

V. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

Based on the research findings and discussion, the following conclusions were drawn:

1. The secondary metabolites of *Bacillus* sp. D28 contain two main compounds *oxime-methoxy-phenyl* (78.40%) and *benzeneacetic acid* (21.60%), which are believed to suppress the severity of purple blotch disease in shallot plants, with the lowest disease severity of 20% observed at a 40% concentration.
2. The secondary metabolites of *Bacillus* sp. D28 do not stimulate the growth of shallot plants but are able to maintain growth after inoculation with *Alternaria porri*, as indicated by no significant differences in growth among treatment groups, although all treatments differed significantly from the control.
3. A 40% concentration of the *Bacillus* sp. D28 secondary metabolite was effective in suppressing purple blotch disease in shallot plants. This treatment extended the incubation period to 4 DAI, reduced disease severity to 20%, and achieved an efficacy rate of 69.23%.

5.2. Recommendations

The 40% concentration of *Bacillus* sp. D28 secondary metabolites has the potential to be developed as an alternative biological control method to reduce reliance on synthetic fungicides in shallot cultivation. However, its development as a biopesticide product still requires further testing regarding safety, stability, shelf life, and effectiveness across various cultivation systems.