

POTENTIAL OF EPIPHYTIC YEASTS AGAINST *ALTERNARIA BRASSICICOLA* CAUSING ALTERNARIA LEAF SPOT OF CAULIFLOWER

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Abstract

Six antagonistic yeast isolates from different sources were tested for their resistance against *Alternaria brassicicola* under *in vitro* conditions. *Saccharomyces cerevisiae* isolates, namely, BK 1 to BK 7 inhibited the hyphal growth of pathogen in the range of 59.72 to 43.61 %, respectively. Out of 6 isolates BK 5 showed the best result against the tested pathogen.

Cauliflower (*Brassica oleracea* var. *botrytis*) is one of the most important vegetable crops belongs to *Brassicaceae* family and cultivated in 458 thousand ha (t Ha) area in India with production of 8840 thousand metric tonnes (t MT) and productivity of 19.2 MT/Ha (NHB 2020). Among fungal pathogens, *Alternaria* is the most dominant pathogen and different species of *Alternaria* like *A. brassicae*, *A. brassicicola*, *A. raphani* and *A. alternata* are reported to be the constraint in the production of brassicacea crops (Kolte 1985). Amongst these, *A. brassicicola* (Schwein.) is one of the important pathogens of cauliflower. Usually, chemical fungicides are used for the management of *Alternaria* leaf spots/ blight in cauliflower. The present study aimed to address the biocontrol potential of epiphytic yeasts as an alternative to chemical fungicides against *Alternaria brassicicola*.

Infected leaves showing typical symptoms of the disease were used for the isolation of the fungus following standard procedure described by Pun *et al.* (2020). Six phylloplane yeast isolates were procured from VCSG Uttarakhand University of Horticulture and Forestry, Pauri, Uttarakhand, India. Among the isolates, BK 1 and BK 4 were from chickpeas, BK 2 from apple pomace, and BK 5 and BK 6 from grapes and BK 7 from raisins. Antagonistic potential of six yeast isolates were evaluated *in vitro* for their antagonism against *A. brassicicola* by dual culture technique (Bhan *et al.* 2023). Statistical analysis was performed by one-way ANOVA using OPSTAT software (Gomez and Gomez 1984).

In vitro efficacy of different isolates of yeasts against mycelial growth of *Alternaria brassicicola* is presented in Table 1. All the yeast isolates produced white or creamy pigmentation, oblong/ eclipse colony with cell length of 2-8 µm and cell breadth of 2-5 µm and attained a full growth of 90 mm on Yeast Peptone Dextrose Agar (YPDA) medium at 25 ± 1°C in 3-4 days. On the basis of cultural and morphological characters, all the yeasts were identified as *Saccharomyces cerevisiae* Meyen ex E.C. Hansen. The identification of the yeasts was further reconfirmed as *Saccharomyces cerevisiae* Meyen ex E.C. Hansen at National Centre of Fungal Taxonomy, New Delhi.

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Table 1. Efficacy of yeasts isolates against mycelial growth of *Alternaria brassicicola*.

Yeast	Radial growth (mm)	% Inhibition of mycelia growth
BK 1	50.75 (45.41)*	43.61 (41.31)*
BK 2	41.75 (40.24)	53.61 (47.05)
BK 4	40.50 (39.51)	55.00 (47.85)
BK 5	36.25 (37.00)	59.72 (50.59)
BK 6	42.26 (40.53)	53.05 (46.73)
BK 7	40.00 (39.21)	55.56 (48.17)
Control	90.00 (0.00)	0.00 (0.00)
CD _(0.05)	2.96	1.68
SE(m)	0.97	0.57
SE(d)	1.37	0.80

*Figures in parenthesis are arc sign transformed values.

Significant variations were observed among the yeast isolates in their ability to suppress the radial growth of the pathogen. All the yeast isolates significantly reduced the mycelial growth of *A. brassicicola* in comparison to control. Among the tested yeast isolates, BK 5 was found most effective significantly superior to other treatment with a radial growth of 36.25 mm and the corresponding inhibition of mycelial growth was 59.72%. Similarly, isolates BK 7 (40.00 mm, 55.56%) and BK 4 (40.50 mm, 55.00%) also demonstrated strong antagonistic activity. Isolates BK 2 (41.75 mm, 53.61%) and BK 6 (42.26 mm, 53.05%) displayed moderate inhibitory effects, whereas BK 1 exhibited the least inhibition, with a radial growth of 50.75 mm and inhibition of mycelial growth was 43.61%. The statistical analysis revealed significant differences among the treatments, as indicated by the critical difference (CD) values of 2.96 for radial growth and 1.68 for inhibition percentage ($p \leq 0.05$). The effectiveness of yeast isolates in suppressing the growth of *A. brassicicola* suggests their potential as biocontrol agents. The differences in antagonistic efficacy among isolates may be attributed to variations in mechanisms such as competition for nutrients and space, secretion of antifungal metabolites, or mycoparasitism. The arc-sine transformed values further validated the reliability of the inhibition percentages recorded in this study.

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