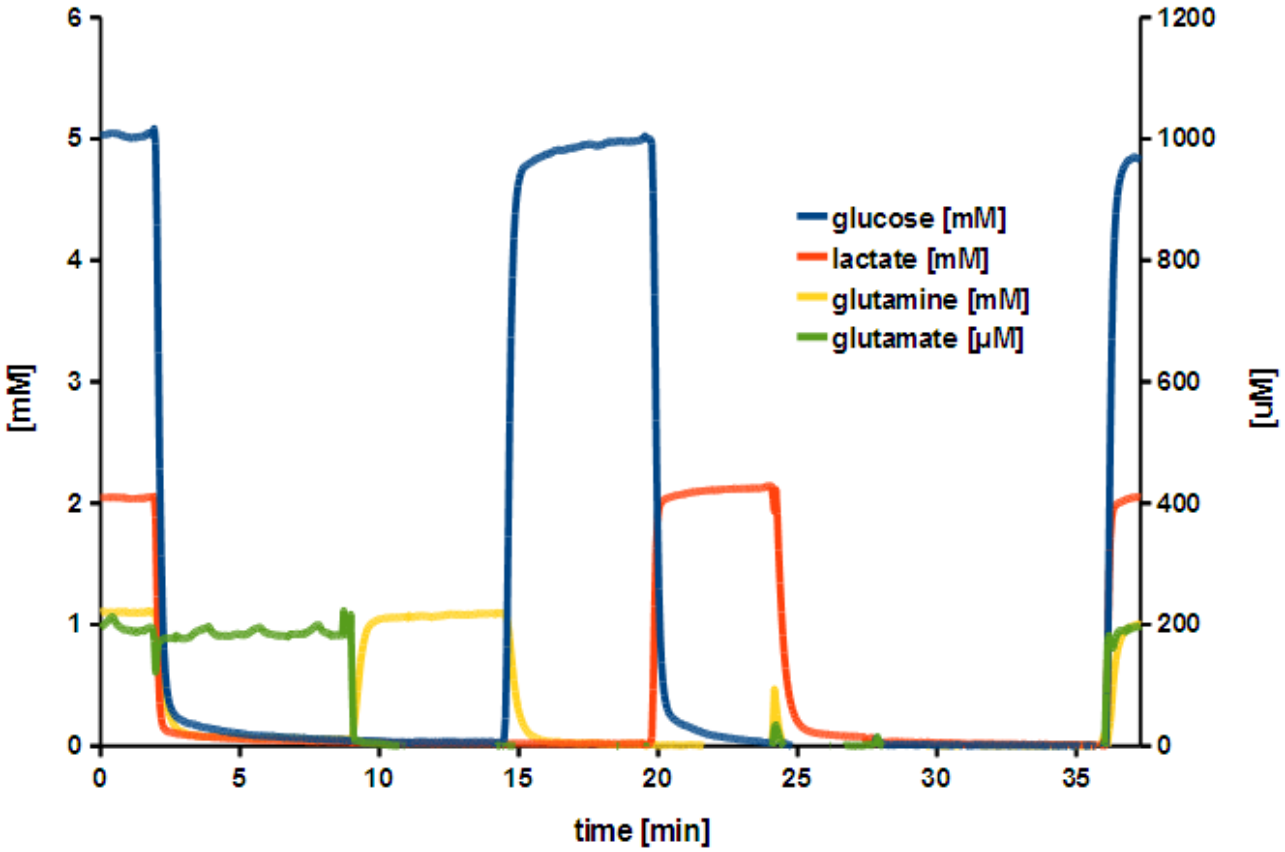

Figure 2: After measuring simultaneously 5 mM glucose (blue line), 2 mM lactate (red), 1 mM glutamine (yellow), and 0.2 mM glutamate (green) each anaylte is measured separately and without crosstalking in the same concentration as in the mixture.

Figure 3 a-d shows the calibration graph of the glucose, lactate, glutamine, and glutamate biosensor in the array. The biosensors are designed to measure in their physiological useful range as well as for (clinical) metabolism monitoring as for fermentation control in bioreactors or bioreactor control.

