

## CHAPTER V

### CONCLUSION

The research validated the efficacy of the MADC2 PCR marker for reliable sex differentiation in Thai cannabis cultivars, with distinct and consistent band patterns enabling early selection of economically valuable female plants. For date palm, a novel Loop-mediated Isothermal Amplification (LAMP) assay was developed and optimized, providing a rapid, field-friendly alternative to conventional sex determination methods. The inclusion of phenol red allowed straightforward, visual detection of male-specific amplification, eliminating the need for sophisticated laboratory equipment. Significantly, this study achieved the development of a stable, lyophilized LAMP kit employing trehalose as a stabilizer. This user-friendly kit demonstrated excellent shelf stability for at least six months -20°C storage facilitating easy deployment in field conditions. Overall, this research makes substantial contributions by providing accessible, reliable, and cost-effective molecular tools for early sex determination in cannabis and date palm cultivation. These innovations empower farmers and breeders to make informed, timely decisions, significantly optimizing resource management, reducing economic risks, and enhancing agricultural sustainability and profitability within Thailand and globally.