Effect of pH on Antifungal Activity of *Streptomyces arabicus* Diffusate in Relation to *Alternaria brassicae* (Berk.) Sacc. and *Alternaria brassicicola* (Schew.) Wiltshire.

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Abstract

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The effect of pH on the production of antifungal substance(s) by *Streptomyces arabicus* in relation to two pathogens: *Alternaria brassicae* and *A. brassicicola* (causal organisms of yellow sarson and taramira leaf blight) was evaluated. The pH corresponding with optimum production of antifungal substances was found to be 7.0.

Key words: pH, *Streptomyces arabicus*, antifungal activity, *Alternaria* spp.

Introduction

Amongst 32 microorganisms of yellow sarson and taramira tested against *A. brassicae* and *A. brassicicola*, only *Streptomyces arabicus* exhibited an antagonistic behaviour. The hydrogen ion concentration has been reported to affect the production of antifungal substances by different antagonists (1, 2, 3, 4). This study was carried out to evaluate the effect of pH on the production of antifungal substance(s) in the diffusate of *S. arabicus* in relation to *A. brassicae* and *A. brassicicola*.

Materials and Methods

To evalute the effect of pH on the production of antifungal substance(s), Czapek's broth was adjusted to different pH levels (4.5 - 9.0) using citrate buffer (dipottasium phosphate and citric acid), and stored in Erlenmeyer flasks. A glass electrode pH meter (Cambridge) was used to determine the pH of the medium. Three replicates of 30 ml. media for each pH value were used for each pathogen. Flasks were then sterilized and inoculated with 0.1 ml of a spore suspension of the antagonist. 30 days after incubation at 28°C ± 1, the medium was filtered and the diffusates obtained at different pH levels were stored in separate sterilized test tubes. *A. brassicae* spores were incubated for 60 hr. and *A. brassicicola* spores for 36 hr. in *S. arabicus* diffusate. Spore germination was determined by the hanging drop method. Fifty observations were made for each replicate.

Results and Discussion

The data presented in table 1 suggests that the antifungal activity of the *S. arabicus* diffusate against the two pathogens increased with the increase in pH value from 4.0

Table 1. Effect of the pH of the medium on the production of antifungal substance by *Streptomyces arabicus* in relation to *Alternaria brassicae* and *Alternaria brassicicola*.

Initial pH	Percentage of spore germination for *A. brassicae*	Percentage of spore germination for *A. brassicicola*
4.5	78.43 ± 4.2	79.24 ± 4.4
5.0	68.42 ± 3.9	79.21 ± 3.8
5.5	56.41 ± 3.4	58.22 ± 3.2
6.0	51.34 ± 3.2	53.24 ± 3.1
6.5	44.21 ± 3.0	46.12 ± 4.2
7.0	26.22 ± 2.5	27.12 ± 3.3
7.5	35.52 ± 2.5	38.22 ± 2.8
8.0	61.21 ± 4.0	69.24 ± 3.4
8.5	72.41 ± 4.1	73.46 ± 4.4
9.0	79.32 ± 4.4	81.22 ± 4.8

Each number in the table represents a mean of 50 observations

to 6.5. The minimum percentage of spore germination was 26.22% and 27.12% *A. brassicae* and *A. brassicicola,* respectively, at pH 7. The antifungal activity of the antagonist's diffusate declined gradually upon further increase in the pH value. Maximum spore germination of 97.32% and 81.22% for *A. brassicae* and *brassicicola,* respectively, was observed at pH 9.0.

Therefore, it was suggested that if maximal production of antifungal substance for this antagonist is to be obtained, the pH should be maintained at 7.

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الملخص

شارما أ. ك. 1989. تأثير درجة الحموضة (pH) على النشاط المثبط لافرازات البكتيريا *Streptomyces arabicus* على الفطريات *Alternaria brassicae* و *A.brassicicola* . مجلة وقاية النبات العربية 7: 182 - 183.

تم دراسة تأثير الحموضة على إنتاج الافرازات المثبطة للفطريات بواسطة *Streptomyces arabicus* على نوعي الفطور *Alternaria brassicae* و *A. brassicicola* الذين يسببان لفحة الأوراق على النباتات «Yellow Sarson and Taramira».

تبين من التجارب أن أفضل درجة حموضة (pH) لإنتاج هذه المواد المثبطة للفطريات كانت 7.

كلمات مفتاحية: حموضة، بكتيريا، تثبيط نشاط الفطريات، مرض اللفحة.

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