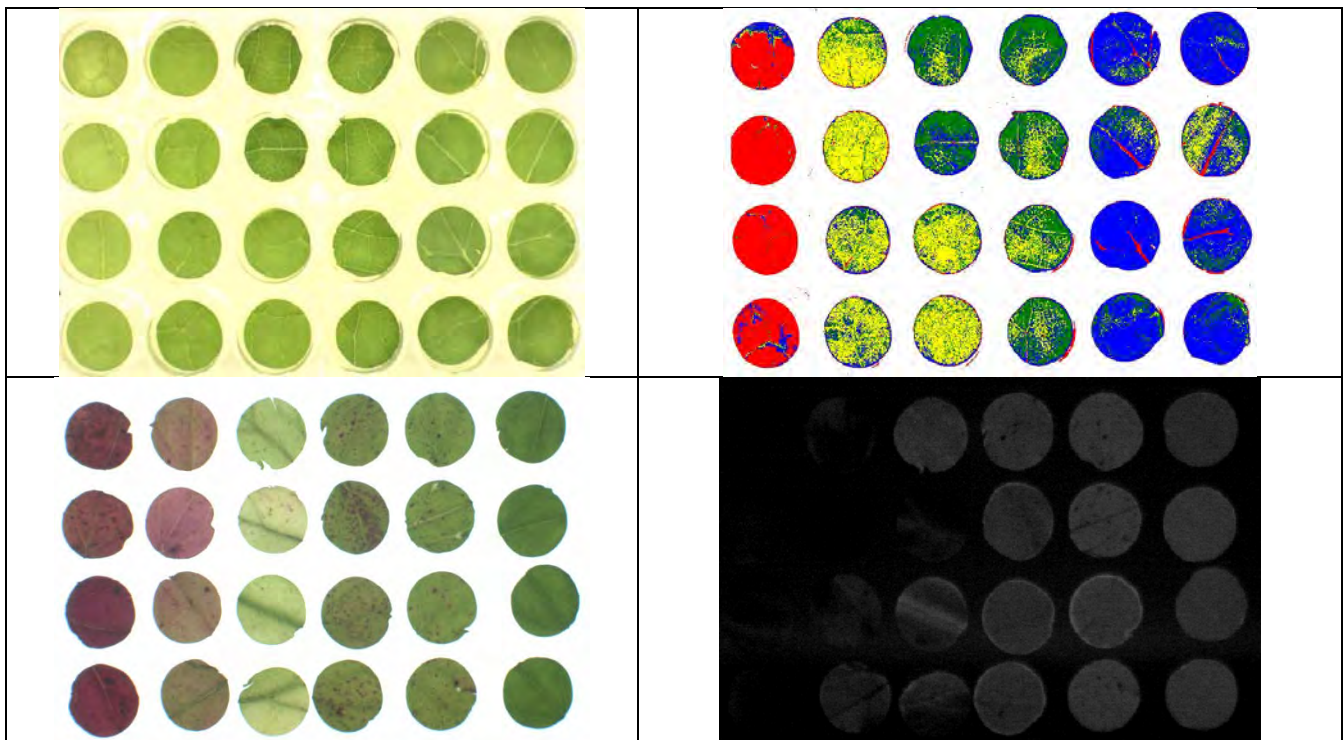




**HIGH THROUGHPUT SCREENING WITH LEAF DISCS
(FUNGIZIDE SCREENING)**

Image processing

Depending on design, aim and throughput of the test all kinds of multi-well plates up to 96 well plates can be used with the LemnaTec Scanalyzer HTS units.
For tests with leaf discs 24 well plates are most common.



The images above shows a leaf disc test and the colour classification in RGB and Chlorophyll fluorescence

The Scanalyzer HTS is able to analyze even smallest changes in colour and fluorescence

