

0809-1 *Candida krusei*

HISTORY This sample was sent as an isolate from skin.

CMPT QA: Pure growth of 4+ *Candida krusei*, viable for 37 days.

Reference Laboratory: Growth of *Candida krusei* confirmed.

Participant Results: Results received and media and methods noted are listed in Table 1.

Identification	No. of labs	Media & ID Methods
<i>Candida krusei</i>	1	PDA, DTM, FSA/33°C, Vitek2
Yeast	1	PDA, FSA/25°C
No growth	2	FSA/RT
No report received	1	/
Total	5	/

Key: PDA - potato dextrose agar; DTM - dermatophyte test medium; FSA - fungal selective agar

ISOLATION & IDENTIFICATION ¹⁻⁶ *C. krusei* grows at 25°C, 37°C, and 42°C on Sabouraud dextrose agar, but fails to grow on media containing cycloheximide. The two laboratories that reported no growth only used fungal selective agar (FSA) to culture this sample. FSA contains cycloheximide (and chloramphenicol.) *C. krusei* is difficult to differentiate from other non-*C. albicans* species by “classical” methods”; however, it identifies well using Vitek, API 20AUX, or other methods ².

Colony morphology On Sabouraud's dextrose agar *C. krusei* colonies are white to cream colored, smooth, glabrous yeast-like colonies making them difficult to differentiate from other non-*C. albicans* species by classical methods. On chromogenic agar media, *C. krusei* identifies as a dry, flat, rough-textured and spreading colony with a pale pink colour with white edges. New chromogenic media are being evaluated which may prove helpful for early identification of *C. krusei* ⁵.

Microscopic morphology shows predominantly small, elongated to ovoid budding yeast-like cells or blastoconidia, 2.0-5.5 x 4.0-15.0 µm in size.

Dalmu Plate Culture on Cornmeal and Tween 80 Agar After 72 hours of incubation at 25°C *C. krusei* produces abundant long, wavy, branched pseudohyphae with elongated to ovoid blastoconidia, budding off in verticillate branches.

Physiological Tests: negative germ tube test, does not produce chlamydoconidia on cornmeal or bird seed agar, variable hydrolysis of urea (some strains are positive), and no capsules are present viewed in an India Ink preparation.

Fermentation Reactions: Where fermentation means the production of gas and is independent of pH changes: positive in glucose and negative in sucrose, lactose, galactose, maltose, and trehalose.

Assimilation Tests: Positive: glucose; glycerol (delayed); DL-lactic acid; succinic acid. Variable: L-sorbose; citric acid. Negative: potassium nitrate; lactose; ribitol; galactose; raffinose; maltose; cellobiose; D-ribose (some positive); sucrose; melibiose; galactitol; trehalose; erythritol; D-mannitol; D-xylose; inositol; and D-glucitol.

CLINICAL SIGNIFICANCE *Candida krusei* is an environmental yeast (beer, milk products, animal and bird feces) that has emerged in recent years as an opportunistic pathogen ^{1-4,6}. It is well-known as a fungal pathogen for patients from hematology/oncology services and for transplant recipients and is associated with some forms of infant diarrhea. It also colonizes and infects the vaginal or urinary tract of immunocompetent persons. Why this should be is not understood. It is common practice to not identify urinary or vaginal yeasts as *Candida* species, not *C. albicans*, although further identification is appropriate for recurrent or persistent infections because of potential drug resistance. This is especially true for patients known or suspected as immunocompromised. Patients who have recurrent infections with yeasts initially identified as “yeast, not *C. albicans*” or “germ tube negative yeast” should have identification performed to the species level to ensure that treatment is directed effectively.

TREATMENT ¹ As *C. krusei* possesses an intrinsic resistance to many triazole antifungal agents, especially fluconazole, and some strains have elevated minimal inhibitory concentrations to itraconazole (MICs 0.5 to 1.0 mg/L) **all *C. krusei* isolates should be reported as resistant to fluconazole** ⁷. New data suggest that more recently developed azole agents like posaconazole, ravuconazole, and glucan inhibitors like micafungin and anidulafungin have activity against *C. krusei* and other more resistant *Candida* species ⁸. Among the systemically active antifungal agents, the echinocandins appear to be the most active ^{9,10}.

Specific antifungal susceptibility testing is more widely available at reference laboratories. However, in larger cities where fungal infections in compromising patients are seen, antifungal susceptibility testing should be available for isolates from invasive infections.

REFERENCES

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4. http://www.doctorfungus.org/thefungi/candida_krusei.htm
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7. Pfaller MA, Diekema DJ. 2007. Epidemiology of invasive Candidiasis: a persistent public health problem. Clin Microbiol Rev. 20:1. p. 133-163.
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10. Denning DW. 2002. Echinocandins: a new class of antifungal. J Antimicrob Chem. 49. p. 889-891.

Internet Resources:

Flow Chart Yeast Identification

http://microbiology.mtsinai.on.ca/mig/charts/FC10_yeast.pdf

Image Gallery Resource

<http://microbiology.mtsinai.on.ca/mig/index.shtml>

Mycology Manual Mt Sinai

<http://microbiology.mtsinai.on.ca/manual/myc/index.shtml>

Identification to the species level is accomplished by physiological, assimilation and fermentation tests.