

External Quality Assessment Scheme

Fungal Culture Round 1, 2023

Specimens

Please find enclosed 3 lyophilized samples S001, S002 and S003, and vials of rehydration fluid, each 0.5 mL.

Caution

Quality control specimens must be handled with the same care as patient samples, i.e. as potential transmitters of serious diseases.

Background information

Sample S001

Type of specimen: Yeast isolated from blood culture.

Clinical details: A 54-year-old man. Leukemia. Fever.

Sample S002

Type of specimen: A skin rash specimen.

Clinical details: A 7-year-old girl. A skin rash. Tinea corporis?

Sample S003

Type of specimen: Pleural fluid.

Clinical details: A 68-year-old woman. COPD.

Examinations

Fungal culture and identification

Antimicrobial susceptibility testing of yeasts

Storage and use

After arrival, the samples should be stored at +2...8 °C.

1. Let the samples and the rehydration fluids warm up to room temperature.
2. Cut the foil packet open at the end where you can feel the thicker part of the loop.
3. Remove the plastic sheath from the loop. Break the loop shaft off from handle directly into the tube containing warm rehydration fluid (blue cap).
4. Incubate the tube for 30 minutes in +35...37 °C incubator.
5. Check that the black film inside the loop (containing the lyophilized specimen) has dissolved completely.
6. Mix well the contents of the tube and culture immediately like a patient sample.

Result reporting

Please enter the results and methods via LabScala (www.labscale.com). If you cannot find your answer or method from the list, please contact the EQA Coordinator.

Give your final report to the clinician based on the test results of your own laboratory. Finally, please answer to the question, whether or not the isolate would normally be sent to a reference laboratory.

Identification tests and morphology: report the features, which are important for the identification. Comments regarding the significance of the finding as well as possible additional features observed during the examination can be given in the comments field.

2023-02-28

INSTRUCTIONS

Product no. 5260

LQ765123011-013/US

UN3373

Subcontracting: Sample pretesting

If the kit is incomplete or contains damaged specimens, please report immediately to info@labquality.fi.

The results should be reported no later than **April 3, 2023.**

The expected results of the round are published in LabScala in the View Reports section by April 6, 2023.

Inquiries

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Laboratories performing antifungal susceptibility tests: report the antifungal susceptibility results only for yeasts. Report the MIC values as mg/L. Note, that a rounded MIC result is to be reported in addition to the actual MIC result. Only the rounded values are included in the report. Guidance for correct rounding can be found below and is also available in LabScala (click the *i*-button in column “MIC result, rounded”). The rounded MIC value should always be selected from the list on the result form, also when it is the same as the actual obtained MIC result (see examples below guidance table). In the last column report the corresponding SIR interpretation (Sensitive/Intermediate/Resistant). The interpretation should be reported by taking into consideration possible resistance mechanisms of the microbe.

E-test or other MIC test result (mg/L)	Rounded value (mg/L)
<0.002, <0.003, 0.002	0.002
<0.004, <0.006, 0.003, 0.004	0.004
<0.008, <0.012, 0.006, 0.008	0.008
<0.015, <0.016, <0.023, 0.012, 0.015, 0.016	0.016
<0.03, <0.032, <0.047, 0.023, 0.03, 0.032	0.032
<0.06, <0.064, <0.094, 0.047, 0.06, 0.064	0.064
<0.12, <0.125, <0.19, 0.094, 0.12, 0.125	0.125
<0.25, <0.38, 0.19, 0.25	0.25
<0.5, <0.75, 0.38, 0.5	0.5
<1, <1.5, >0.5, 0.75, 1	1
<2, <3, >1, >1.5, 1.5, 2	2
<4, <6, >2, >3, 3, 4	4
<12, <8, >4, >6, 6, 8	8
<16, <24, >12, >8, 12, 16	16
<32, <48, >16, >24, 24, 32	32
<64, <96, >32, >48, 48, 64	64
<128, <192, >64, >96, 128, 96	128
<256, <384, >128, >192, 192, 256	256
<512, <768, >256, >384, 384, 512	512
<1024, <1536, >512, >768, 1024, 768	1024
<2048, >1024, >1536, 1536, 2048	2048

Example 1: Obtained test result is 0.002 mg/L, rounded value is 0.002 mg/L

Example 2: Obtained test result is 0.003 mg/L, rounded value is 0.004 mg/L

Example 3: Obtained test result is >16 mg/L, rounded value is 32 mg/L

Results reported in the “Report to the clinician” part will be scored.

Fungal culture

S001



S002



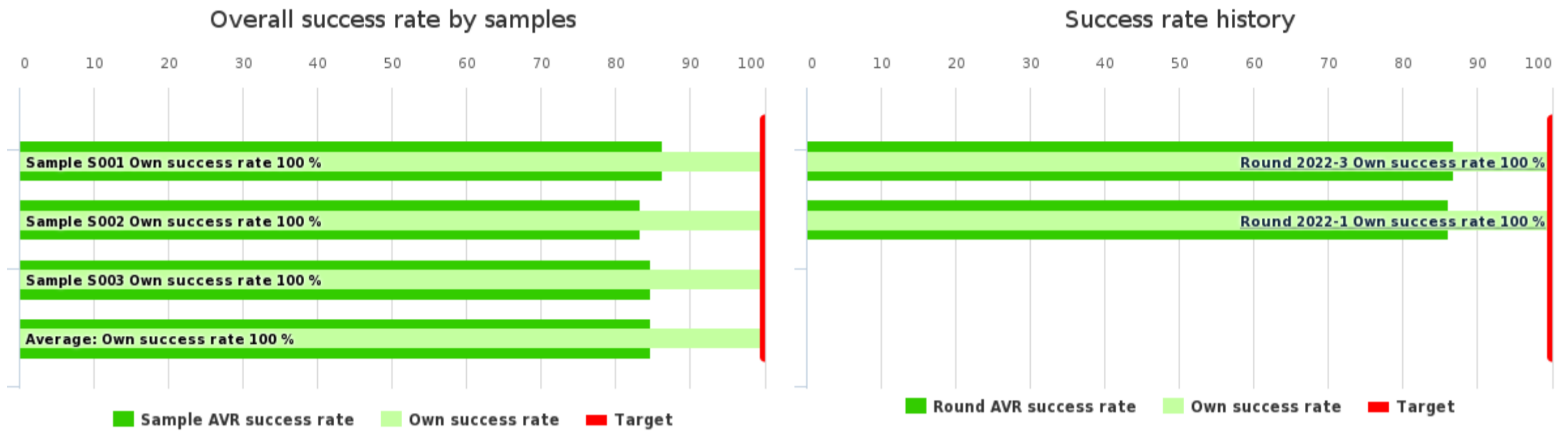
S003



Client report

	No of participants	No of responded participants	Response percentage
Fungal culture, March, 1-2023	52	51	98.1 %

Summary

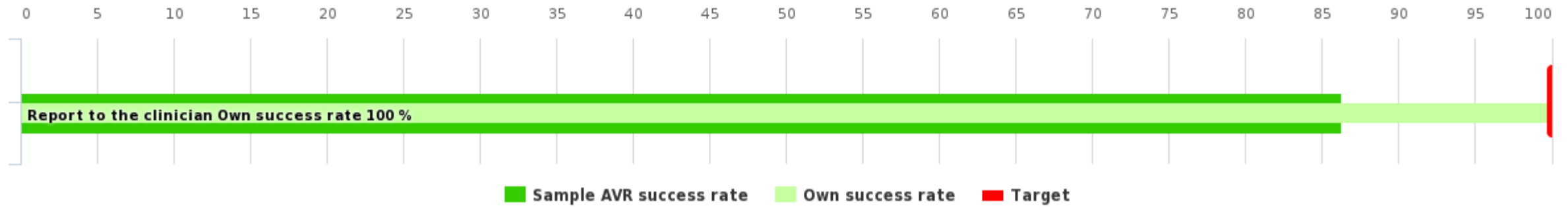


Summary	Own score	Max score	Own success rate	Difference	AVR success rate
Sample S001	4	4	100 %	13.7 %	86.3 %
Sample S002	4	4	100 %	16.7 %	83.3 %
Sample S003	4	4	100 %	15.2 %	84.8 %
Average:			100 %	15.2 %	84.8 %

History	Test nr.	Own success rate	Difference	AVR success rate
Round 2022-3	1	100 %	13.2 %	86.8 %
Round 2022-1	1	100 %	13.9 %	86.1 %

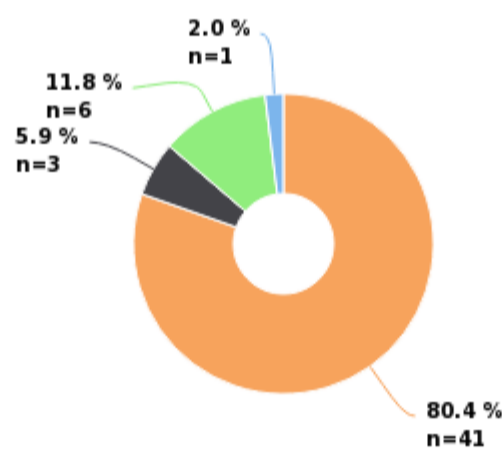
Sample S001 | Candida dubliniensis

Sample S001 success rate



Sample S001 results	Responded	Own score	Max score	Own success rate	Difference	AVR success rate	Count
	Report to the clinician	4	4	100 %	13.7 %	86.3 %	51
	Identification method	-	-	-	-	-	9
	Identification test kits and analyzers	-	-	-	-	-	9
	Identification tests: MALDI-TOF	-	-	-	-	-	40
	Morphological features	-	-	-	-	-	27
	Total:	4	4	100 %	13.7 %	86.3 %	308

Sample S001 Report to the clinician



LABORATORY SPECIFIC SCORING TABLE

Finding	Further action	Own score	Max score	Own success rate	Difference	AVR success rate
Candida dubliniensis	Not referred for further action	4	4	100 %	13.7 %	86.3 %
Total:		4	4	100 %	13.7 %	86.3 %

REPORT TO THE CLINICIAN

Finding	Finding count	Referred	Not referred	AVR success rate
<input checked="" type="radio"/> Candida dubliniensis	41	7	<input checked="" type="radio"/> 34	
Candida sp.	3		3	
Candida albicans	6		6	
Trichophyton sp.	1		1	
Total:	51			86.3 %