Special fungicide tests

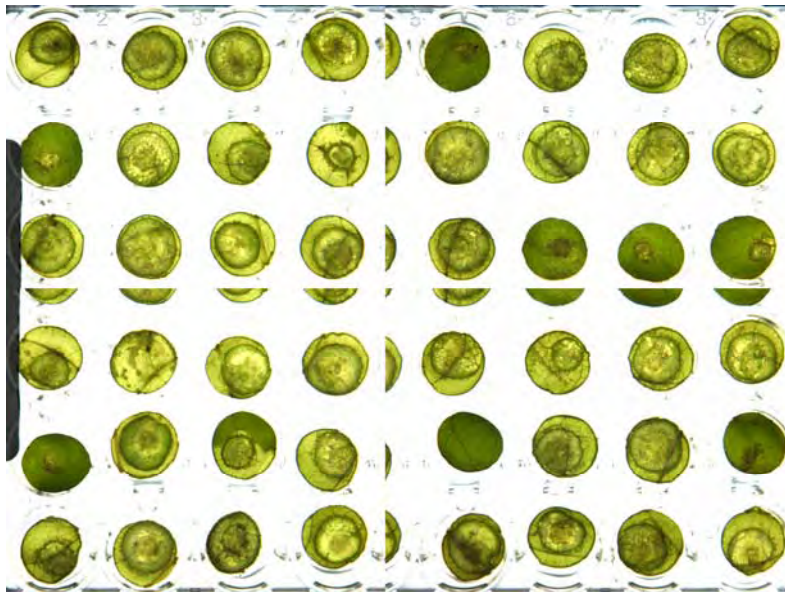
This is a small list of test system which have been integrated already into the Scanalyzer Platform. The hit definition is based on absolute values as well as relative measurement to the control. Measured parameters are also used to setup validity criteria.

