CHITOSAN ELICITATION STRATEGY FOR BIOMASS AND SECONDARY METABOLITES PRODUCTION IN ADVENTITIOUS ROOT CULTURE IN VITRO : A REVIEW

THESIS

To qualify as a condition

achieve the academic degree Magister of Biology (M.Si)

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Master of Biology Study Program

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THESIS

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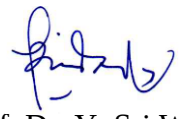

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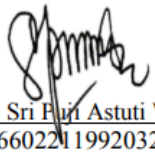

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Declaration

I hereby declare that in this thesis there are no works that have been submitted to obtain a Master degree in a tertiary institution, and to the best of my knowledge there are also no works or opinions that have been written or published by other people, except those that are written in writing that is referred to in this manuscript, and mentioned in the bibiliography.

Surabaya, 24th January 2022

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FOREWORD

Praise be to Allah's grace and blessings so the author can cmplete the thesis paper entitled **"Chitosan Elicitation Strategy For Biomass and Secondary Metabolites Production in Adventitious Root Culture in vitro : A Review."** This thesis is used as one of the requirements for obtaining a Master of Science degree in Biology at the Faculty of Science and Technology, Airlangga University.

The author would like to thank all who were involved and helped preparation of this thesis so can be completed properly. The aunthor realizes that tis thesis still has shortcomings so that constructive criticism and suggestions from readers are desired. Hopefully this thesis is useful and opens mpre insight for readers.

Surabaya, 24th January 2022

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I would like to express my gratitude to Allah SWT, because it is thanks to His grace that the author was able to complete the thesis entitled "**Chitosan Elicitation Strategy For Biomass and Secondary Metabolites Production in Adventitious Root Culture in vitro : A Review.”**

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The author realizes that there are still many shortcomings in this thesis report, so the author expects constructive criticism and suggestions for the improvement of this thesis. Last, the writer would like to say thank you.

Surabaya, 24th January 2022
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ABSTRACT

Utilization of plants as basic ingredients in the manufacture of drugs that can treat various diseases has been carried out because plants are the largest natural source in producing bioactive compounds called plant secondary metabolites. However, the high level of human activity affects the preservation of nature, causing various impacts on the sustainability of plants. Various environmental factors, such as air pollution produced by vehicles, reduction of productive land due to development, and exploitation of substantial natural resources have become obstacles in the cultivation of medicinal plants. In addition, plants grown naturally are currently experiencing various contaminations from contamination of pesticides, herbicides, fungicides, and heavy metals from industrial waste. Therefore, to overcome these problems, a biotechnology method in in vitro culture was created for the cultivation and production of pharmacologically useful plant biomass and secondary metabolites. However, in its development, in vitro culture requires an additive that is able to optimize the increase in biomass and secondary metabolites, namely elicitors. One of the elicitors that has been proven effective is chitosan. Based on this, this review attempts to comprehensively describe the effect of elicitation of chitosan on the productivity of biomass and secondary metabolites in in vitro adventitious root culture in various plant species.

Keywords: Adventitious root culture in vitro, elicitor, chitosan, biomass, secondary metabolites, bioreactor.