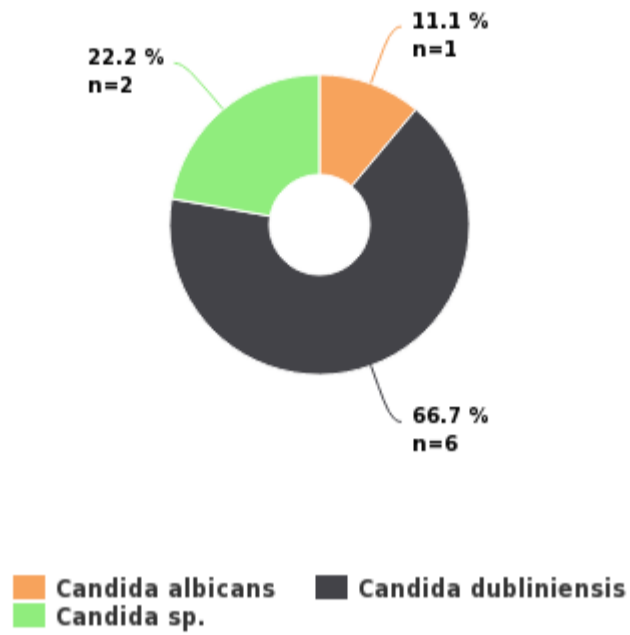
SCORING SUMMARY

Finding	Finding score	Max score
Candida dubliniensis	4	4
Candida sp.	2	4
Candida albicans	1	4
Trichophyton sp.	0	4
Total:		4

IDENTIFICATION METHOD

Method	Negative	Positive
Chrom-agar: C. albicans	-	6
Germ tube test	-	2
Urea hydrolysis	1	-

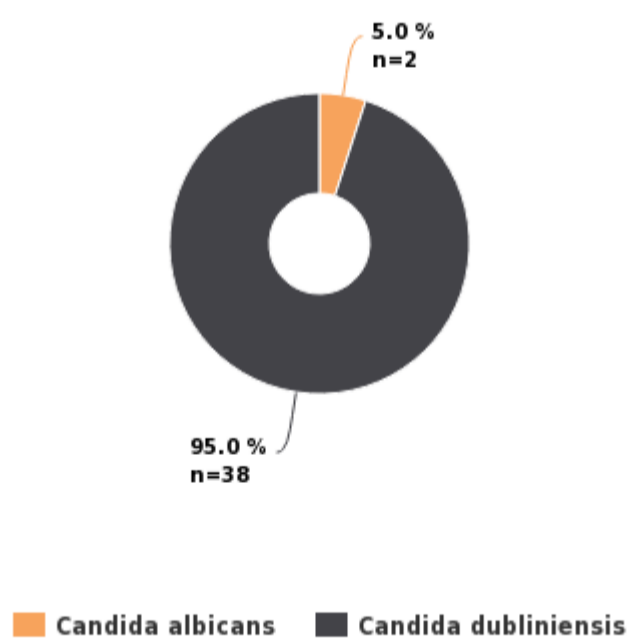
Sample S001 Identification test kits and analyzers



IDENTIFICATION TEST KITS AND ANALYZERS

Method	Result	Profile number	Profile number count
API Candida, bioMérieux	Candida albicans	6012	1
VITEK 2 YST	Candida dubliniensis	4103546061305571	1
		4102544061305170	1
		4102544061104170	1
		4102144061305170	1
		4002144061305170	1
	Candida sp.	4012144061105170	1
VITEK YST, bioMérieux	Candida dubliniensis	4102144061115070	1
	Candida sp.	4102144061303170	1
Total:			9

Sample S001 Identification tests: MALDI-TOF



IDENTIFICATION TESTS: MALDI-TOF

Method	Result	Score / Probability %	Score / Probability % count
MALDI Biotyper, Bruker	Candida dubliniensis	≥2	15
		≥1.7..<2	8
VITEK MS, bioMérieux	Candida albicans	99,8 %	1
		N/A	1
	Candida dubliniensis	99,9 %	12
		99 %	1

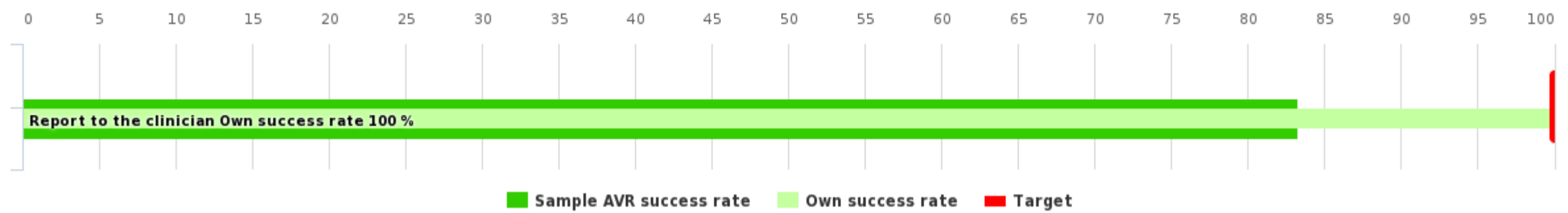
		N/A	2
Total:			40

MORPHOLOGICAL FEATURES

Feature	Negative	Positive
Blastospores	-	8
Chlamydo spores	-	8
Hyphae	-	1
Microconidia	-	1
Mucoid capsules	1	-
Pseudohyphae	-	8

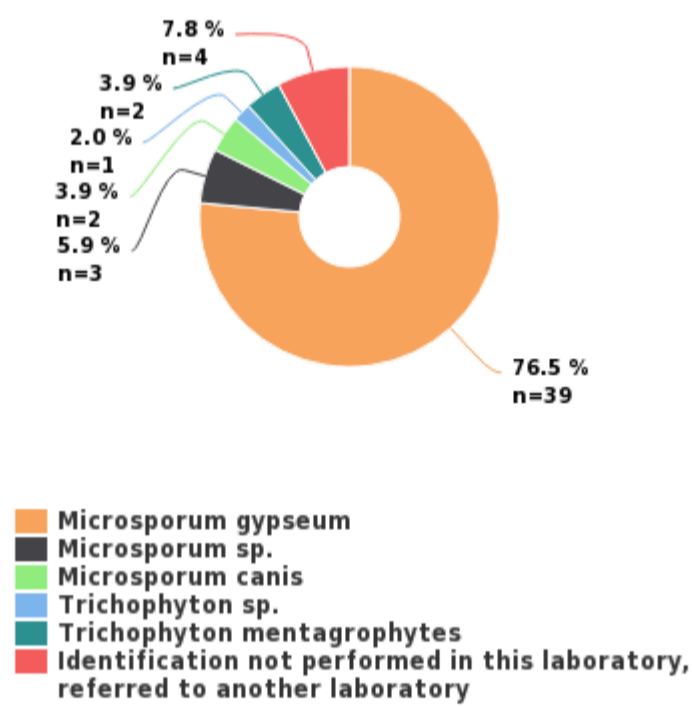
Sample S002 | Microsporium gypseum

Sample S002 success rate



Sample S002 results	Responded	Own score	Max score	Own success rate	Difference	AVR success rate	Count
	Report to the clinician	4	4	100 %	16.7 %	83.3 %	51
	Identification method	-	-	-	-	-	2
	Identification tests: NAT	-	-	-	-	-	1
	Identification tests: MALDI-TOF	-	-	-	-	-	18
	Morphological features	-	-	-	-	-	79
	Total:	4	4	100 %	16.7 %	83.3 %	277

Sample S002 Report to the clinician



LABORATORY SPECIFIC SCORING TABLE

Finding	Further action	Own score	Max score	Own success rate	Difference	AVR success rate
Microsporium gypseum	Not referred for further action	4	4	100 %	16.7 %	83.3 %
Total:		4	4	100 %	16.7 %	83.3 %

REPORT TO THE CLINICIAN

Finding	Finding count	Referred	Not referred	AVR success rate
Microsporium gypseum	39	1	38	
Microsporium sp.	3	2	1	
Microsporium canis	2		2	
Trichophyton sp.	1		1	
Trichophyton mentagrophytes	2	1	1	
Identification not performed in this laboratory, referred to another laboratory	4	4		
Total:	51			83.3 %

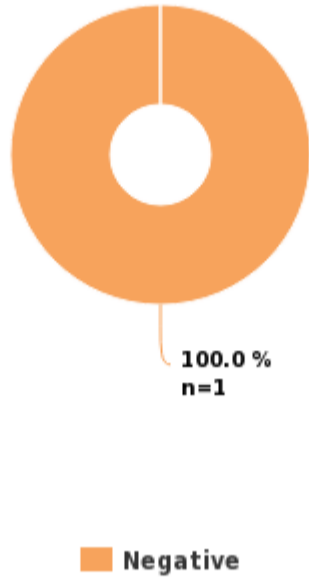
SCORING SUMMARY

Finding	Finding score	Referred	Max score
Microsporium gypseum	4		4
Microsporium sp.	2	1	4
Microsporium canis	1		4
Trichophyton sp.	0		4
Trichophyton mentagrophytes	0		4
Identification not performed in this laboratory, referred to another laboratory	0	1	4
Total:			4

IDENTIFICATION METHOD

Method	Positive
Germ tube test	1
Urea hydrolysis	1

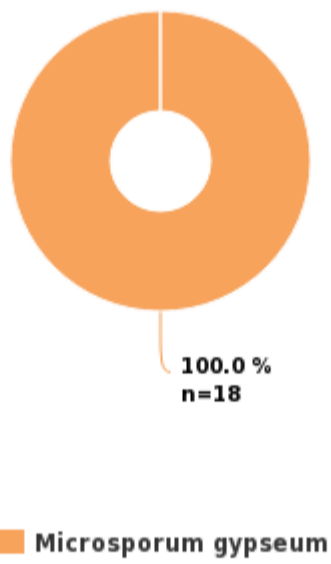
Sample S002 Identification tests: NAT



IDENTIFICATION TESTS: NAT

Method	Result	Result count
DermaGenius 2.0, PathoNostics	Negative	1
Total:		1

Sample S002 Identification tests:
MALDI-TOF



IDENTIFICATION TESTS: MALDI-TOF

Method	Result	Score / Probability %	Score / Probability % count
MALDI Biotyper, Bruker	Microsporium gypseum	≥2	2
		≥1.7..<2	8
VITEK MS, bioMérieux	Microsporium gypseum	99,9 %	7
		99 %	1
Total:			18