The Scanalyzer Platform uses

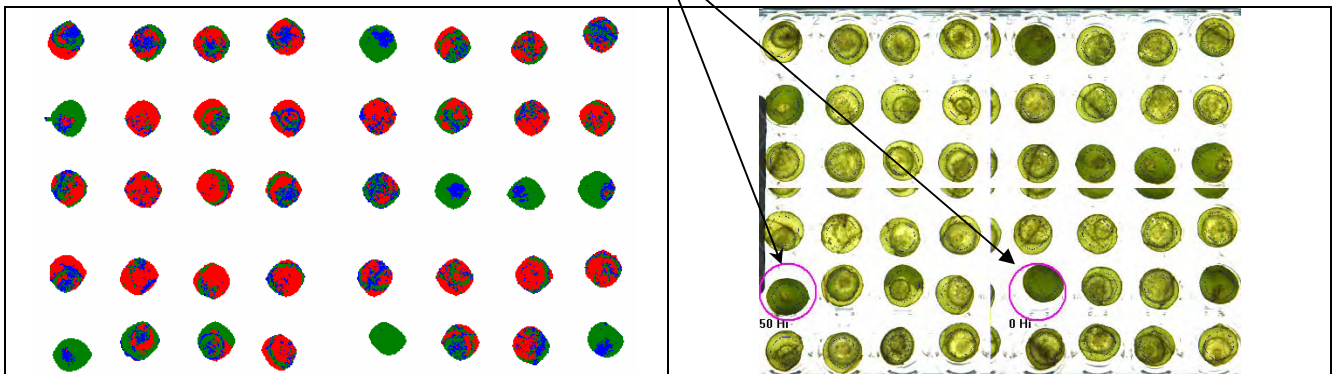
- ⇒ Colour
- ⇒ Shape
- ⇒ Fluorescence

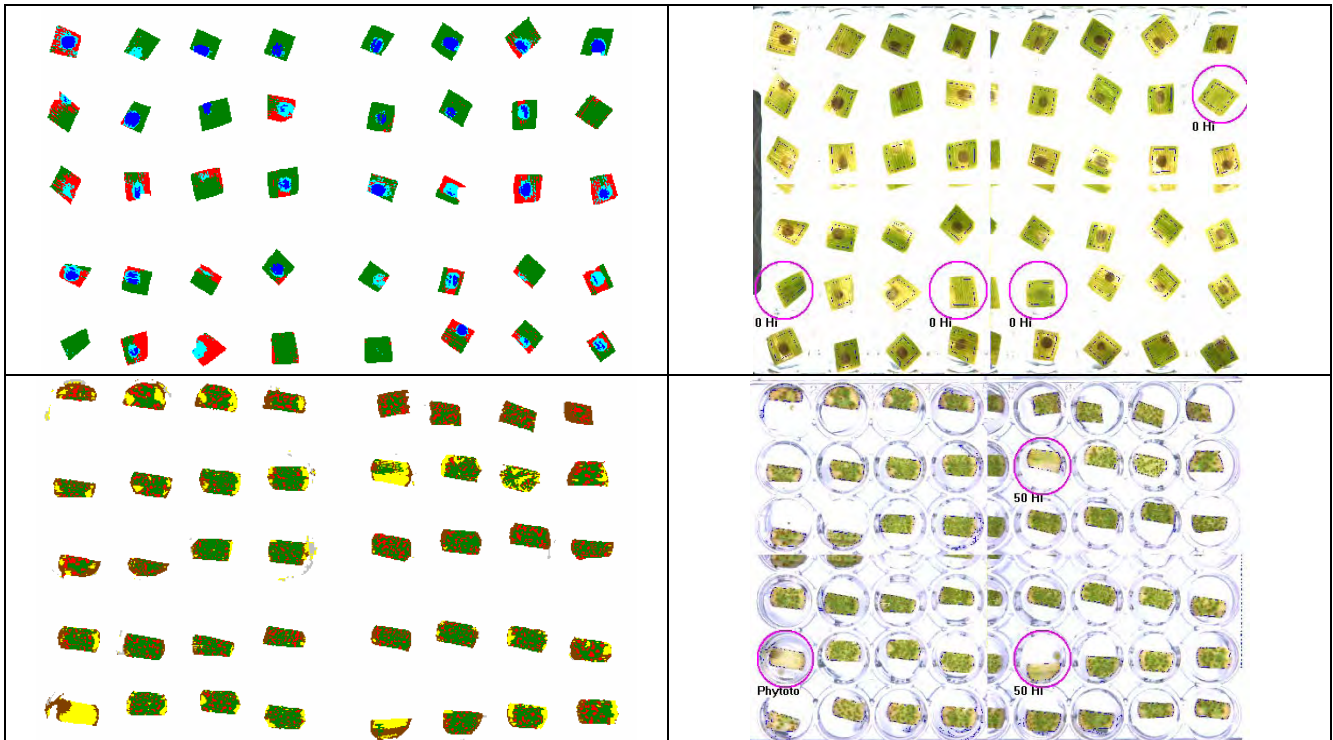
The Software is able to analyze laminar structures on the disc as well as single spots.

To avoid false analysis due to cutting artefacts the platform is able to automatically identify cutting artefacts.



50% and 100% Hit





Different leaf disc tests with fungus

Data bases

In the SQL server-data base the following information is stored:

- ⇒ One original image
- ⇒ All results of the image processing as far as made quantitative (e.g. numbers, areas, colours)
- ⇒ All objects found in the images as additional image suitable for later refined e.g. shape analysis
- ⇒ Classification of hits based on the LemnaTec hit finder. This allows automatic classification of different types of effects derived from quantitative measurements.
- ⇒ All image acquisition and image processing conditions (time, person, methods)
- ⇒ All information related to the well (Plate number, well name, substance identification, etc.) as far as imported to the database (LIMP system).
- ⇒ Additional information like manual comments, finalisation of results for export

Allocation of the acquired data to the LIMS data (e.g. substance, concentration etc.) in the database is automatically done by a barcode identification and a barcode reader in the HTS Scanalyzer Systems.

The database is completely searchable without specific database application knowledge. PHP-modules for convenient data base use from every computer linked to the server can be provided.

All information necessary within the data base can be imported and later exported directly via SQL protocols or data files to other electronic systems and file formats (e.g. *.xls, *.txt, *.html etc.)

Positive interactions between image processing and biological test design for High Throughput Screening with leaf discs

There can be a vast and decisive amount of positive interaction between image processing and biological test design:

While manual assessment often forces to start with extremely homogenous test organisms in one batch and between batches, fast quantitative image processing allows to check start conditions and correlate them to test end conditions. As an example amount of leaf disc can be correlated to number or size of the necroses at the start or the end of the test. Thus image processing can reduce your needs for homogenous biological material.

Dynamic development processes even with inhomogeneous starting conditions can be quantified based on implementation of an additional tool in HTS Bonit platform reflecting the appropriate mathematical model.

If already slight changes in culturing conditions between plates or different test starts occur, results can be evaluated in relation to controls on the own plate or relatively to a whole test. Differences in the controls can be measured, which are hard to manage manually due to shifting classifications.

Handling of different chemicals with extremely different toxicity in pipetting units may cause toxicity transfer from plate to plate. This can be detected by our PHP data system. Objective tools are available to control and optimise the cleaning steps.

Volatility may cause transfer of toxicity to neighbour wells. This is a big problem if wells should allow ventilation but minimised evaporation of water. Statistic data base tools from LemnaTec are able to identify suspected cases. Thus options of the data analysis may interact with plate design.

These are just some examples to demonstrate the power of the LemnaTec HTS System. Cost and time efficiency means to play with biological AND technical parameters and ask questions about how image processing and data analysis can help you to streamline the work and cost intensive preparation and cultivation of the test plates.

For any questions please do not hesitate to contact LemnaTec.