Short Communication

THE COENZYME Q SYSTEM IN STRAINS OF SPECIES IN THE GENUS ITersonilia, SporobolomyCetaceae

YUZO YAMADA AND TAKASHI KONDA
Laboratory of Applied Microbiology, Department of Agricultural Chemistry, Shizuoka University, Shizuoka 422, Japan
(Received June 29, 1984)

Since the genus Itersonilia was established as a fourth genus in the family SporobolomyCetaceae by Derx (1), three species have been described. The type species is I. perplexans Derx, which was first isolated from an infected leaf of Althea rosea (1). A second species, I. pyriformis Nyland was isolated from leaves of Acer macrophyllum (2). A third species, I. pastinacae Channon was reported (3).

In a previous paper (4), one of the authors (Y.Y.) reported the Co-Q system of some yeasts and yeast-like fungi including strains of species of the genera Bullera Derx, Tilletiopsis Nyland, and Itersonilia Derx in the family SporobolomyCetaceae. This paper is concerned with a further investigation of the Co-Q system in strains of Itersonilia species.

Four strains of I. perplexans, I. pyriformis, and I. pastinacae were used in this experiment (Table 1). Microorganisms were cultured on agar plates containing 3% glucose, 0.5% peptone, and 0.5% yeast extract, pH 6.0, at 20° for 5 days. Harvests of yeast-like fungus cells were done by scraping mycelia off the agar plates, followed by centrifugation. Coenzyme Q or ubiquinone was extracted from the cells and purified as described previously (5). The Co-Q system was determined by reversed phase paper chromatography (5).

As shown in Table 1, all four strains examined of Itersonilia species had the Q-9 system, differing from strains of species of the genera Sporobolomyces Nyland et van Niel, Bullera, and Tilletiopsis in the family SporobolomyCetaceae (Q-10) (4–6). These four strains revealed a single spot corresponding to Q-9 on paper chromatograms. Previously, one of the authors (Y.Y.) examined only one

1 This constitutes Part XI of a series entitled “Significance of the Coenzyme Q System in the Classification of Yeasts and Yeast-like Organisms.” For Part X, see ref. 4. Address reprint requests to Dr. Y. Yamada.
strain of *Itersonilia* and showed that it had the Q-10 system as found in *Sporobolomyces*, *Bullera*, and *Tilletiopsis* species (4). However, the present authors must here correct the previous data. The test strain of *I. perplexans* was probably mixed up occasionally.

The genus *Itersonilia* is characterized by no budding cells and mycelia with clamp connections, and is distinguishable in these features from other three genera, *Sporobolomyces*, *Bullera*, and *Tilletiopsis*, in the family *Sporobolomycetaceae* (7). The Q-9 system of the genus *Itersonilia* is regarded as an additional new criterion which discriminates the genus from other three genera.

According to Nyland (2), *I. pyriformis* is distinguished from *I. perplexans* by the former’s chlamydospores without clamp connections and abundant aerial mycelia on malt agar. However, Tubaki (8) described that *I. pyriformis* is conspecific with *I. perplexans* using his eight isolates of *I. perplexans* from six different hosts. It is reasonable that the Co-Q systems were the same in the two *Itersonilia* species, since the Co-Q system was proposed to be applicable for classifying microorganisms at a generic level (9, 10).

Sowell and Korf (11) studied the genus *Itersonilia* based on its morphology and pathogenicity and considered *Tilletiopsis* and *Sporidiobolus* Nyland as possible synonyms of *Itersonilia*. The authors’ present study excludes the possibility that the Q$_{10}$-equipped *Tilletiopsis* and *Sporidiobolus* are synonymous of the Q$_{9}$-equipped *Itersonilia*.

It has been known that most basidiomycetous yeasts and yeast-like fungi have the Q-10 system (4–6, 12). The Q$_{9}$-equipped *Itersonilia* species, considered to be imperfect Heterobasidiomycetes along with species of the genera *Bullera*, *Sporobolomyces*, and *Tilletiopsis* in the family *Sporobolomycetaceae*, Blastomycetes, Deuteromycotina (7), are different from the above-mentioned basidio-

---

**Table 1.** The coenzyme Q system in strains of *Itersonilia* species.

<table>
<thead>
<tr>
<th>Species and strain</th>
<th>Other designation</th>
<th>Co-Q$^a$ system</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>I. perplexans</em> Derx (1948)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBS 197.53</td>
<td>CMI 62257, ATCC 15495, from <em>Pastinaca sativa</em>, G. Sowell</td>
<td>Q-9</td>
</tr>
<tr>
<td>CBS 144.68</td>
<td>ATCC 36404, from air, G.A. de Vries</td>
<td>Q-9</td>
</tr>
<tr>
<td><em>I. pyriformis</em> Nyland (1949)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBS 286.50</td>
<td>ATCC 15496, type, from <em>Acer macrophyllum</em>, G. Nyland</td>
<td>Q-9</td>
</tr>
<tr>
<td><em>I. pastinaceae</em> Channon (1963)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBS 356.64</td>
<td>CMI 92075, ATCC 36403, type, from <em>Pastinaca sativa</em>, A.G. Channon</td>
<td>Q-9</td>
</tr>
</tbody>
</table>

$^a$ Co-Q or Q, coenzyme Q or ubiquinone; Q-$n$ or Q$_{n}$, with $n$ denoting a specified number of isoprene units in a side chain, e.g., Q-9 or Q$_{9}$.

Abbreviations: CBS, Centraalbureau voor Schimmelcultures, Baarn, Netherlands; CMI, Commonwealth Mycological Institute, Kew, United Kingdom; ATCC, American Type Culture Collection, Rockville, Maryland, U.S.A.
mycetous yeasts and yeast-like fungi. This indicates that the genus *Itersonilia* must occupy a unique situation among basidiomycetous yeasts and yeast-like fungi from the view-point of phylogeny. To clarify the phylogenetic relationship, more detailed investigation is necessary concerning the Co-Q system in a number of basidiomycetous yeasts and yeast-like fungi, especially of yeast-like fungi.

REFERENCES