



0709-2 *Microsporium canis*

HISTORY This sample was sent as scalp scraping culture isolate.

CMPT QA: Pure growth of 4+ *Microsporium canis* viable for 36 days.

Reference Laboratory: Growth of *Microsporium canis*.

Results received and media and methods noted are listed in Table 1. There was one misidentification. In a previous challenge with this fungus, Mycology Plus 0501-2 Skin Scraping (Torso), all participants identified the genus correctly and all but one reported *M. canis*.

IDENTIFICATION *Microsporium* differs from *Trichophyton* and *Epidermophyton* by having spindle-shaped macroconidia with echinulate to rough walls.

Colony morphology¹⁻³ On Sabouraud's dextrose agar, *Microsporium canis* matures within 6 to 10 days producing colonies that are flat, spreading, white to cream-coloured, with a dense cottony, granular to coarsely fluffy to hairy surface which may show some radial grooves. Colonies usually have a bright golden yellow to brownish yellow reverse pigment, but non-pigmented strains may also occur. There are variants that are slow growing, heaped and folded, yellow surface, no reverse pigment, macroconidia absent, but which revert to typical colony on rice grains.

Microscopic morphology^{2,3} *Microsporium canis* produces septate hyphae, macroconidia, and few or rare microconidia. Macroconidia are typically long spindle-shaped, with 5-15 cells, verrucose, thick-walled and often have a terminal knob. The septal walls are thin. Microconidia are rare, unicellular and clavate to pyriform in shape. Raquet hyphae, nodular bodies, and chlamydospores may be present.

Macroconidia and/or microconidia are often not produced on primary isolation media and it is recommended that sub-cultures be made onto boiled polished rice grains to stimulate sporulation.

Tests^{1,4,5}

No special growth factor is required to grow *Microsporium canis*.

- BCP-milk-solids-glucose agar: no change in pH
- Urease: positive
- Hair perforation: positive. Invaded hairs show an ectothrix infection and fluoresce a bright greenish-yellow under Wood's ultra-violet light.
- Rice grains: a deep yellow pigment is typically produced^{1,5}

Microsporium canis differs from *Microsporium audouinii* by perforating hair and growing on polished rice grains. *Trichophyton rubrum* is a very variable organism and many characteristics either overlap or are inconsistent⁵. On Sabouraud's dextrose agar, colonies are flat to slightly raised, white to cream, suede-like with a pinkish-red reverse. Microscopically, most cultures have numerous clavate to pyriform microconidia and moderate numbers of smooth, thin walled multiseptate, slender cylindrical macroconidia. Older cultures may show numerous chlamydospores with few clavate to pyriform microconidia. Invaded hairs show ectothrix or endothrix infection but do not fluoresce under Wood's ultra-violet light. Urease is positive at 7 days for one variant of *T. rubrum*.

CLINICAL SIGNIFICANCE *Microsporium canis* is a dermatophyte which causes ringworm of the scalp and skin in children and has been occasionally reported as the cause of nail infections¹. Tinea or ringworm is the result of the host reaction to the enzymes released by the fungus during the digestive process². Rarely, *mycetoma*-like lesions have been observed in immunocompromised hosts³. *Microsporium canis* is a complex species with several variants. *M. canis* var. *canis* is the most commonly encountered species in human infections and is distributed world wide; however, it is less common in North America, the United Kingdom, and Scandinavia than the rest of the world.

Most *M. canis* infections in humans are acquired from infected dogs or cats. In an *M. canis* outbreak affecting 15 people and 2 dogs with rapid transmission, the researchers noted that family pets may have acted as intermediate hosts, facilitating transmission between human contacts⁶. They concluded that while *M. canis* is an infrequent cause of tinea infections in the USA, it should remain in the differential diagnosis when a fungal infection presents in an atypical fashion. From the sanitary point of view, isolation of either an anthropophilic or zoophilic species requires different interventions⁷.

TREATMENT⁷ Griseofulvin has been established as a safe and effective drug for children, when prescribed in doses from 20 to 25 mg per kilogram of body weight. However, due to side effects such as headaches and gastrointestinal disturbances, or even idiosyncratic ones,

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Table 1. 0709-2 Identification results received and media and methods noted.		
Identification	No. of labs	Media & ID Methods
<i>Microsporium canis</i>	7	DTM, Litman oxgall medium, Mycosel agar, PDA, 30°C, urea; IMA, 30°C; IMA, 30°C, PDA; IMA 25°C, 37°C; BHI w/ chloramphenicol, cycloheximide, PDA, SAB, 25°C & 37°C; Littman oxgall, Mycosel, 25°C; PDA, Mycobiotic Agar with thiamine & Inositol, 27°C; IMA, Mycosel, 29°C
<i>Trichophyton rubrum</i>	1	IMA, Mycosel, 30°C, urea, BCP
Total	8	
Key: PDA - potato dextrose agar; IMA - inhibitory mould agar; DTM - dermatophyte test medium; BCP - bromcresol purple media FSA – fungal selective agar		

such as hypersensitivity it is not always well tolerated. Under such circumstances, terbinafine, itraconazole and even fluconazole are alternatives. Oral therapy with terbinafine and itraconazole are very widely used for treatment of *Microsporum* infections; however, treatment failure with terbinafine has been reported for *M. canis*. Itraconazole, in the dose of 5 mg per kilogram of body weight is effective, even though there may be restrictions to its use in virtue of its cost or less experience of its use in children. Topical therapy with Tea Tree Oil, might be considered before oral therapy⁸.

REFERENCES

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Rice Grain Test To induce sporulation and for differentiation of *M. canis* and *M. audouinii*^{1,5}.

Media Preparation:

1. Place approximately 1/2 teaspoon polished (white) rice grains into wide neck 20 mL vials.
2. Add 8 mL distilled water to each vial. (Note: Adding Tween 80 can enhance chlamydospore formation in *Candida albicans*¹—p. 1742.)
3. Lid, then slope on racks ensuring rice grains are evenly distributed.
4. Autoclave racks at 121°C for 15 minutes.

Rice Grain Test Method

1. With a long-handled inoculating needle, transfer a small portion of the isolate to be tested to a vial containing sterile rice grains.
2. Incubate the flask at 30°C and examine for growth for 8-10 days.

Results

- a. Positive - *M. canis*—Rapid growth on rice grains, typically produce many conidia and a bright yellow pigment.
- b. Negative - *M. audouinii*—Absence of growth with or without a brown discoloration of the rice grains at the site of inoculation.

Quality Control - Known isolates of *M. canis* and *M. audouinii* are run concurrently with each rice grain test.