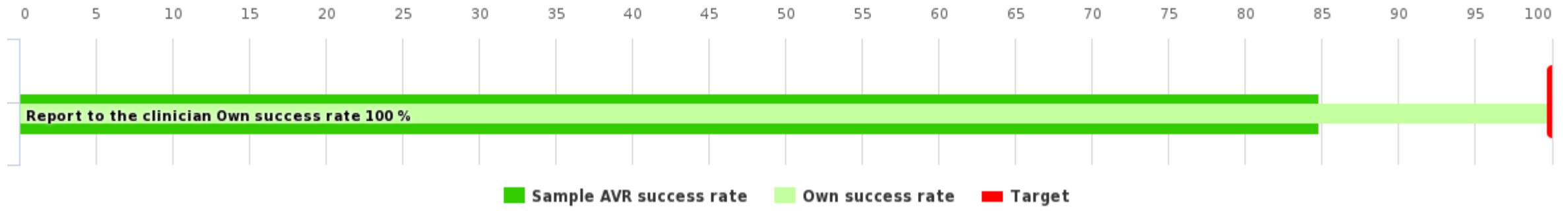
MORPHOLOGICAL FEATURES

Feature	Positive
Ascospores	1

Chlamyospores		1
Conidia		2
Conidiophores		1
Hyphae		19
Macroconidia	⊙	34
Microconidia	⊙	21

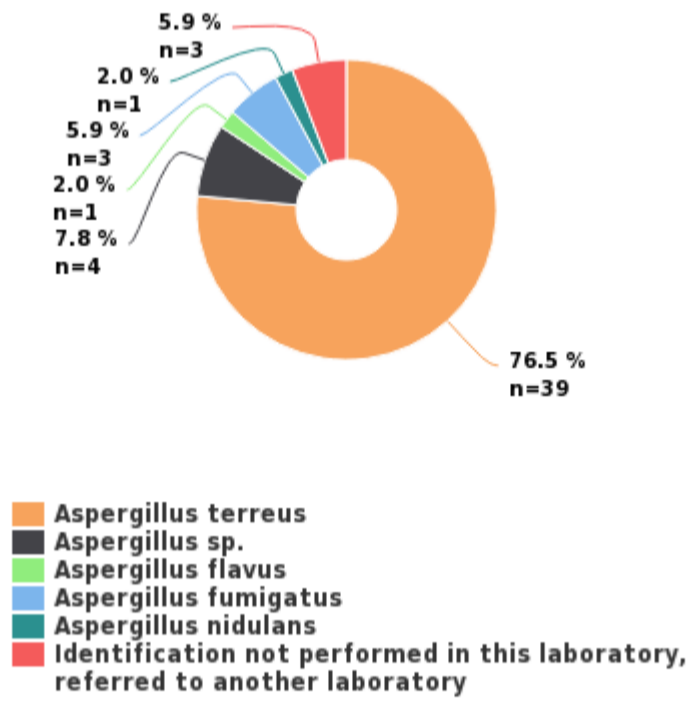
Sample S003 | *Aspergillus terreus*

Sample S003 success rate



Sample S003 results	Responded	Own score	Max score	Own success rate	Difference	AVR success rate	Count
	Report to the clinician	4	4	100 %	15.2 %	84.8 %	51
	Identification method	-	-	-	-	-	2
	Identification tests: MALDI-TOF	-	-	-	-	-	19
	Morphological features	-	-	-	-	-	77
	Total:	4	4	100 %	15.2 %	84.8 %	273

Sample S003 Report to the clinician



LABORATORY SPECIFIC SCORING TABLE

Finding	Further action	Own score	Max score	Own success rate	Difference	AVR success rate
Aspergillus terreus	Not referred for further action	4	4	100 %	15.2 %	84.8 %
Total:		4	4	100 %	15.2 %	84.8 %

REPORT TO THE CLINICIAN

Finding	Finding count	Referred	Not referred	AVR success rate
<input checked="" type="radio"/> Aspergillus terreus	39	3	36	
Aspergillus sp.	4		4	
Aspergillus flavus	1		1	
Aspergillus fumigatus	3	1	2	
Aspergillus nidulans	1		1	
Identification not performed in this laboratory, referred to another laboratory	3	3		
Total:	51			84.8 %

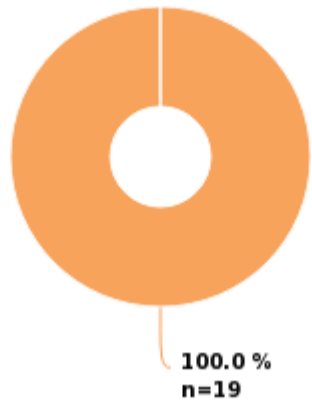
SCORING SUMMARY

Finding	Finding score	Referred	Max score
Aspergillus terreus	4		4
Aspergillus sp.	2		4
Aspergillus flavus	1		4
Aspergillus fumigatus	1	1	4
Aspergillus nidulans	1		4
Identification not performed in this laboratory, referred to another laboratory	0	1	4
Total:			4

IDENTIFICATION METHOD

Method	Positive
Germ tube test	1
Urea hydrolysis	1

Sample S003 Identification tests:
MALDI-TOF



Aspergillus terreus

IDENTIFICATION TESTS: MALDI-TOF

Method	Result	Score / Probability %	Score / Probability % count
MALDI Biotyper, Bruker	Aspergillus terreus	≥2	6
		≥1.7..<2	6
VITEK MS, bioMérieux	Aspergillus terreus	99,9 %	7
Total:			19

MORPHOLOGICAL FEATURES

Feature	Negative	Positive
Chlamydospores	-	2
Conidia	-	22
Conidiophores	-	22
Hyphae	-	16
Hülle cells	1	1
Microconidia	-	2
Phialides	-	10
Sporangiospores	-	1

Report Info**PARTICIPANTS**

Altogether 52 laboratories from 19 countries participated in this EQA round.

REPORT INFO

On the front page you can see summaries of overall success rate and sample specific success rates which have been calculated from the scores. The reported results and the scores are presented in the same report but in separate tables.

In general, the expected results are marked with green color. Accepted results may also be indicated with yellow color. Laboratory's own results are indicated with a black radio button . In the participant specific report there is also a laboratory specific scoring table for each sample, where you can find your own result and the scores given.

If you have not reported results you will get a note: "You have not responded in time, only global report is available".

For information on report interpretation and performance evaluation, please see the "EQAS Interpretation guidelines" in LabScala User instructions. In case you have any questions regarding the reports, please contact the EQA Coordinator.

SCORING

The results in the "Report to the clinician" part can be scored when at least 60% of the participants have reported the correct/expected result and when there are at least three reported results. The report includes a sample specific scoring summary.

Laboratory's scores have been converted to percentage (own success rate, % from maximum scores) with a target at 100%. Own success rate is compared with the success rate of all results.

The following general rules are applied:

4 points is reached by reporting the expected result

1-3 points is given to results that are partly correct/insufficient regarding the expected finding

