

Sample A***Penicillium chrysogenum***

Score: *P. chrysogenum* 35%, *Penicillium* species: 56%
This time the sample is not scored.

This sample contained *Penicillium chrysogenum* (also known as *Penicillium notatum*), the source for the drug penicillin. The name *Penicillium* comes from the resemblance of the conidiophore of the fungus to a paintbrush-- penicillus is the Latin word for paintbrush (TomVolk Fungi.net). *Penicillium spp.* are widespread and are found in soil, decaying vegetation and the air.

Pathogenicity:

Penicillium spp. other than *Penicillium marneffeii* are commonly considered as contaminants but may cause infections, particularly in immunocompromised hosts. *Penicillium* has been isolated from patients with keratitis, endophthalmitis, otomycosis, necrotizing esophagitis, pneumonia, endocarditis, peritonitis and urinary tract infections. Most *Penicillium* infections are encountered in immunosuppressed hosts. Corneal infections are usually post-traumatic.

The genus *Penicillium* has several species. The most common ones include *Penicillium chrysogenum*, *Penicillium citrinum*, *Penicillium janthinellum*, *Penicillium marneffeii* and *Penicillium purpurogenum*.

Distribution:

Worldwide.

Lab diagnosis:

1. Macroscopic morphology on Sabouraud agar at 30°C: yellow-green or pale green-blue, exuding a bright yellow pigment into the medium; reverse yellow (Fig. 1).
2. Microscopic morphology : conidiophore smooth-walled; penicillin usually terverticillate (Fig. 3a-c); phialides flask-shaped; conidia smooth-walled (Fig. 2).

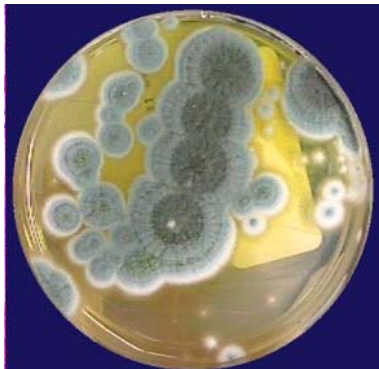


Fig. 1 Macroscopic morphology on Sabouraud agar (front)

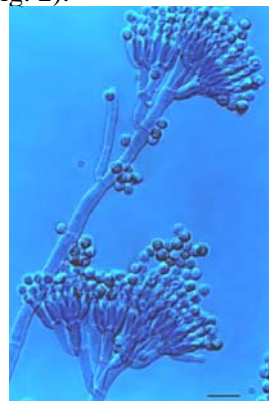


Fig. 2 Microscopic morphology



Fig. 3a
Monoverticillate



Fig. 3b
Biverticillate



Fig. 3c
Terverticillate

Difference between *Penicillium chrysogenum* and other species are shown below.

Strain	Macroscopic morphology	Microscopic morphology	Supplementary test(s)
<i>P. chrysogenum</i>	Yellow-green or pale green-blue, exuding bright yellow pigment into the medium; reverse yellow.	Conidiophore smooth-walled; penicilli usually terverticillate; phialides flask-shaped; conidia smooth-walled.	No or limited growth at 37°C
<i>P. expansum</i>	Dull green, brown exudate	Conidiophore smooth-walled; penicilli terverticillate; phialides closely packed and flask-shaped; conidia smooth-walled.	No growth at 37°C
<i>P. marneffe</i>	Green to purple, orange or red pigment into the agar.	Penicilli biverticillate but also monoverticillate; conidia smooth-walled.	At 37°C: colonies restricted, whitish, yeast like.

Sample B

Saccharomyces cerevisiae

Strain was previously part of QC-sending SKML 01-2006. Score at that time was 94%, now it is 88%.

Saccharomyces is a yeast commonly isolated from humans, mammals, birds, wine, beer, fruits, trees, plants, olives and soil. Also known as the "baker's" or "brewer's" yeast, *Saccharomyces cerevisiae* is used in food industry in production of various food stuffs, wines and beers.

Pathogenicity:

Intestinal colonization following ingestion of a *Saccharomyces* strain with diet is commonly observed. *Saccharomyces* spp. are now among the emerging causative agents of opportunistic mycoses in patients who are immunocompromised due to various reasons. Severe immunosuppression, prolonged hospitalization, prior antibiotic therapy and prosthetic cardiac valves are the major risk factors for developing infections due to *Saccharomyces*. Pneumonia, endocarditis, liver abscess, fungemia and sepsis due to *Saccharomyces cerevisiae* have so far been reported. Noteworthy, fungemia and aortic graft infection has been observed in an immunocompetent host as well. *Saccharomyces cerevisiae* has also been isolated from periodontal lesions of HIV-infected patients and from oral leukoplakia. Also, vaginitis due to *Saccharomyces cerevisiae* has been rarely reported.

