

# Isolation of filamentous fungi from Yardenit- Baptismal site on the Jordan River

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## Abstract

The isolation and characterization of filamentous fungi from the Yardenit-Baptismal site on the Jordan River was investigated in 126 water samples. The result obtained showed that filamentous fungi were isolated from 78 of 126 (61.9%) samples and yeasts from 5 (4.0%). The most predominant genera were *Aspergillus* spp, isolated from 41, *Penicillium* spp, from 33, and *Candida* from 4 of the examined samples. These results suggest that the river may be a potential transmission route of fungi and may pose a health hazard mainly for the immunodepressed individual.

## Introduction:

Fungi are everywhere rivers, lakes, soil, air, groundwater, seas, oceans etc<sup>(1)</sup>, and some can cause opportunistic infections where both endogenous and exogenous fungal infections are the prevailing mode of fungal transmissions<sup>(2,3,4)</sup>.

With the increasing number of patient undergoing complex medical therapy, more unusual infectious disease processes have emerged. Fungal pathogens as agents of a variety of infections are part of this trend and are found much more frequently as the cause of community acquired infections, which can be acquired from use of community water/river as seen in immuno-compromised individual.<sup>(1)</sup>

In the present study, the main objectives were to isolate and characterize the prevalence of fungi and yeasts in the Yardeint –Baptismal site on the Jordan River.

## Materials and Methods

### Study Area

Water samples used for this study were collected from Yardenit site, situated at the southern end of the sea of Galilee at the place where river Jordan flow out on its way down to the Dead sea. Yardenit site is about 8km south of Tiberius by the lake. It is one of the tourist sites in Israel where pilgrims mainly Christian all over the world come to be baptized or reaffirm their faith.

### Collection of water sample

A total of 126 water samples were aseptically collected from four different parts of the site with sterile screw-capped bottles. The bottle was dipped with it cap on, a few (about 30cm) below the water surface, the cap was removed with the other hand and water rushed inside the bottle until it was filled, and the bottle was recapped while it was still inside the waters.

Due to the distance between the site of collection and the laboratory, the water was stored in the refrigerator until the analysis was done.

### Sample Processing

#### Fungal culture

The presence of fungi and yeast was investigated in 126 water samples within one hour of collection using the membrane filter technique.(5) A volume of 100ml of the samples was filtered, in duplicate, through membrane filters with pores 0.45um in diameter. The membranes were placed on sabourands dextrose agar (SDA) supplemented with chloramphenicol and on SDA with a chloramphenicol-actidione mixture. The plates were then maintained at room temperature for 2 weeks and examined every second day. Positive cultures were sub cultured on SDA for the isolation of a pure, single colony for identification. The identification of filamentous fungi was based primarily on the macroscopic and microscopic morphology (slide culture) and the use of color atlas.(6,7) Physiological test (germ-tube formation), biochemical characteristic including carbohydrate assimilation (API 20C Aux; Bio Merieux SA, Lyon, France) and morphology (Dalmau plate technique on corn meal-Tween 80 agar) were applied for the identification of yeasts.

## Results

Filamentous fungi were isolated from 78 of 126 (61.9%) samples, yeast from 5 (3.9%). The prevailing genera were *Aspergillus* spp isolated from 41 (32.5%), *Penicillium* spp from 33 (26.2%) Table 1 and *Candida* spp from 2 (1.6%). A total of 9 genera of filamentous fungi (Table 1) and two of yeasts were isolated. *Candida tropicalis* and *Candida valida* were each isolated twice and other genera of yeast isolated from water sample was *Rhodotorula* spp (one isolate)

Table 1. Frequency of isolation of filamentous fungi in Yardenit-Baptismal site

Filamentous fungi	N	%
<i>Aspergillus</i> spp	41	32.5
<i>Aureobasidium pullulans</i>	1	0.8
<i>Chaetomium globosum</i>	16	12.7

<i>Chryosporium</i> spp	3	2.4
<i>Cladosporium</i> spp	11	8.7
<i>Cladosporium cladosporioides</i>	3	2.4
<i>Hortaela werneckii</i>	1	0.8
<i>Penicillium</i> spp	33	26.2
<i>Scopulariopsis</i> spp	3	2.4
<i>Trichoderma</i> spp	2	1.6

## Discussion

The prevalence of filamentous fungi was found to be (61.9%) and that of yeasts (3.9%) in the examined water samples. Filamentous fungi and yeasts are ubiquitous organisms found wherever organic matter occurs, being mostly parasitic and occasionally pathogenic. Despite their wide occurrence little attention has been given to their presence and significance in aquatic environments.

The water at the Yardenit-Baptismal site on the Jordan River is heavily contaminated with water microorganisms and by baptismal activities at the site. It is believed that the river which is an off- shoot of the Jordan River contain nutrient rich water bodies because the site is grossly polluted from diverse sources hence the presence of numerous contaminating microorganisms. In addition, the water being a pilgrimage site for Christian faith all over the world witnesses intense human activities and thus is heavily contaminated in the process.

The high occurrence of *Aspergillus* spp a hyaline moulds and other hyper saline fungal isolates shows that the water is very salty. *Aspergillus* spp and *Penicillium* spp are major contaminants of the environments and occur as ubiquitous saprophytes, with their spores able to survive and reproduce in the water. Others like *Cladosporium* species a non-halophilic, terrestrial species known for their cosmopolitan distribution was also isolated.

The survival of filamentous fungi in the river agrees with previous study (8, 9, 10), which showed that most filamentous fungi have the ability to survive in a relatively high salt concentration. The presences of yeasts in the present study are very significant. It has been reported (1) that *Candida* species are common pathogens in community water samples.

As has been shown by the results of this study, the river at Yardenit can be considered a possible transmission route for filamentous fungi and yeasts, especially for pilgrims who in there numerous number visits the site and may constitute a potential health hazard mainly to immunodepressed individuals.

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