0 points is given for an incorrect/false result

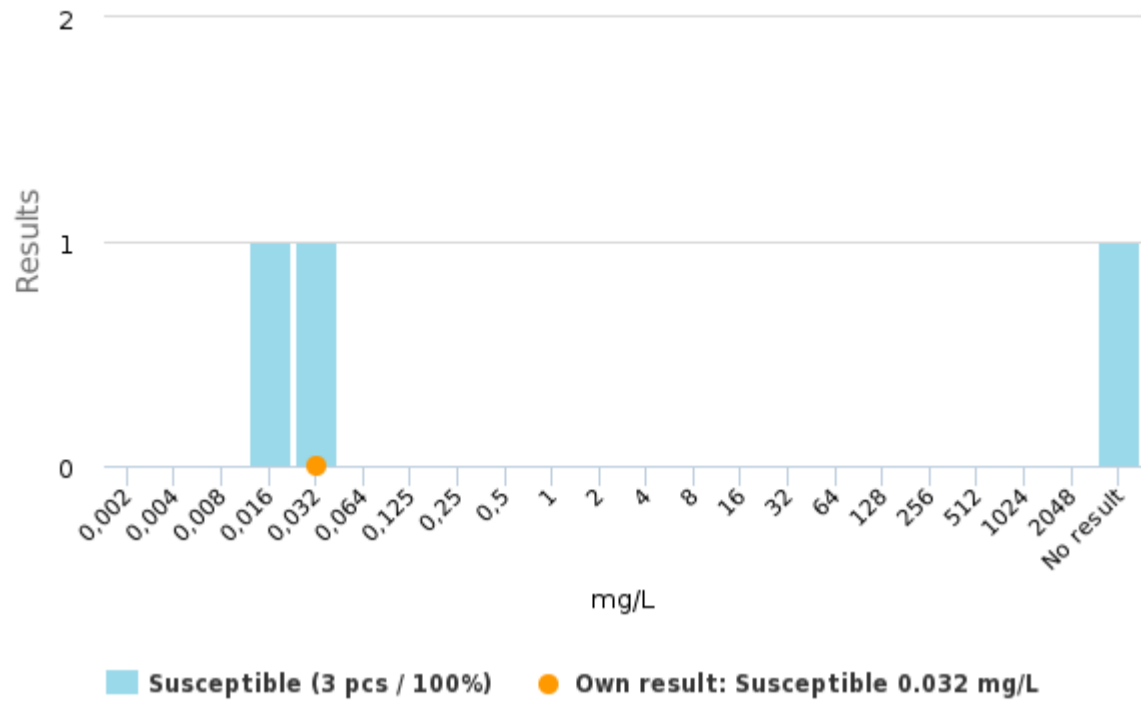
Sample S001

Candida dubliniensis

Antimicrobial agent	MIC method	MIC						n
		Own result (mg/L)	Mo (mg/L)	S	I	R	No interpretation	
Amphotericin B	bioMerieux, E-test	-	0.125	13 (100%)	0 (0%)	0 (0%)	0 (0%)	13
	bioMerieux, Vitek	-	0.25	7 (100%)	0 (0%)	0 (0%)	0 (0%)	7
	Liofilchem, Integral system Yeast Plus	0.032 ●	-	3 (100%) ●	0 (0%)	0 (0%)	0 (0%)	3
	Bio-Rad, Fungitest	-	-	1 (50%)	1 (50%)	0 (0%)	0 (0%)	2
	Thermo Scientific, Sensititre YeastOne	-	0.5	6 (86%)	0 (0%)	0 (0%)	1 (14%)	7
	Merlin, Micronaut	-	0.125	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1
	All				31 (94%)	1 (3%)	0 (0%)	1 (3%)
Anidulafungin	bioMerieux, E-test	-	0.016	8 (67%)	0 (0%)	0 (0%)	4 (33%)	12
	bioMerieux, ATB Fungus	-	0.002	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
	Liofilchem, Integral system Yeast Plus	0.016 ●	0.016	0 (0%)	0 (0%)	0 (0%)	1 (100%) ●	1
	Thermo Scientific, Sensititre YeastOne	-	0.125	1 (14%)	0 (0%)	1 (14%)	5 (71%)	7
	Merlin, Micronaut	-	0.032	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
	All				9 (41%)	0 (0%)	1 (5%)	12 (55%)
Caspofungin	bioMerieux, E-test	0.125 ●	0.125	2 (40%)	0 (0%)	0 (0%)	3 (60%) ●	5
	bioMerieux, Vitek	-	-	4 (100%)	0 (0%)	0 (0%)	0 (0%)	4
	Thermo Scientific, Sensititre YeastOne	-	-	1 (17%)	0 (0%)	0 (0%)	5 (83%)	6
	Merlin, Micronaut	-	0.125	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
	All				7 (44%)	0 (0%)	0 (0%)	9 (56%)
Fluconazole	bioMerieux, E-test	32 ●	32	0 (0%)	1 (7%)	14 (93%) ●	0 (0%)	15
	bioMerieux, Vitek	-	-	0 (0%)	0 (0%)	6 (100%)	0 (0%)	6
	Liofilchem, Integral system Yeast Plus	-	-	0 (0%)	0 (0%)	2 (100%)	0 (0%)	2
	Bio-Rad, Fungitest	-	-	1 (50%)	1 (50%)	0 (0%)	0 (0%)	2
	Thermo Scientific, Sensititre YeastOne	-	16	0 (0%)	0 (0%)	7 (88%)	1 (13%)	8
	All				1 (3%)	2 (6%)	29 (88%)	1 (3%)
Micafungin	bioMerieux, E-test	-	0.016	4 (50%)	0 (0%)	1 (13%)	3 (38%)	8
	bioMerieux, Vitek	-	0.064	3 (100%)	0 (0%)	0 (0%)	0 (0%)	3
	Liofilchem, Integral system Yeast Plus	0.016 ●	0.016	0 (0%)	0 (0%)	0 (0%)	1 (100%) ●	1
	Thermo Scientific, Sensititre YeastOne	-	0.032	0 (0%)	0 (0%)	0 (0%)	5 (100%)	5
	Merlin, Micronaut	-	0.032	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
	All				7 (39%)	0 (0%)	1 (6%)	10 (56%)
Posaconazole	bioMerieux, E-test	0.25 ●	-	1 (17%)	0 (0%)	5 (83%) ●	0 (0%)	6
	Thermo Scientific, Sensititre YeastOne	-	0.25	0 (0%)	0 (0%)	7 (88%)	1 (13%)	8
	Merlin, Micronaut	-	0.016	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1
	All			2 (13%)	0 (0%)	12 (80%)	1 (7%)	15
Voriconazole	bioMerieux, E-test	0.25 ●	0.125	5 (45%)	4 (36%) ●	2 (18%)	0 (0%)	11
	bioMerieux, Vitek	-	0.25	4 (44%)	3 (33%)	2 (22%)	0 (0%)	9
	Liofilchem, Integral system Yeast Plus	-	-	2 (100%)	0 (0%)	0 (0%)	0 (0%)	2
	Thermo Scientific, Sensititre YeastOne	-	-	4 (50%)	3 (38%)	0 (0%)	1 (13%)	8
	Merlin, Micronaut	-	0.016	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1
	All				16 (52%)	10 (32%)	4 (13%)	1 (3%)

