Metschnikowia kunwiensis comb. nov., the teleomorph of Candida kunwiensis

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Abstract

The teleomorph of Candida kunwiensis Hong, Bae, Herzberg, Titze, Lachance, Metschnikowia kunwiensis, is described. Repeated attempts to obtain ascospore formation succeeded using modified V8 sporulation media and extended incubation times. The asci are ovoid, with only a small protrusion caused by the spore(s). The species is diplontic, possibly homothallic, with one or two ascospores per ascus. Aside from having atypical ovoid asci, the acicular shape of the spores is characteristic of the genus Metschnikowia. The type strain is CBS 9676T.

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Keywords: Metschnikowia kunwiensis; Ascus shape; Sporulation conditions

1. Introduction

Candida kunwiensis, a yeast associated with bumblebees and flowers, has been recently described by Hong et al. [1] who also discussed the phylogenetic placement of the species. According to D1/D2 sequences as well as morphological and physiological characteristics the species was shown to belong to the Metschnikowia clade. The D1/D2 sequence of C. kunwiensis exhibited the highest similarity to M. gruessii, while the species is morphologically and physiologically similar to M. pulcherrima. Since C. kunwiensis produced chlamydospores while most known haploid, heterothallic Metschnikowia species do not (Lachance, personal communication) it was hypothesized that the species would be diploid and possibly homothallic. In this study a successful attempt was made to induce sporulation and the perfect species Metschnikowia kunwiensis is described.

2. Materials and methods

The strains considered in this study were isolated from various bumblebee species [1] in the New Botanical Garden in Marburg, Germany.

These were characterized by replica plating [2] and the standard methods described by Yarrow [3], while the D1/D2 Domain of rDNA was sequenced as described by Lachance et al. [4].

V8 sporulation media were prepared according to the method of Pitt and Miller [5] with a slight modification: Salted V8 vegetable juice (Campbell’s Grocery Products, Ltd) was diluted 1:1 with bi-distilled water and pH was adjusted to 5.5 with NaOH. After filtration (filter with maximum pore diameter of 1.4 μm) the solution was diluted 1:1, 1:3, 1:5; 1:10; 1:20 with bi-distilled water. These dilutions were supplemented with 2% agar and autoclaved for 20 min at 121 °C. Twenty four hours old, actively growing cultures were inoculated on the media and incubated at 12 and 16 °C.

The cultures were examined periodically with an Axiophot microscope (Zeiss, Germany). Images were recorded with a digital camera (Mega Fire, Intas, Göttingen, Germany) and optimized for brightness and...
3. Results and discussion

3.1. Latin diagnosis of Metschnikowia kunwiensis Brysch-Herzberg comb. nov

Ascosporae possunt videtur in agaro V8 percolato (mero aut 1:3, 1:5, 1:10) ad 12 et 16 °C post puris menses. Asci formantur e chlamydosporis. Asci subglobosi (Fig. 1(a)) ad ovales alquando cum tumulo parvo. Ascosporae 1 aut 2 pro ascus (Fig. 1(b)), aciculares (8–12 aut 15 μm).

Typus: CBS 9676⁴, e superficie corporis Bombus cryptarum isolatus est. In collectione zymotica Centraalbureau voor Schimmelcultures (CBS 9676) preservatus.

3.2. Description of Metschnikowia kunwiensis comb. nov

The description is identical to that of Candida kunwiensis [1], except for characteristics of ascus formation.

Sporulation was observed on diluted (1:1, 1:3, 1:5, 1:10) filtered V8 agar at 12 and 16 °C after 4–5 months. Subglobose to oval asci (Fig. 1B, C) developed from chlamydospores with only a small protrusion caused by the ascospore(s). There where one to two spores per ascus (Fig. 1A). One to two needle-shaped (8–12 (15) μm) long spores were formed per ascus.

The shape of the ascus is not typical of the genus Metschnikovia as all known species form clavate to spheropedunculate asci, although species such as M. reukaufii occasionally produce asci without a peduncle as shown on the pictures of Barnett et al. [6]. Nevertheless, the shape and number of spores, the formation of chlamydospores, the physiological properties, and the D1/D2 rDNA sequence clearly establish this species as a member of the genus Metschnikovia.

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References