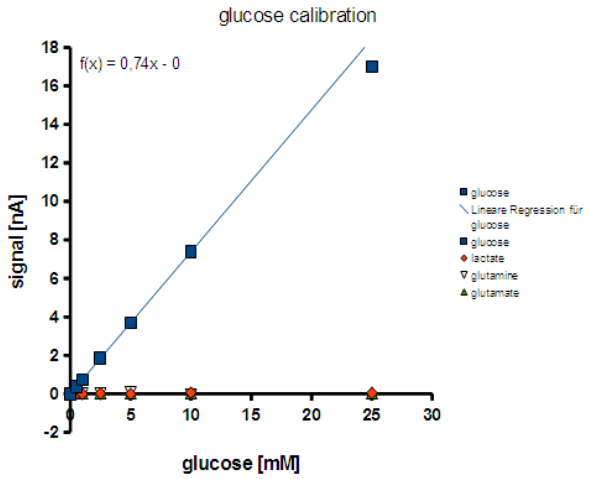

Figure 3a: Glucose calibration

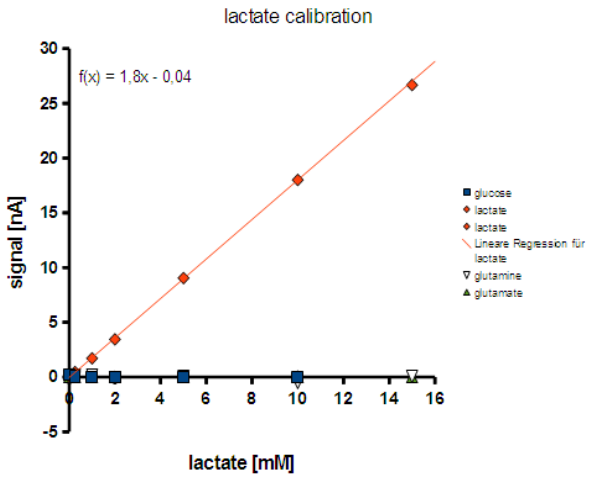

Figure 3b: Lactate calibration

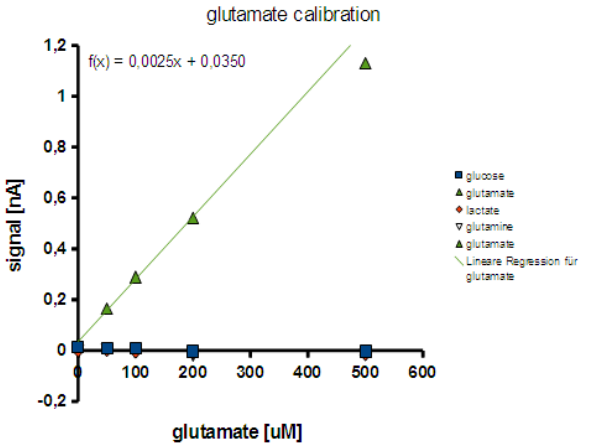

Figure 3c: Glutamate calibration

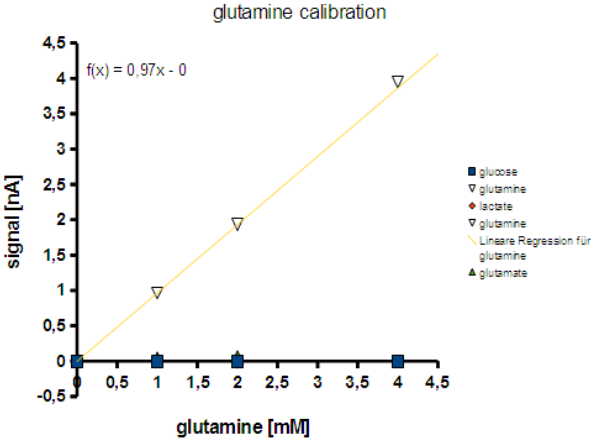

Figure 3d: Glutamine calibration

Literature

I. Moser, G. Jobst, G.A. Urban.
Biosensor Arrays for Simultaneous Measurement of Glucose, Lactate, Glutamate, and Glutamine (2002).
Biosensors & Bioelectronics 17/4, 297-302.