

CHAPTER V. CONCLUSION AND SUGGESTION

A. Conclusion

1. Based on the results of this study, the nanoemulsion mixture from *P. aduncum* essential oil and *C. nardus* hydrosol at 1% concentration optimally inhibited the growth of pathogenic bacteria (Xaa). Moreover, nanoemulsion also has the ability to increase the defense enzymes in shallots to control Xaa, which can be used as an alternative disease control measure for synthetic pesticides to prevent pathogens.

2. The introduction of *B. thuringiensis* strain MRSNR3.1 and nanoemulsion at 1% concentration into shallots affected the production defense enzymes of shallots, which were characterized by increased activity defense enzymes peroxidase, polyphenol oxidase and phenylalanine ammonia lyase. The colonization of *B. thuringiensis* strain MRSNR3.1 resulted in the highest PO, PPO, PAL enzyme activities in roots and leaves.

B. Suggestion

Based on the results of this study, further investigation of nanoemulsion concentrations is required to find the optimal concentration to control *Xanthomonas axonopodis* pv. *allii* and identification of defense compounds associated with increased activity of enzymes peroxidase, polyphenol oxidase and phenylalanine ammonia lyase in shallots.

