



IKOSA

IKOSA®

Application Documentation

Application Name	Fungi REPAINT Assay
Version	2.0.0
Documentation Version	01.02.2022 - 1
Input Image(s)	Single Image (standard, RGB)
Input Parameter(s)	None
Keywords	phenomic, fungus, fungi, spore, growth, conidium, hypha, phenotype, plate, well, multiwell, 96, photo, biolog, macro, assay, microplate
Short Description	Quantification of fungal phenomics (conidia and hyphae coverage and radial distribution) in a 96-well Biolog microplate.
References / Literature	For more information regarding the assay check e.g. https://www.nature.com/articles/s41396-020-0709-0 .



IKOSA

Table of Contents

Table of Contents	2
IKOSA® Image Analysis	3
Application Description	3
Further Information	3
Requirements	4
Input Image(s)	4
Input Parameter(s)	5
Results	5
Files	5
Description of files	5
Error Information	6
App-specific Error Codes and Messages	6



IKOSA

IKOSA® Image Analysis

You can use this or any other of our image analysis applications through your IKOSA® account. If it is not listed in the available applications, please contact your organization's IKOSA® administrator or our team at support@kmlvision.com.

Application Description

This application automatically measures the relative conidia and hyphae coverage in the 96 wells of a Biolog FF microplate. This microplate includes 95 carbon sources and water. The application was trained and evaluated on images showing different stages of conidia and hyphae of the following types of fungi: *trichoderma*, *metarhizium robertsii*, *aspergillus niger*, and *penicillium sp.*

In the following, the requirements for an accurate analysis are given and the output of the applications is described.

Further Information

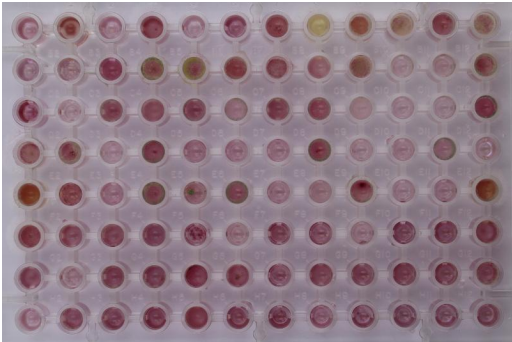
If you have any questions regarding this application or if you want to know if your specific type of images can be analyzed, please get in touch with us at support@kmlvision.com. Also, if you have requests or ideas regarding additional image analysis applications that you would require, please get in touch with us at support@kmlvision.com.

For more information, please visit www.ikosa.ai.

Requirements

Input Image(s)

Input for this application is the following image data:

No.	Image data	Type of image	Color Channels	Color Depth (per channel)	Size [Px]	Resolution [µm/Px]
#1	Single image	Standard	3 (RGB)	8 Bit	Max: 7,245 x 7,245	-
<p>Image Content: Photo of standard Biolog multiwell plate with 96 wells.</p> <p>Additional requirements:</p> <ul style="list-style-type: none"> • The dimensions of the multiwell plate must be the same as for a Biolog multiwell plate with 96 wells (12.75 x 8.5 cm; well diameter: 5 mm; well distance: ~5 mm). • The multiwell plate is placed on a homogeneous white background. • Image and well plate borders have to be approximately parallel. • The multiwell plate is rotated in a way that labels of wells are shown in correct order (starting with A1 at the top left; see examples below). • The photo was taken under an angle of approximately 90 degrees (avoid perspective distortion). • The individual wells have to be clearly distinguishable. • The application was optimized for well diameters of 200 pixels, significantly smaller and larger diameters could affect the results. <p>Examples:</p> 						

For all images, the following requirements apply:

- The illumination must be constant throughout the image(s).
- The sample must be in focus, i.e. no blurry regions in image(s).

Input Parameter(s)

No additional input parameters are required for this application.

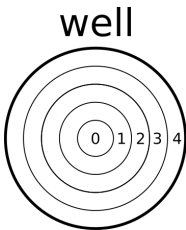
Results

Files

No.	File type	Content and Description
1	csv	<i>result.csv</i> : Coverage of conidia/hyphae for each well. See also below (Description of files).

Description of files

File no. 1: Single csv-file with the following content (*result.csv*):

Col. no.	Column name	Examples	Value range	Description
1	well	A01	A01-H12	Name of the well.
2	coverage conidia [%]	25	0 - 100	Percentage of the well area covered with conidia.
3	coverage hyphae [%]	75	0 - 100	Percentage of the well area covered with hyphae.
4	mean intensity conidia [0,1]	0.60	0 - 1	Mean intensity of the area classified as conidia in the range [0,1], where 0 corresponds to a bright conidia color, and 1 corresponds to a dark conidia color. Due to different illuminations in the images, the value cannot be compared between different images.
5-14	radial distribution [conidia/hyphae] bin [x] [%]	50	0 - 100	The circular area of the well is divided into 5 annuli. For each annulus with index [x], the percentage of the area covered by conidia/hyphae is given. A visualization of the annuli and their indices is given shown in the image below: 
15-24	intensity histogram conidia bin x ([a, b]) [%]	0.3	0 - 100	A histogram of the intensities of the area classified as conidia. Each bin contains the percentage of the well area classified as conidia in the intensity range [a, b].



Error Information

If an image analysis job fails, an error code and error message are returned. Failed analysis jobs are listed in the *Failed* tab of the *Analysis Jobs* section on the *Image Analysis* page on IKOSA®. For more information regarding the errors, please check the [Application Errors Documentation](#).

App-specific Error Codes and Messages

Error Code	Error Message	Solution
APPERR_0011	Failed to detect wells in image.	Provide an image showing a photo of a standard Biolog multiwell plate with 96 wells. All wells have to be clearly distinguishable, resolution and contrast have to be high enough.