

## CHAPTER 5

### CONCLUSIONS

This study demonstrates the control of fungi, which were isolated from shallot and onion, by various plant extracts. It can be concluded that six isolates of fungi were found on shallot and onion. From the identification study, three isolates obtained from onion were *Penicillium* sp.1, *Aspergillus niger*1 and *Penicillium* sp.2 and three isolates obtained from shallot were *A. niger*2, *Penicillium* sp.3 and *Penicillium* sp.4.

After testing with six aqueous fresh plant extracts, it was found that aqueous fresh garlic extract showed the greatest antifungal activity against all six isolated fungi. In the case of ethanolic extraction, ethanolic dry galangal extract could more effectively inhibit the growth of all isolates than other ethanolic dry plant extracts. For methanolic extraction, methanolic dry galangal and ginger extract could more effectively inhibit fungal growth than other methanolic dry plant extracts.

The crude extract of each plant showed the greatest antifungal activity against all six fungi. For *in vitro* test, aqueous fresh garlic extract presented higher antifungal activity than ethanolic dry galangal extract, methanolic dry galangal extract and methanolic dry ginger extract.

In the *in vivo* test, the investigation of shallot treated with plant extracts showed that ethanolic dry galangal extract had higher effect against *A. niger*2, *Penicillium* sp.3 and *Penicillium* sp.4 than aqueous fresh garlic extract, methanolic dry galangal and ginger extracts.

In case of inoculated onion bulb, it did not present the disease symptom but soft and rot of bulbs was observed instead. Thus, the results could not explain the effectiveness of plant extracts on the inoculated onion bulbs.