Sample S001 | Amphotericin B

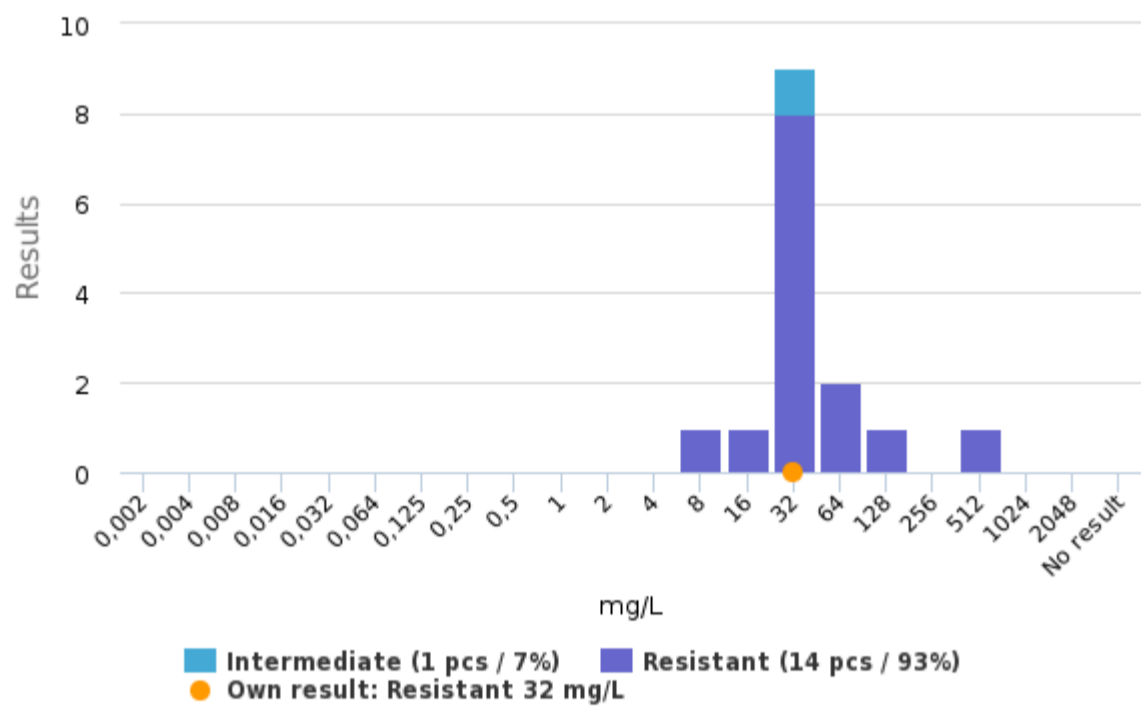
Liofilchem, Integral system Yeast Plus



	Mo	min	max	n
Amphotericin B	-	0.016	4096	3

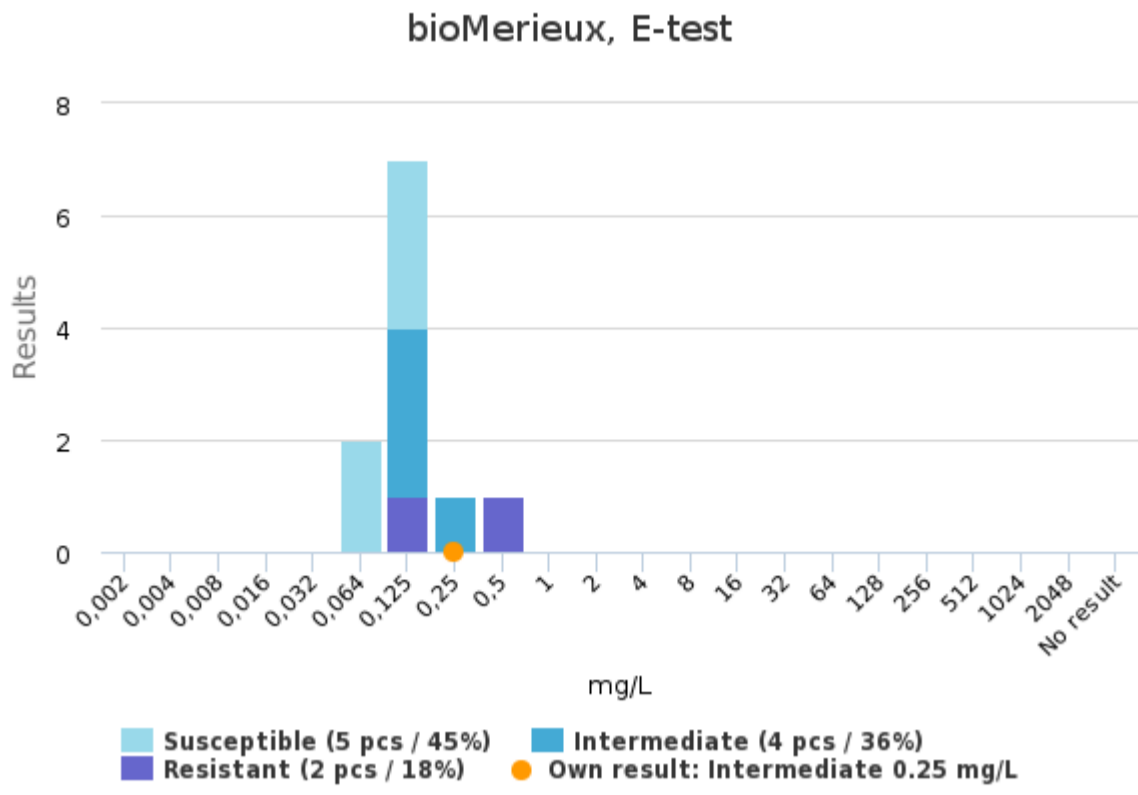
Sample S001 | Fluconazole

bioMerieux, E-test



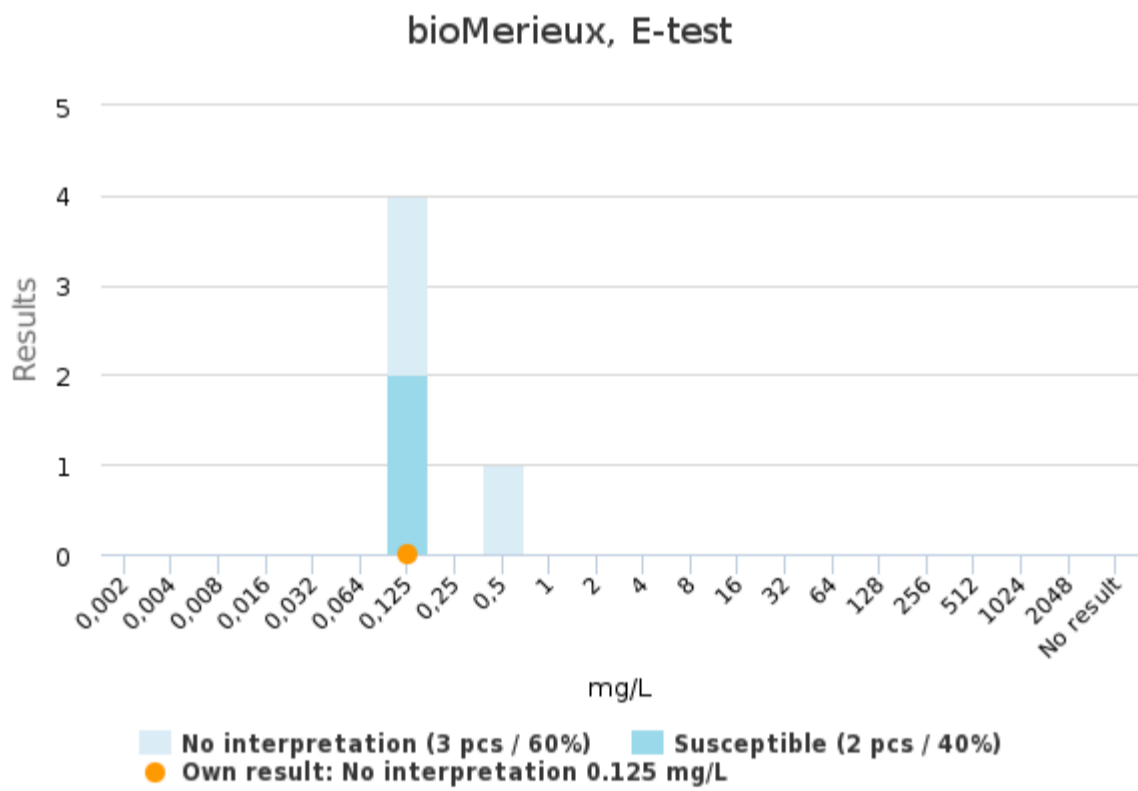
	Mo	min	max	n
Fluconazole	32	8	512	15

Sample S001 | Voriconazole



	Mo	min	max	n
Voriconazole	0.125	0.064	0.5	11

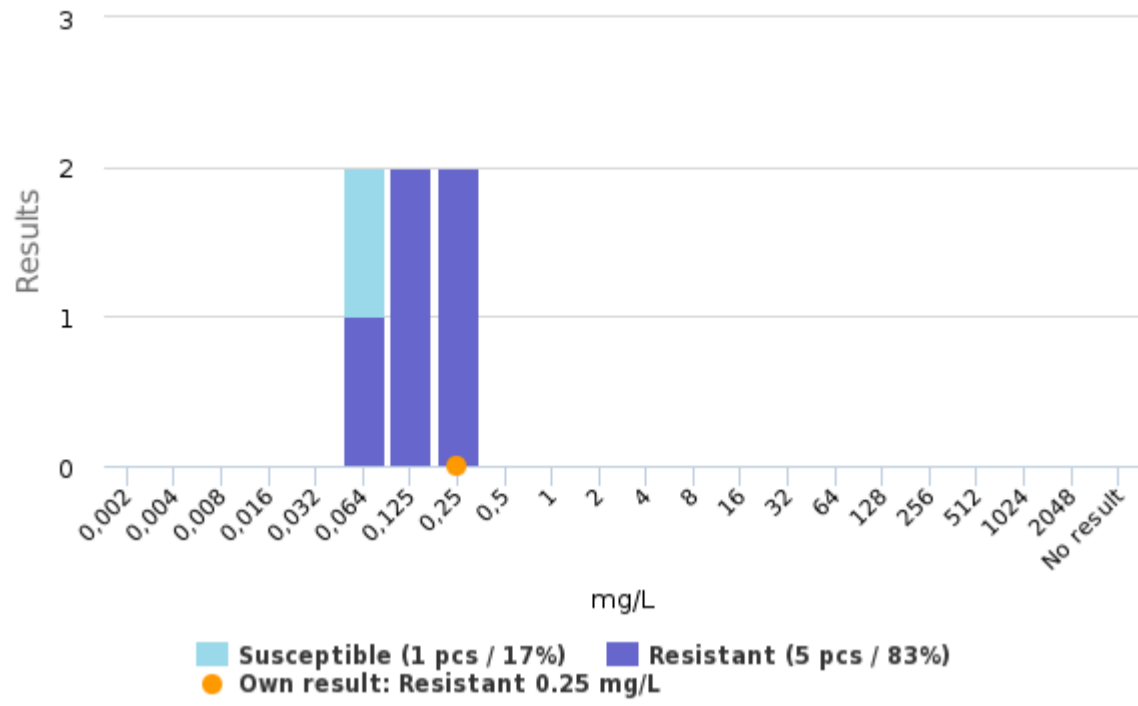
Sample S001 | Caspofungin



	Mo	min	max	n
Caspofungin	0.125	0.125	0.5	5

Sample S001 | Posaconazole

bioMerieux, E-test



	Mo	min	max	n
Posaconazole	-	0.064	0.25	6

Report info

Participants

Altogether 52 laboratories from 19 countries participated in this EQA round.

Report info

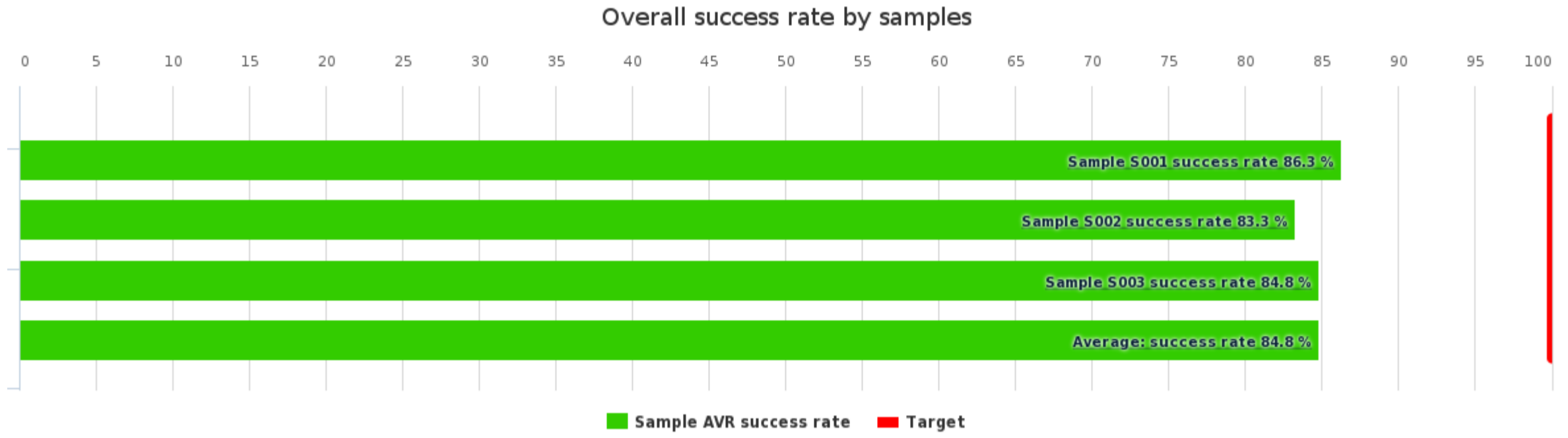
The antimicrobial susceptibility testing results are shown in laboratory specific summary tables and histograms. Histograms are drawn for each antimicrobial agent if the laboratory's result is included in a group of at least two results. By "group" is meant results which are obtained with the same method. Laboratory's own results are indicated with a black radio button in the table and an orange dot in the histograms. Mode (Mo) is used as a reference value.

If you have not reported antimicrobial susceptibility testing results you will get a note: "You have not reported antimicrobial susceptibility results, only global report is available." For information on report interpretation and performance evaluation, please see the "EQAS Interpretation guidelines" in LabScala User instructions. In case you have any questions regarding the reports, please contact the EQA Coordinator.

GLOBAL REPORT

	No of participants	No of responded participants	Response percentage
Fungal culture, March, 1-2023	52	51	98.1 %

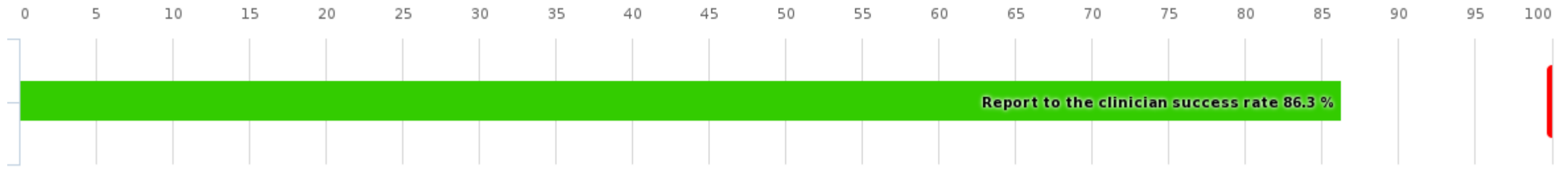
Summary



Summary	AVR success rate
Sample S001	86.3 %
Sample S002	83.3 %
Sample S003	84.8 %
Average:	84.8 %

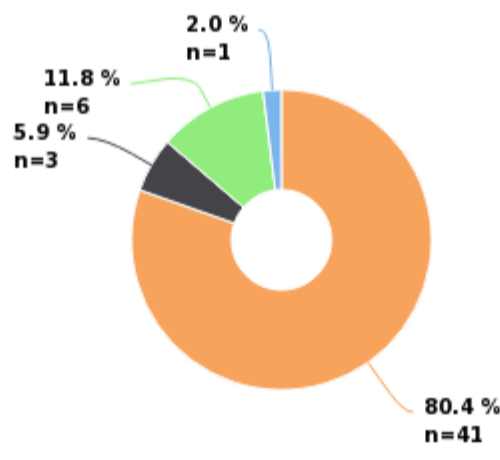
Sample S001 | Candida dubliniensis

Sample S001 success rate



Sample S001 results	Responded	AVR success rate	Count
	Report to the clinician	86.3 %	51
	Identification method	-	9
	Identification test kits and analyzers	-	9
	Identification tests: MALDI-TOF	-	40
	Morphological features	-	27
	Total:	86.3 %	308

Sample S001 Report to the clinician



■ Candida dubliniensis
 ■ Candida sp.
 ■ Candida albicans
■ Trichophyton sp.