Distribution:

Worldwide.

Lab diagnosis:

1. Macroscopic morphology on Sabouraud agar at 30°C: flat, smooth, moist, glistening or dull and cream to tannish cream in colour. (Fig. 4).
2. Microscopic morphology
Blastoconidia are unicellular, globose and ellipsoid to elongate in shape. Multilateral (multipolar) budding is typical. Pseudohyphae, if present, are rudimentary. Hyphae are absent (Fig. 5).



Fig. 4 Macroscopic morphology on Sabouraud agar

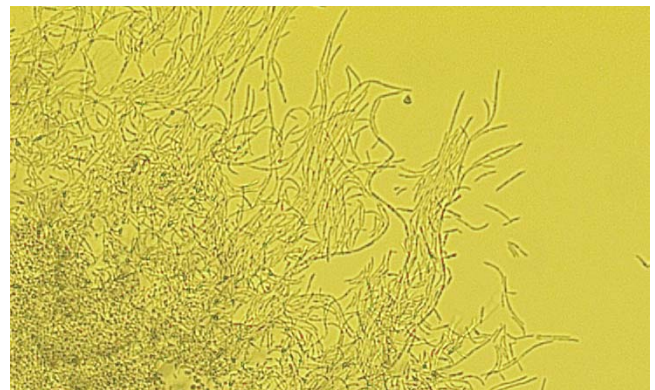


Fig. 5 Microscopic morphology on ricecream agar

Difference between *Saccharomyces cerevisiae* and other species are shown below.

Strain	Macroscopic morphology	Microscopic morphology	Supplementary test(s)
<i>S. cerevisiae</i>	Flat, smooth, moist, glistening or dull and cream to tannish cream in colour.	Blastoconidia unicellular, globose and ellipsoid to elongate. Multilateral (multipolar) budding. Pseudomycelium, if present, are rudimentary. Hyphae are absent.	Growth at 42°C: +,-
<i>Candida glabrata</i>	Cream colored, glossy and smooth	Pseudomycelium absent; budding unipolar	Growth at 42°C: +
<i>C. sphaerica</i>			
<i>C. guilliermondii</i>	White to cream colored, butyrous	Pseudomycelium may be present, radiating from the centre of masses of budding cells; hyphae not produced.	Growth at 42°C: +,-

Sample C

Scopulariopsis brevicaulis

Strain was part of SKML 2002-02 and 2004-02. The scores were 54% and 69% respectively. Now the score is 91%. This is an excellent improvement.

Scopulariopsis inhabits soil, plant material, feathers and insects.

Pathogenicity:

Scopulariopsis brevicaulis is an agent of onychomycosis and of opportunistic disease in immunocompromised patients. It has also been reported as the etiologic agent in a plantar infection and in granulomatous skin disease. Invasive manifestations include cases of endocarditis associated with prosthetic valves, fungal keratitis and posttraumatic fungal endophthalmitis.

Distribution:

Worldwide.

Lab diagnosis:

1. Macroscopic morphology on Sabouraud agar at 30°C: initially white, becoming buff and powdery to granular at maturity. Reverse is honey-colored to brownish (Fig. 6).
2. Microscopic morphology
Hyphae are septate and hyaline. Conidiophores terminate in groups of 2 to 4 annellophores in a scopula (broomlike structure, similar to a penicillus in the genus *Penicillium*). Anneloconidia are globose to ovoid, have a distinctly truncate base, are finely to coarsely roughened at maturity and hyaline to brown in colour (Fig. 7).



Fig. 6 Macroscopic morphology on Sabouraud agar



Fig. 7 Microscopic morphology

Difference between *Scopulariopsis brevicaulis* and other species are shown below.

Strain	Macroscopic morphology	Microscopic morphology	Supplementary test(s)
<i>S. brevicaulis</i>	White, becoming buff and powdery to granular; reverse honey-colored to brownish.	Conidiophores terminate in groups of 2 to 4 annellophores in a scopula. Anneloconidia globose to ovoid, have a distinctly truncate base, are finely to coarsely roughened at maturity and hyaline to brown in colour.	
<i>Scopulariopsis sp.</i>	White or dark grey to black, expanding or restricted.	Conidia smooth- or rough-walled.	

Sample D***Trichophyton soudanense***

Score is 35%_

Pathogenicity:

Trichophyton soudanense is an anthropophilic fungus which is a frequent cause of tinea capitis in Africa. Invaded hairs show an endothrix infection but do not fluoresce under Wood's ultra-violet light.

Distribution:

Mainly in Africa with occasional isolates from Europe, Brazil and U.S.A.

