Mycological Characteristics of Nine Unrecorded Yeasts from Flowers in the Orchard of Yesan-gun, Chungcheongnam-do and Hanbat Arboretum in Daejeon City, Korea

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ABSTRACT : Six unrecorded yeasts, Cryptococcus festucosus 41-3, Cryptococcus heveanensis 56-4, Debaryomyces nepalensis 95-4, Issatchenka occidentalis 142-1, Dioszegia zsoltii 39-1, and Kwoniella europaea 47-2 were screened from 108 yeasts isolated from flowers and fruits in orchards of Yesan-gun, Chungcheongnam-do, Korea. The morphological and cultural characteristics of these unrecorded yeasts were investigated. They had various shapes, including ellipsoidal, globose, and oval, and also had budding mode in vegetable reproduction, except I. occidentalis 142-1 (fission mode). K. europaea 47-2 only formed pseudomycelium. D. zsoltii 39-1 did not grow in yeast extract-malt extract medium, potato dextrose medium, and vitamin-free medium. C. festucosus 41-3 grew well in 5% NaCl-containing yeast extract-peptone-dextrose medium and had a growth pH range of 7.0~10.0. Three unrecorded yeasts Ogataea polymorpha HB45-1, Rhodotonula hinnula HB62-2, and Cryptococcus rajasthanensis HB80-4 were screened from 51 yeasts isolated from flowers in Hanbat arboretum in Daejeon city, Korea. They were globose in shape and did not form pseudomycelium. In addition, O. polymorpha HB45-1 and C. rajasthanesis HB80-4 had budding mode in vegetable reproduction. All of them grew well in vitamin-free medium and C. rajasthanesis HB80-4 also grew in 50% glucose and 5% NaCl-containing YPD medium.

KEYWORDS : Mycological characteristics, Unrecorded yeasts, Orchard and arboretum

Until now, almost all yeasts have been isolated and reported from Korean fermented foods and their raw materials such as traditional alcohol beverages and nuruks, soy sauces and soy pastes and its koji, meju etc. [1-4]. Recently, we isolated various yeasts from wild flowers in cities [5, 6], mountains [7], and coastal areas [8], and islands including Jeju-island [9], Ulleungdo and Yokjido [10], Korea. We also screened and characterized unrecorded yeasts [11, 12].

In a previous paper, we reported on yeast diversities of flowers and fruits in some orchards [13] of Yesan-gun and Hanbat arboretum [14] of Daejeon city, Korea. This study describes the microbiological characteristics of the unrecorded yeasts screened from the above mentioned orchards and arboretum.

Characteristics of the unrecorded yeasts from orchard flowers of Yesan-gun, Chungcheongnam-do, Korea

We screened the unrecorded yeasts by searching Keris, PubMed and other fungal taxonomy databases [11] and investigated their morphological and cultural characteristics using a previously described method [11, 12].

Six unrecorded yeasts, Cryptococcus festucosus 41-3 and Cryptococcus heveanensis, 56-4, Debaryomyces nepalensis 95-4, Issatchenka occidentalis 142-1, Dioszegia zsoltii 39-1, and Kwoniella europaea 47-2 were screened from 108 yeasts from flowers and fruits in three orchards of Yesan-gun, Korea. The morphological and cultural characteristics of the six unrecorded yeasts are summarized in Table 1. All of the unrecorded yeasts had various shapes, and did not form pseudomycelium, except K. europaea 47-2. All of the unrecorded yeasts, except D. zsoltii 39-1 grew...
well in yeast extract-peptone-dextrose (YPD), yeast extract-malt extract (YM), and potato-dextrose (PD) broth. *D. nepalensis* 95-4, *I. occidentalis* 142-1, and *K. europaea* 47-2 grew in vitamin-free media. In particular, *C. festu-
Bai et al. [15] first reported on a new ballistoconidium-forming yeast, *Dioszegia zsoltii*, from various plant leaves collected in Yunnan, China. *Cryptococcus festucosus* was also reported as a new hymenomycetous yeast in the holtermannia clade [16], and Guerreiro et al. [17] reported on *Kwoniella europaea*, basidiomyces yeast, which have a tetrapolar mating system. *Cryptococcus heveanensis* [18] was known as a sister species to the pathogenic *Cryptococcus* species and *Issatchenkia occidentalis* [19] was first isolated from the esophagus of a leukemic patient. Ethanol production of *Debaryomyces nepalensis* [20] was also reported. However, their taxonomic characteristics or application in industry have not yet been studied in detail.

**Characteristics of the unrecorded yeasts from flowers in Hanbat arboretum of Daejeon city, Korea**

*Ogataea polymorpha* HB45-1, *Rhodotorula hinnulea* HB62-2, and *Cryptococcus rajasthanensis* HB80-4 were screened as unrecorded yeasts from 51 yeasts from flowers and fruits in Hanbat arboretum, Daejeon city, Korea. All of them were globose in shape and did not have pseudomycelium. Three unrecorded yeasts grew well in YPD,
YM, and PD media and vitamin-free medium. C. rajas-
thanensis HB80-4 was sugar-tolerant, growing in 50% 
glucose-containing YPD medium and was also a halo-
tolerant yeast with O. polymorpha HB45-1, grew in 5% 
NaCl-containing YPD medium.

Ogataea polymorpha is closely related to Ogataea para-
polymorpha [21] and Cryptococcus rajasthanensis, an anamor-
phic yeast, is also related to C. laurentii, isolated from Rajasthan, India [22].

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