REPORT TO THE CLINICIAN

Finding	Finding count	Referred	Not referred	AVR success rate
Candida dubliniensis	41	7	34	
Candida sp.	3		3	
Candida albicans	6		6	
Trichophyton sp.	1		1	
Total:	51			86.3 %

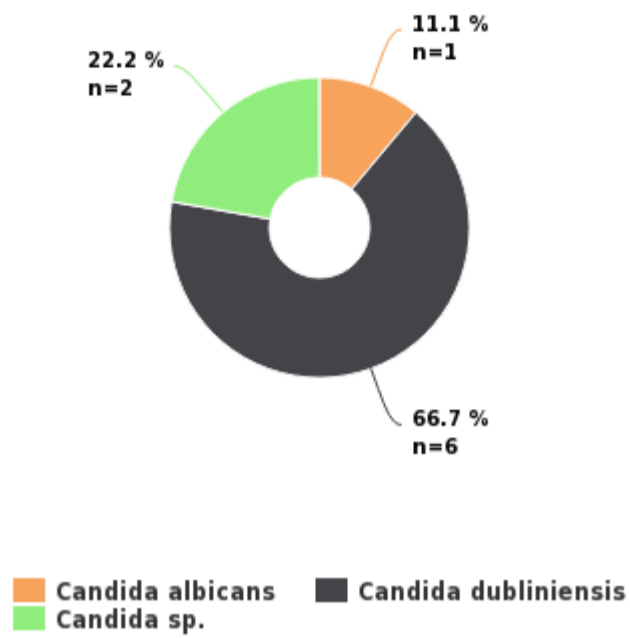
SCORING SUMMARY

Finding	Finding score	Max score
Candida dubliniensis	4	4
Candida sp.	2	4
Candida albicans	1	4
Trichophyton sp.	0	4
Total:		4

IDENTIFICATION METHOD

Method	Negative	Positive
Chrom-agar: C. albicans	-	6
Germ tube test	-	2
Urea hydrolysis	1	-

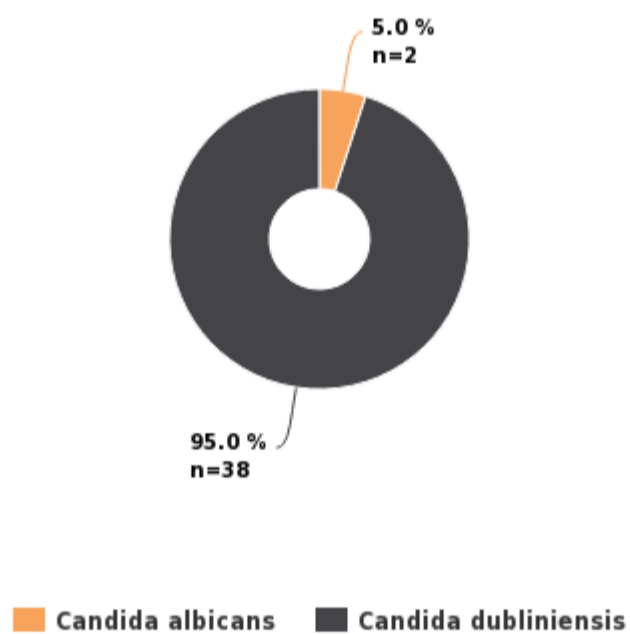
Sample S001 Identification test kits and analyzers



IDENTIFICATION TEST KITS AND ANALYZERS

Method	Result	Profile number	Profile number count
API Candida, bioMérieux	Candida albicans	6012	1
VITEK 2 YST	Candida dubliniensis	4103546061305571	1
		4102544061305170	1
		4102544061104170	1
		4102144061305170	1
		4002144061305170	1
	Candida sp.	4012144061105170	1
VITEK YST, bioMérieux	Candida dubliniensis	4102144061115070	1
	Candida sp.	4102144061303170	1
Total:			9

Sample S001 Identification tests: MALDI-TOF



IDENTIFICATION TESTS: MALDI-TOF

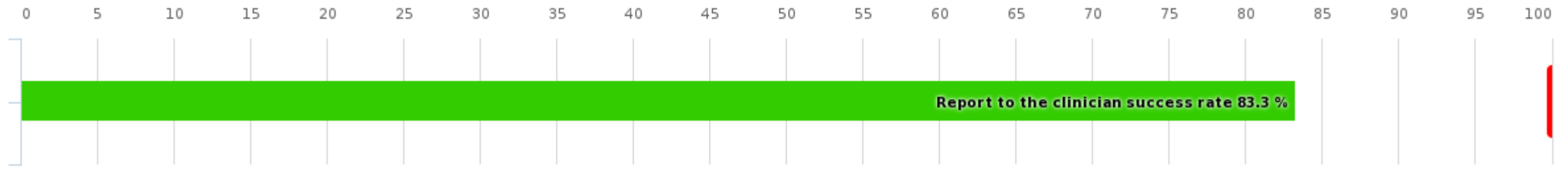
Method	Result	Score / Probability %	Score / Probability % count
MALDI Biotyper, Bruker	Candida dubliniensis	≥2	15
		≥1.7..<2	8
VITEK MS, bioMérieux	Candida albicans	99,8 %	1
		N/A	1
	Candida dubliniensis	99,9 %	12
		99 %	1
		N/A	2
Total:			40

MORPHOLOGICAL FEATURES

Feature	Negative	Positive
Blastospores	-	8
Chlamyospores	-	8
Hyphae	-	1
Microconidia	-	1
Muroid capsules	1	-
Pseudohyphae	-	8

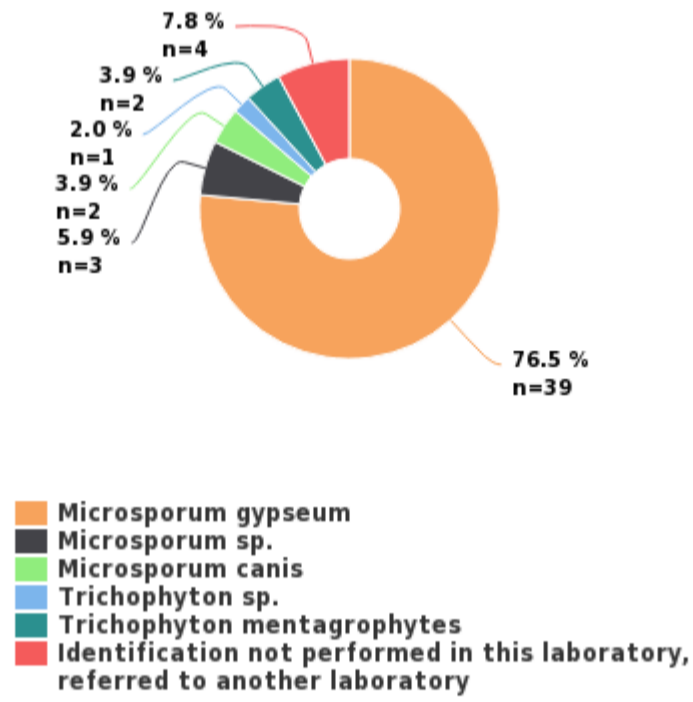
Sample S002 | Microsporium gypseum

Sample S002 success rate



Sample S002 results	Responded	AVR success rate	Count
	Report to the clinician	83.3 %	51
	Identification method	-	2
	Identification tests: NAT	-	1
	Identification tests: MALDI-TOF	-	18
	Morphological features	-	79
	Total:	83.3 %	277

Sample S002 Report to the clinician



REPORT TO THE CLINICIAN

Finding	Finding count	Referred	Not referred	AVR success rate
Microsporium gypseum	39	1	38	
Microsporium sp.	3	2	1	
Microsporium canis	2		2	
Trichophyton sp.	1		1	
Trichophyton mentagrophytes	2	1	1	
Identification not performed in this laboratory, referred to another laboratory	4	4		
Total:	51			83.3 %

SCORING SUMMARY

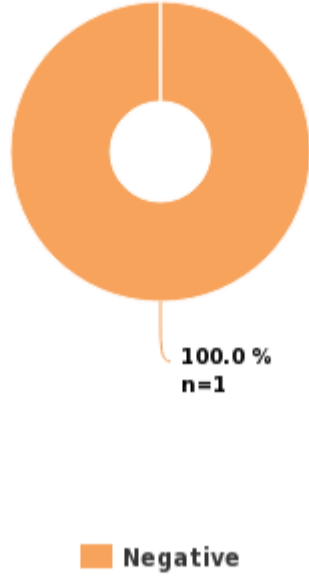
Finding	Finding score	Referred	Max score
Microsporium gypseum	4		4
Microsporium sp.	2	1	4
Microsporium canis	1		4
Trichophyton sp.	0		4
Trichophyton mentagrophytes	0		4
Identification not performed in this laboratory, referred to another laboratory	0	1	4
Total:			4

IDENTIFICATION METHOD

Method	Positive

Germ tube test	1
Urea hydrolysis	1

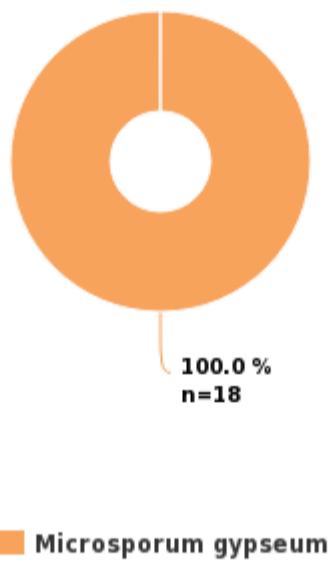
Sample S002 Identification tests: NAT



IDENTIFICATION TESTS: NAT

Method	Result	Result count
DermaGenius 2.0, PathoNostics	Negative	1
Total:		1

Sample S002 Identification tests:
MALDI-TOF



IDENTIFICATION TESTS: MALDI-TOF

Method	Result	Score / Probability %	Score / Probability % count
MALDI Biotyper, Bruker	Microsporum gypseum	≥2	2
		≥1.7..<2	8
VITEK MS, bioMérieux	Microsporum gypseum	99,9 %	7
		99 %	1
Total:			18

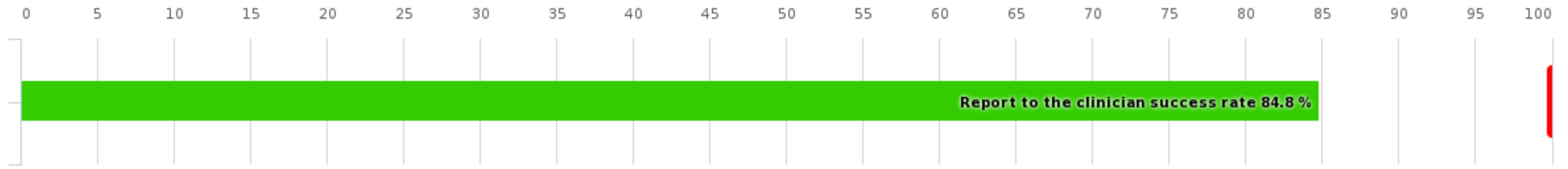
MORPHOLOGICAL FEATURES

Feature	Positive
Ascospores	1
Chlamydoconidia	1
Conidia	2
Conidiophores	1
Hyphae	19
Macroconidia	34

