EXPERTS IN ANALYSIS

phytoLABELbox

Plant cultivation box with atmospheric monitoring and regulation

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phytoLABEL**box**

- Cultivation of plants in controlled atmosphere
- Regulation of the oxygen (O_2) and carbon dioxide (CO_2) concentrations
- Labeling of plants by introduced $^{13}CO_2$
- Additional control of air pressure, humidity and temperature
- Available as fitting version for the application in incubators

Phytolabelbox

Control unit for the phytolabelbox

Description

The Phytolabelbox is developed for controlled plant breeding. Constant conditions inside the cultivation box are achieved by automatic control of the composition and property of the atmospheric gases. Therefore, the phytolabelbox is suitable for test series about plant growing and metabolism.

The Phytolabelbox is equipped with different gas connections for synthetic air (20 % O_2 / 80 % N_2) or, if requested, a separate supply for oxygen and nitrogen, and carbon dioxide. Furthermore, it comes with a fused drain for exhaust air. The humidity is kept at the desired level by an effective Peltier cooling unit. A slight overpressure of 10 mbar against the ambient pressure can be set.

When running long-term experiments, the plants can be supplied individually with water and nutrients via additional supply lines.

Moreover, the Phytolabelbox can be used in incubators at temperatures between 10 °C and 40 °C and in the ambient pressure range of 955 hPa to 1061 hPa. The gas supply, the measuring and control unit as well as the computer are located outside of the incubator.

Applications

- Basic research on plants
- Research on agricultural crops
- Check of new and imported plant species
- Green biotechnology
- Plant breeding
- Proteomic and metabolomic research

Breeding of agricultural crops

Device version for particularly high plants

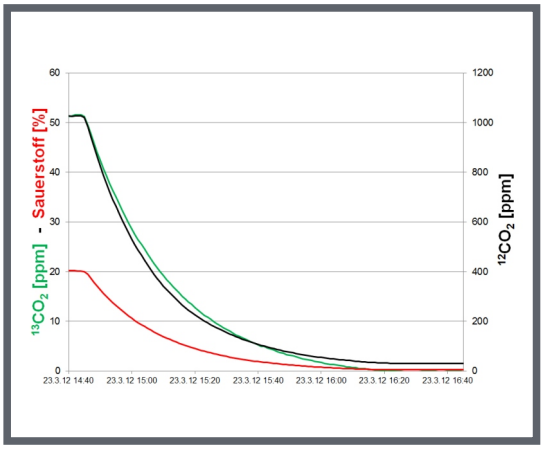
Example of application

The following parameters can be monitored and strictly regulated inside the phytolabelbox: the concentrations of O_2, CO_2 and N_2, air pressure, humidity and temperature. Hence, the cultivation box is ideally suited as a tool for plant breeding with regards to metabolism research under defined conditions such as pure atmosphere of ^{13}C.

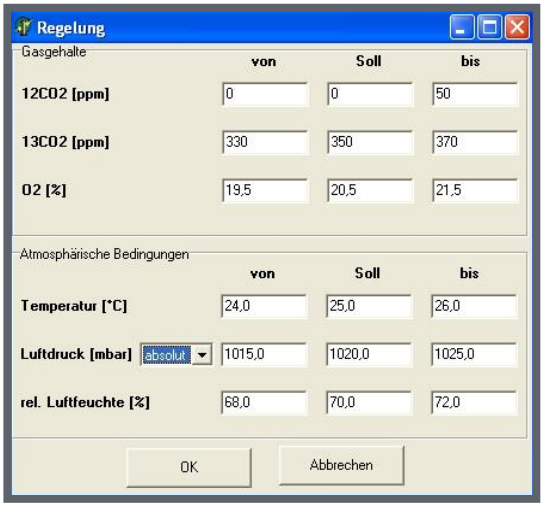
Plants incorporate the introduced $^{13}CO_2$ by photosynthesis and respiration (labeling). Thus, the mechanism of the respiration process can be investigated.

At the end of the marking process, the atmosphere is completely converted to regular $^{12}CO_2$ in no time at all in order to track the subsequent processes accurately. The plants can be easily removed through the comfortable opening.

At night, plants produce CO_2 as a result of the O_2-consumption. Therefore, it is possible to replace the entire gas inside the phytolabelbox at the end of the night. The plants then absorb the $^{13}CO_2$ provided in the phytolabelbox.



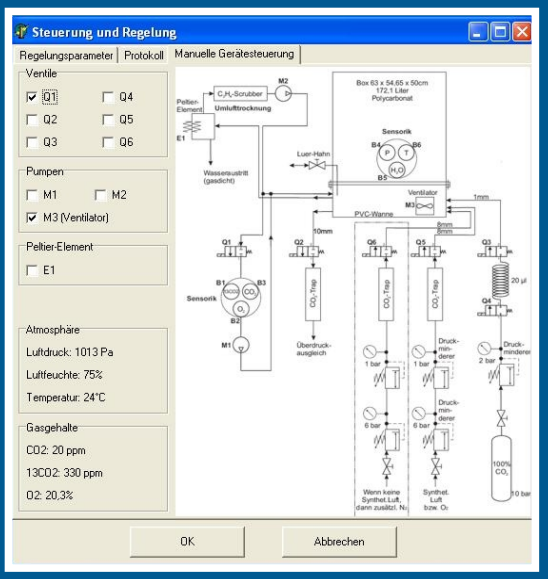
Typical measuring curves during rinsing step with argon



Example for control of the plant growing process

Advantages

- Crystal clear and space-saving construction
- Big opening for loading
- Intuitive software for monitoring and controlling the measuring system
- Optical determination of $^{12}CO_2$ and $^{13}CO_2$
- Economical consumption of $^{13}CO_2$ through fine-tuned regulation
- Selective electrochemical oxygen sensor
- Regulation of humidity by Peltier cooling
- Fitting version for incubators on request
- Optional with individual lighting and temperature regulation
- Optional with 4, 6, 8, 12 or 16 supply lines to the plants
- Optional with remote control to the computer for external monitoring (a network connection is required)



Intuitive software

Specifications

Dimensions (W x H x D), weight:	680 x 600 x 513 mm, 15 kg (box without control unit) 370 x 345 x 160 mm, 10 kg (measuring- and control unit)
Material:	cover: acrylic glass, bowl: PVC
Power supply:	230 V, 50 Hz
Measuring range CO_2/resolution:	0 ... 1000 ppm/1 ppm
Measuring range $^{13}CO_2$/resolution:	0 ... 1000 ppm/1 ppm
Measuring range O_2/resolution:	0 ... 25 %/0.1 %
Measuring range temperature/resolution:	0 ... 100 °C/0.1 °C
Measuring range pressure/resolution:	600 ... 1100 mbar/0.1 mbar
Measuring range air moisture/resolution:	0 ... 100 % RH/0.1 % RH

We are here for you

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