

Videometer

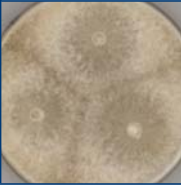
Automated identification of fungi

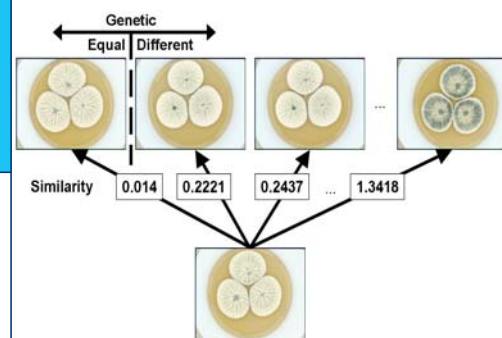
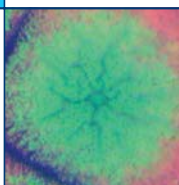
Fungi with both desired and harmful properties are encountered everywhere. Their properties are closely related to their classification into species, strains, and even clones, and for that reason their accurate and reproducible identification is essential. This applies to:

- Food and beverage
 - yeast quality
 - cheese production control
- Grain and forage
 - detection of fungal infection of grain
- Biotechnology
 - isolation of strains/clones with desired properties
- Environmental
 - identification of moulds causing allergy
 - identification of fungi originating from a common contamination source
- Clinical
 - development of new cultivation media

Traditionally, identification of fungi is carried out manually with visual identification based on dichotomous keys. This requires personnel trained in identification of specific groups of fungi and is very resource demanding. Furthermore, a reproducible identification is hard to obtain with this set-up. For this reason, semi- or full-automatic cultivation and identification methods have been developed. These methods, however, increase the use of disposables, such as cultivation media, instrument specific cultivation plates, etc.

Videometer A/S uses a patented technology integrating illumination, camera technology, computer hardware, and advanced image processing. This ensures full control of the illumination from where the light is emitted, reflected by the object, registered by the camera, until it is translated into digital data and used for image analysis. The result is a robust and reproducible identification.





When developing equipment for visual inspection Videometer A/S focuses on accuracy and reproducibility in order to ensure consistent results.

Videometer

Innovative technologies for identification

High-end vision systems

Videometer A/S has specialized in developing vision-based systems for color and texture measurements, handling situations such as high brilliance, scatter, transparency, surface topography, and color texture. This is due to the use of a unique technology that eliminates these effects producing images containing only purely color related information.

Rapid and user-friendly

With a vision-based system results are obtained within seconds. The customized software is easy to use and incorporates advanced statistical tools that take care of the subsequent data analysis. This reduces the need for trained personnel handling the equipment and ensures an objective analysis of the obtained images.

Customized solutions

By use of an innovative multispectral technology based on emitting diodes for image acquisition the vision system may be customized for specific applications. Diodes tuned to emit wavelengths ranging from ultraviolet to infrared allows for a fine tuned measurement focusing on wavelengths containing the most useful information on the group of fungi in question – including information that is not immediately visible to the human eye, such as information on metabolites and chemical composition.

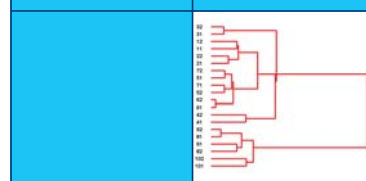
Use of databases

Since a vision based solution will estimate important characteristics, such as color, shape, and texture very accurately it can be used for reproducible classification of pure isolates, cultivation media, and combinations of these. The calibration of the equipment will ensure that images obtained from different instruments at different times at various geographical locations may be combined into the same valuable database. Statistical pattern recognition methods is applied to the image data, combined, and improved as the database is enlarged. Furthermore, no additional sample preparation is required after the cultivation of the fungi, which results in reduced requirements for trained personnel and disposables. An extended database combined with vision may subsequently be used for quick screening of mixed cultures, thus eliminating the need for resource demanding cultivations.

References

The following references demonstrate the performance of the system:
 T. Dörge, J. M. Carstensen, J. C. Frisvad: Direct identification of pure *Penicillium* species using image analysis. *Journal of Microbiological Methods*, 41 (2000), 121-133.
 M. E. Hansen, F. Lund, J. M. Carstensen: Visual clone identification of *Penicillium commune* isolates. *Journal of Microbiological Methods*, submitted (2002).

Videometer A/S develops vision systems for automated visual inspection. Both laboratory and in-line systems including dedicated software is developed.



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