Microconidia	21
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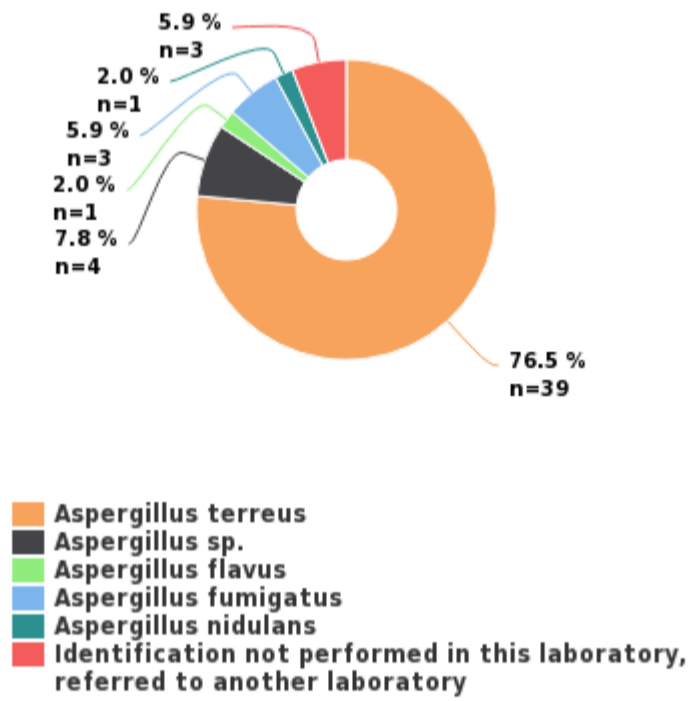
Sample S003 | Aspergillus terreus

Sample S003 success rate



Sample S003 results	Responded	AVR success rate	Count
	Report to the clinician	84.8 %	51
	Identification method	-	2
	Identification tests: MALDI-TOF	-	19
	Morphological features	-	77
	Total:	84.8 %	273

Sample S003 Report to the clinician



REPORT TO THE CLINICIAN

Finding	Finding count	Referred	Not referred	AVR success rate
Aspergillus terreus	39	3	36	
Aspergillus sp.	4		4	
Aspergillus flavus	1		1	
Aspergillus fumigatus	3	1	2	
Aspergillus nidulans	1		1	
Identification not performed in this laboratory, referred to another laboratory	3	3		
Total:	51			84.8 %

SCORING SUMMARY

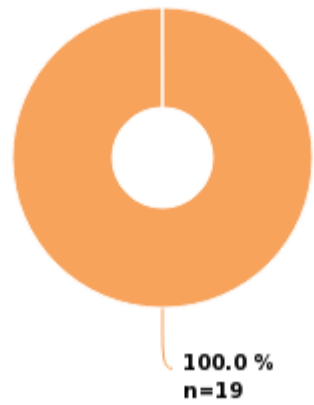
Finding	Finding score	Referred	Max score
Aspergillus terreus	4		4
Aspergillus sp.	2		4
Aspergillus flavus	1		4
Aspergillus fumigatus	1	1	4
Aspergillus nidulans	1		4
Identification not performed in this laboratory, referred to another laboratory	0	1	4
Total:			4

IDENTIFICATION METHOD

Method	Positive
Germ tube test	1

Urea hydrolysis	1
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Sample S003 Identification tests:
MALDI-TOF



■ *Aspergillus terreus*

IDENTIFICATION TESTS: MALDI-TOF

Method	Result	Score / Probability %	Score / Probability % count
MALDI Biotyper, Bruker	<i>Aspergillus terreus</i>	≥2	6
		≥1.7..<2	6
VITEK MS, bioMérieux	<i>Aspergillus terreus</i>	99,9 %	7
Total:			19

MORPHOLOGICAL FEATURES

Feature	Negative	Positive
Chlamydospores	-	2
Conidia	-	22
Conidiophores	-	22
Hyphae	-	16
Hülle cells	1	1
Microconidia	-	2
Phialides	-	10
Sporangiospores	-	1

Report Info

PARTICIPANTS

Altogether 52 laboratories from 19 countries participated in this EQA round.

REPORT INFO

On the front page you can see summaries of overall success rate and sample specific success rates which have been calculated from the scores. The reported results and the scores are presented in the same report but in separate tables.

In general, the expected results are marked with green color. Accepted results may also be indicated with yellow color. Laboratory's own results are indicated with a black radio button . In the participant specific report there is also a laboratory specific scoring table for each sample, where you can find your own result and the scores given.

If you have not reported results you will get a note: "You have not responded in time, only global report is available".

For information on report interpretation and performance evaluation, please see the "EQAS Interpretation guidelines" in LabScala User instructions. In case you have any questions regarding the reports, please contact the EQA Coordinator.

SCORING

The results in the "Report to the clinician" part can be scored when at least 60% of the participants have reported the correct/expected result and when there are at least three reported results. The report includes a sample specific scoring summary.

Laboratory's scores have been converted to percentage (own success rate, % from maximum scores) with a target at 100%. Own success rate is compared with the success rate of all results.

The following general rules are applied:

4 points is reached by reporting the expected result

1-3 points is given to results that are partly correct/insufficient regarding the expected finding

0 points is given for an incorrect/false result

External Quality Assessment Scheme

Fungal culture Round 1, 2023

Specimens

Samples of this EQA round were lyophilized fungal strains in culture loops. The sample lots were tested in an accredited Finnish reference laboratory. Based on the quality controls conducted by the sample material manufacturer, pre-testing and the results obtained in the round, the sample lots are to be considered as homogeneous, stable and suitable for external quality assessment. The materials were sent without temperature control packaging.

The use of samples only for external quality assessment. The consent of Labquality must be requested for the use of the microbial strains contained in the samples for other purposes.

The content of the samples was as follows:

Sample S001 (LQ765123011)

Expected finding: *Candida dubliniensis* C060702
Type of specimen: Yeast isolated from blood culture.
Clinical details: A 54-year-old man. Leukemia. Fever.

Sample S002 (LQ765123012)

Expected finding: *Microsporum gypseum* C060803
Type of specimen: A skin rash specimen.
Clinical details: A 7-year-old girl. A skin rash. Tinea corporis.

Sample S003 (LQ765123013)

Expected finding: *Aspergillus terreus* DAOM 2220009
Type of specimen: Pleural fluid.
Clinical details: A 68-year-old woman. COPD.

Report info

Please see the description of the data analysis on the last page of the laboratory-specific reports and global reports. It is important to read the Final report first, because it contains important information of the samples and results in each round.

Comments – Expert

Sample S001: *Candida dubliniensis*

Candida dubliniensis were grown from the blood culture collected from patient suffering leucaemia. Altogether 80% (41/51) of the participating laboratories reported the finding correctly on species level as *C. dubliniensis*. Three participants reported the finding on genus level as *Candida* sp. and up to six reported this isolate as *C. albicans*.

C. albicans is a typical misidentification in the case of *C. dubliniensis*. These two *Candida* species are closely related to each other and thus have many similar characteristics that challenge the laboratory worker. On a chromogenic agar, they both grow as greenish colony, although there are differences in darkness of color of the colony between the species. However, the color shades of the colonies of different strains also vary, and thus the interpretation cannot be based only on the colony's color. The germ tube test doesn't help either; both are positive in the test. Moreover, the traditional biochemical tests also make it difficult to distinguish between these species.

2023-04-20

FINAL REPORT

Product no. 5260

Subcontracting: Sample pretesting

Samples sent	2023-02-28
Round closed	2023-04-03
Expected results	2023-04-06
Final report	2023-04-20

Request for correction

Typing errors in laboratory's result forms are on laboratory's responsibility. Labquality accepts responsibility only for result processing. Requests must be notified by writing within three weeks from the date of this letter.

Authorized by

EQA Coordinator
Elina Tuovinen
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C. dubliniensis grows on CHROMagar Candida plate as dark green color (figure 1). Although the *C. dubliniensis* shade of the colony is usually slightly darker green compared to the growth of *C. albicans* species (light green to medium green), the color reaction alone is not sufficient to distinguish these species. Previously, some laboratories used special latex-tests to differentiate these two species from each other. Currently, many laboratories use mass spectrometry based method, but it is important to remember that MALDI-TOF is also vulnerable for misidentifications especially in the case of species which are close to each other.

In total, 40 participants (40/51, ca. 78%) reported identification result with MALDI-TOF instrument (Bruker MALDI-TOF, VITEK MS) and nine participants with biochemical reactions based on colorimetric identification. Previously, when *C. dubliniensis* was part of the round (1, 2020), 25 participants (25/44, ca. 57%) used MALDI-TOF for the identification. Although, MALDI-TOF is robust method and helps a lot for the identification process, it can also make mistakes. In this round, two laboratories reported *C. albicans* result based on the MALDI-TOF (Vitek MS) result. MALDI-TOF identification is based on protein profiles and thus closely related species can also resemble each other in MALDI-TOF spectra. Thus, it is important to use correct (validated) agar for the cultivation of fungi prior to MALDI-TOF analysis. Mainly, blood agar is most recommended (no SDA nor CHROMagar). In this round, we did not ask what agar was used.

Figure. 1. *C. dubliniensis* (left) and *C. albicans* (right) on CHROMagar Candida. Both grow as green color.



Sample S001: Antimicrobial susceptibility testing

A total of 38 participants took part in the antifungal susceptibility testing for this yeast, some of whom used two different test methods. In total, 19 laboratories had used Etest for sensitivity testing, ten had used automatic VITEK system, and eight had used Sensititre system. All used methods are listed in the AST report. The reported MIC values corresponded well to each other regardless of the testing method and that can be considered as a good result. However, some differences in SIR interpretations were noticed. EUCAST guideline does not include species-specific breakpoints for anidulafungin nor caspofungin. Otherwise, the breakpoints can be found. The strain was resistant to azole antifungals. Otherwise, the MIC values were low / interpretable as sensitive.

Table 1. The MIC results reported by two Finnish reference laboratories of the strain *C. dubliniensis*. Both laboratories implement the EUCAST guideline (version 10.0, valid from 2nd April 2020) and used the bioMérieux Etest.

Antimicrobial agent	Ref. Lab 1		Ref. Lab 2	
	MIC (mg/L)	SIR	MIC (mg/L)	SIR
Amphotericin B	0.064	S	0.125	S
Fluconazole	16	R	32	R
Itraconazole	NA	NA	0.38	R
Voriconazole	0.125	I	0.125	I
Caspofungin	0.19	NA	0.19	NA
Anidulafungin	0.008	NA	0.016	S
Mikafungin	NA	NA	0.016	S
Posaconazole	0.19	R	0.19	R

Sample S002: *Microsporium gypseum*

M. gypseum (currently *Nannizzia gypsea*) were grown from skin rash sample (tinea corporis). *M. gypseum* is geophilic species and it can cause skin and scalp infections worldwide. In all, 76% (39/51) of the laboratories correctly reported *M. gypseum*. Three participants reported their finding on genus level. In addition, two reported wrong species from correct genus. Some *Trichophyton* findings were also reported.

