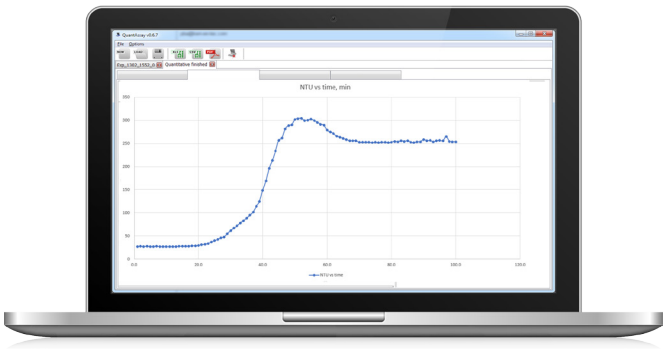
MassGene 4, Bioreactor with Real-time Biomass Registration and Gene Expression Analysis by Fluorescence

MassGene 4 is a 4 vessel bioreactor that registers the growth kinetics of microbial (bacterial and yeast) and suspension cell culture (insect, mammalian or plant cells) by measuring the turbidity, as well as it registers the gene expression based on fluorescence signal detection of fluorescent marker proteins such as GFP, and its derivatives e.g. — RFP, CFP and YFP (Green/Red/Cyan/Yellow Fluorescent Proteins), etc. Both the turbidity and fluorescence detection are non-invasive, thus they are performed real-time and online.

Bioreactor allows to perform following studies:

- Scale-up optimization of biotechnological process: record the yield of product and producers.
- Record the induction or repression processes of the regulatory regions of the genome at the level of protein synthesis.
- Many other studies where comfortable real-time online concentration and fluorescence measurements are key.



Specifications	
Type of measurements	Multi angle light scattering and fluorescence
Concentration Measurement range	10–10 000 NTU (equivalent to 0 – 150 OD_{600nm} 10^3 – 10^{11} cells/ml)
Fluorescence measurement	Single channel
Available channels	BFP, GFP, YFP, RFP, iRFP or equivalent
Temperature setting range	+4 ... 70 °C
Temperature resolution	0.1
Average cooling speed from 25°C to 4°C	0.7 °C/min
Average cooling speed from 25°C to 37°C	0.7 °C/min
Mixing speed	0–2500 rpm
Mixing timer for reverse motion	0–60 sec
Measurement interval	2–60 min
Cultural media volume	10–50 ml
USB	Yes
Dimensions	680 × 520 × 250 mm
Weight	8 kg
Outlet/Inlet filters	Yes
Power supply	Input AC 100–240 V 50/60 Hz, Output DC 12 V

MassGene 4, Combined Real-time Cell Growth Logger and Multiplexed Gene Expression Analyser features:

1. A 4 vessel module for cell cultivation based on Reverse–Spin principle of mixing in 50 ml falcon type tubes (e.g. TPP) with the option of controlling the growth of cells in real time.
2. Turbidity measurement system, (range equivalent to 10^3 – 10^{11} cells/ml) using patented multiangle light scattering method
3. Built in Peltier thermoblock for incubation of the samples for both heating and cooling above/below room temperature.
4. Module for fluorescence signal registration that can be used for intra and extra-cellular fluorescent protein detection.
5. Software for logging, processing and analyzing of the results.

Real time view of HELA cells (10^6 cells per ml), mix of GFP transfected/ not transfected populations: A; B; C: 100:0; 60:40; 30:70.