Lab diagnosis:

1. Macroscopic morphology on Sabouraud agar at 30°C: flat to folded, suede-like surface. Often there is a broad fringe of submerged growth. Surface mycelium and reverse pigment are characteristically a deep apricot-orange in colour (Fig. 8).
2. Microscopic morphology
Hyphae often show reflexive or right-angle branching (Fig. 9); this can be examined best by placing the agar directly under the microscope. Pyriform microconidia may occasionally be present and numerous chlamydoconidia are often found in older cultures.

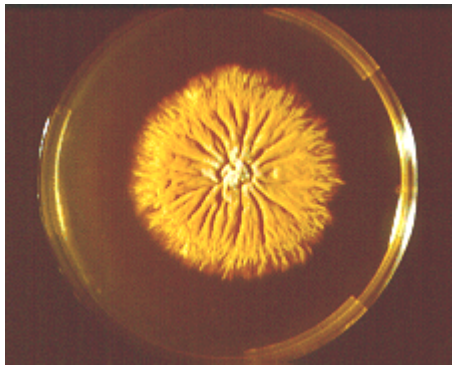


Fig. 8 Macroscopic morphology on Sabouraud agar

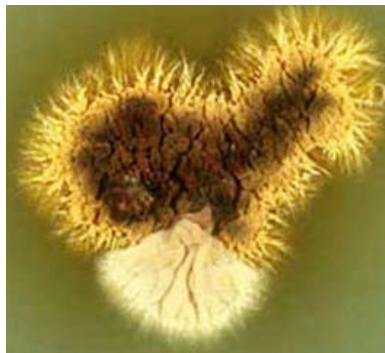


Fig. 9 Microscopic morphology

Difference between *Trichophyton soudanense* and other species are shown in subjoined table.

Strain	Macroscopic morphology	Microscopic morphology	Supplementary test(s)
<i>T. soudanense</i>	Flat to folded, suede-like surface, road fringe of submerged growth. Surface mycelium and reverse pigment are characteristically a deep apricot-orange in colour.	Reflexive or right-angle branching. Pyriform microconidia may occasionally be present, numerous chlamydoconidia often found in older cultures; macroconidia very rare.	
<i>T. erinacea</i>	Expanding, cottony or farinose; white; reverse bright citron yellow.	Macroconidia when present cylindrical to clavate; microconidia abundant, slender, clavate; arthroconidia common.	
<i>T. megninii</i> / <i>T. rubrum</i>	Fluffy to cottony; white; reverse wine-red to olive, sometimes yellow.	Macroconidia mostly absent; microconidia peg-shaped to pyriform> Occasionally only micro- or only macroconidia are present; cultures rarely sterile.	
<i>T. schoenleinii</i>	Growing rather slowly, waxy, later becoming velvety, folded, cerebriform and heaped with age; whitish to cream.	Macro- and microconidia usually absent; Antler-like hyphae with dichotomously branched swollen tips (favic chandeliers); chlamyospores abundant.	
<i>T. tonsurans</i>	Suede-like, radially or irregularly furrowed, white to grayish, yellowish or brownish-buff; reverse mahogany-red, yellow or brown.	Macroconidia, when present, cylindrical to cigar-shaped; microconidia abundance, variable in size; terminal and intercalary, swollen chlamyospores in abundance.	
<i>T. verrucosum</i>	Growing very slowly, heaped of button-like, glabrous later slightly velvety, cream-colored or grayish-white; reverse pale cream- or salmon colored.	Sporulation absent or reduced; macroconidia, when present, stringbean-shaped; microconidia, when present, ovoidal to pyriform; chlamyospores in chains common in fresh isolates.	
<i>Microsporium persicolor</i>	Powdery to fluffy, pale yellowish-buff to pinkish-buff; reverse ochraceous.	Macroconidia thin-walled, rough-walled at the tip, cigar shaped; microconidia in dense clusters; spiral hyphae present.	

Literature

1. de Hoog GS, Guarro J, Gené J, Figueras MJ. Atlas of clinical fungi. 2nd ed. Nederland: Centraal bureau voor schimmelcultures, 2000
2. Andreoni S., Farina C., Lombardi G. Medical mycology atlas. GRAFIK@rt srl – Paderno Dugnano, 2004
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6. <http://www.mycology.adelaide.edu.au/>

The macroscopic descriptions are according to the literature above. This may differ from your results that can depend on the composition of the Sabouraud agar plates.

Brun S, Bouchara JP, Bocquel A, Basile AM, Contet-Audonneau N, Chabasse D. Evaluation of five commercial Sabouraud gentamicin-chloramphenicol agar media. Eur. J. Clin. Microbiol. Dis. 2001; 20:718-723