Many laboratories still identify dermatophytes by analyzing fungi's macro- and micromorphology structures, but MALDI-TOF is coming to help the identification process also with dermatophytes. The visual identification of dermatophyte is quite convenient if there are enough specific structures and typical colony morphology as was the case with *M. gypseum*. *M. gypseum* grows rapidly and the color of the growth is light yellowish brown and reverse is yellow, but sometimes there may be pinkish tinges (figure 2). The colonies are powdery, and the growth is radial, and the colony resembles stars. There are macroconidia in clusters, and they are 3-6(-8)- celled, fusiform-shaped with size of 25-60 x 8.5-15 μm (figure 3). Microconidia are tear-shaped, sessile, or stalked (2.5-8 x 2-3 μm). It is possible to differ *M. gypseum* from *Trichophyton* with these properties. Also, MALDI-TOF-based identifications were success; no misidentification were reported.

Figure 2. *M. gypseum* on potato-dextrose agar (after 5 days), top left, reverse right.

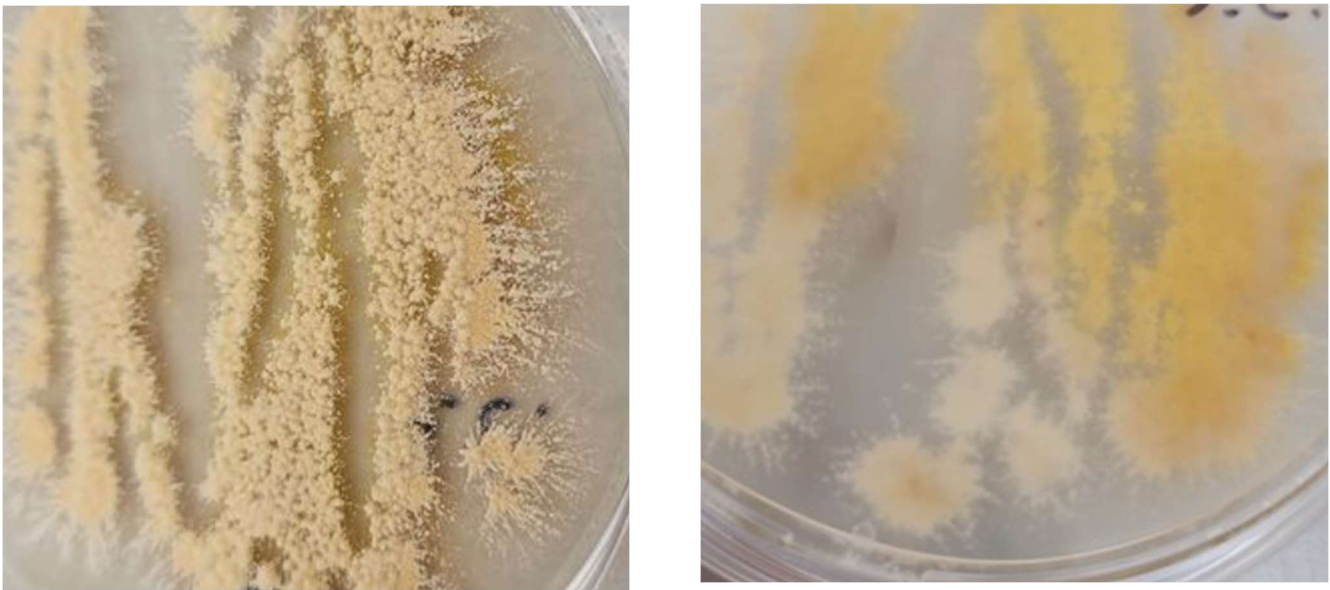
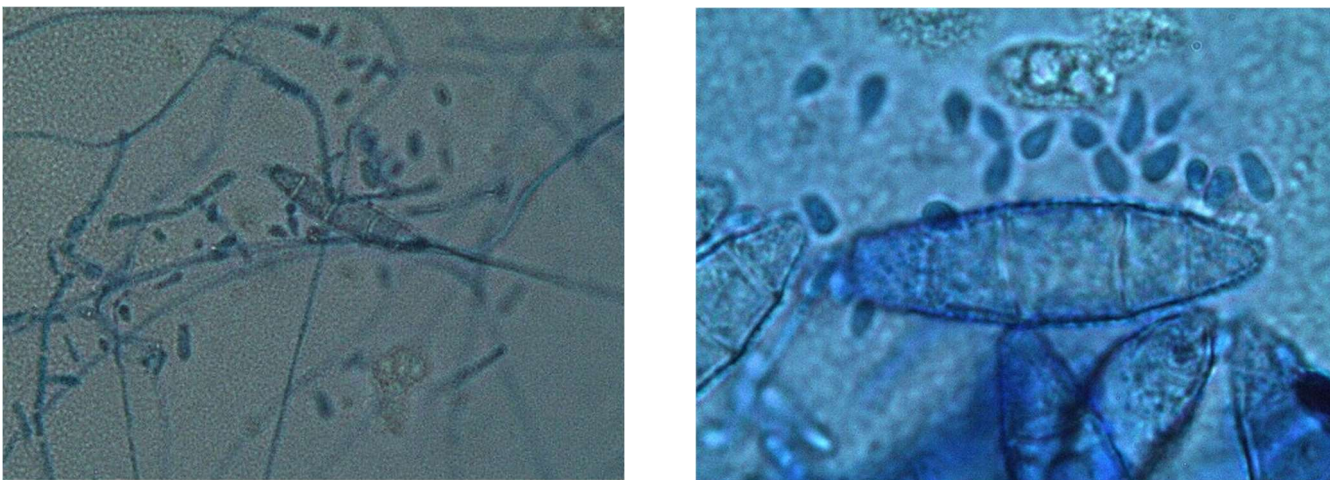


Figure 3. Typical microscopical structures of *M. gypseum* (400x and 1000x magnitude).



Sample S003: *Aspergillus terreus*

Aspergillus terreus were grown from pleural fluid sample. *A. terreus* can cause for example bronchopulmonary infections. In all, 76% (39/51) of the laboratories reported correctly on species level. In addition, four participants gave the correct answer on genus level (*Aspergillus* sp.). A few incorrect *Aspergillus* species were also reported, *A. fumigatus* was the most common misidentification.

Aspergillus terreus grows typically as yellowish brown or cinnamon brown colonies. In contrast, *A. fumigatus*, *A. flavus*, and *A. nidulans* have green colonies. The conidiophores are smooth-walled, and the vesicles (10-20 µm) are subspherical. Conidiogenous cells are biseriates, and metulae are as long as the phialides. Conidia are also smooth-walled, spherical or slightly ellipsoidal (1.5-2.5 µm).

Figure 4. *A. terreus* on Sabouraud-dextrose agar (after 11 days), top left, reverse right.

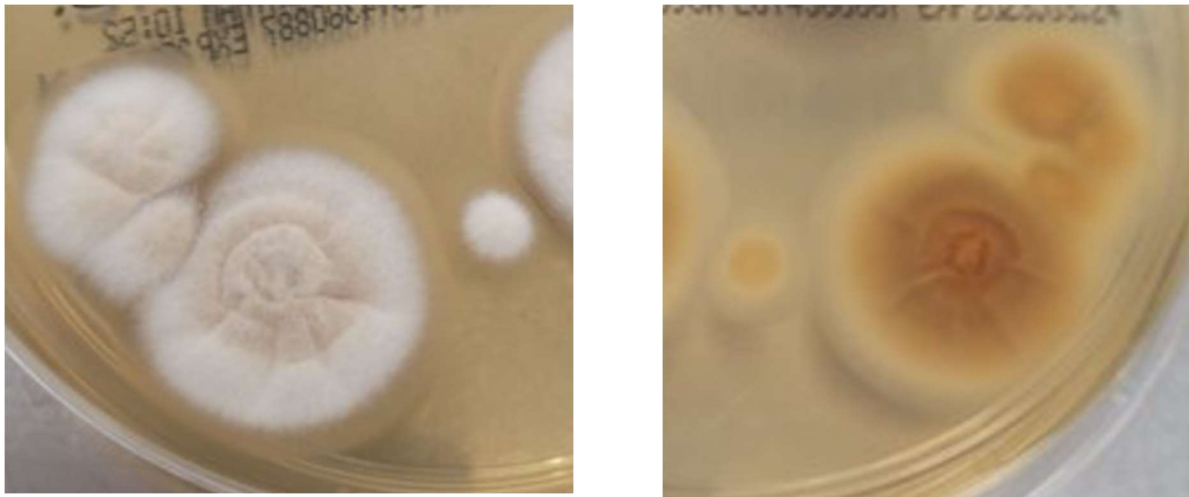
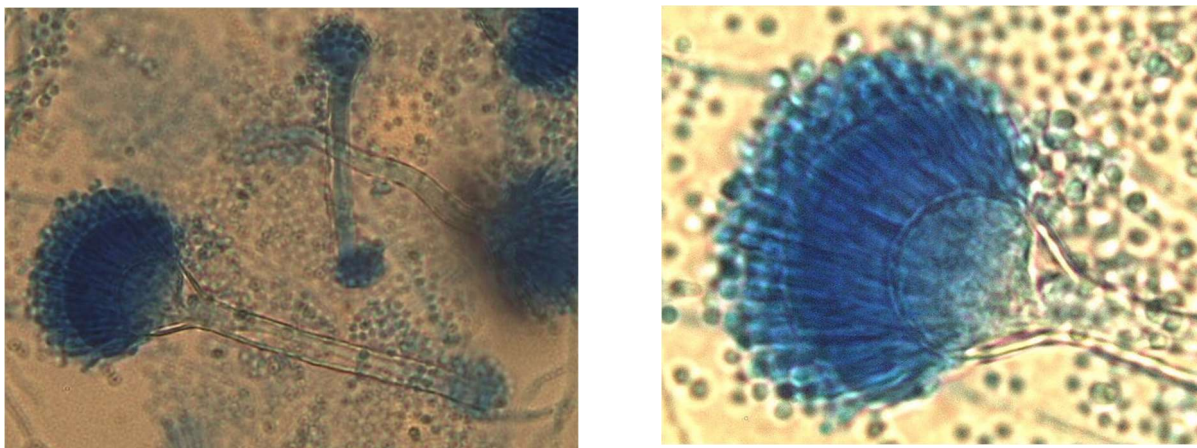


Figure 5. Typical microscopical structures of *A. terreus* (400x and 1000x magnitude).



Exceptions in scoring

No exceptions.

End of report

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