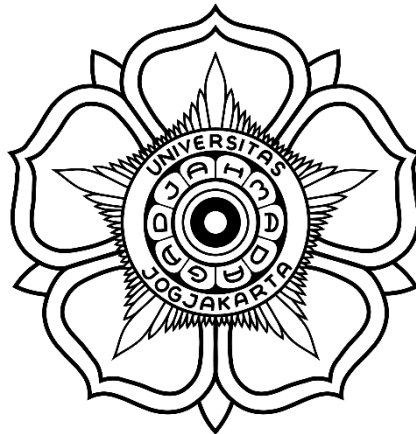


**DEVELOPMENT OF SILVER ION-DOPED CARBONATED
HYDROXYAPATITE-BASED THREE-DIMENSIONAL
PRINTING MEMBRANE FOR PERIODONTAL
TISSUE REGENERATION**

(In vitro study and preliminary study using organ-on-a-chip prototype)

DISSERTATION

to fulfill part of the requirements for obtaining a Doctoral Degree
in the Dental Science Doctoral Study Program



submitted by:

MUH. HIDAYAT SYAHRUDDIN
22/507122/SKG/00100

**DENTAL SCIENCE DOCTORAL STUDY PROGRAM
FACULTY OF DENTISTRY
UNIVERSITAS GADJAH MADA
YOGYAKARTA
2025**

APPROVAL PAGE

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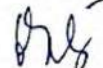
and has been defended in front of the Dissertation Defense Committee
on Monday, 28 July 2025

Dissertation Defense Committee

Promoter

Chief of Defense Committee Member





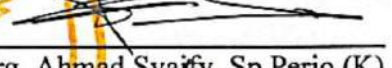
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Co-Promoters

Assesors and examiners

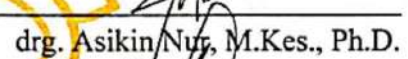




Dr. Rahmi Anggraeni, S.Kep., M.Sc.

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Dr. drg. Dyah Irnawati, M.S.

Dr. drg. Archadian Nuryanti, M.Kes.



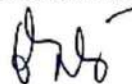


apl. Prof. Natalia Beshchasna

drg. Heribertus Dedy K. Y., M.Biotech., Ph.D.

This dissertation has been accepted as one of the requirements to obtain
a Doctoral Degree in Yogyakarta, 28 July 2025.

Head of Dental Science Doctoral Study Program

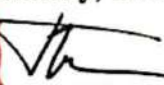


Prof. Dr. drg. Widowati Siswomihardjo, M.S.

Recognized by,

Dean of the Faculty of Dentistry, Universitas Gadjah Mada





Prof. drg. Suryono, S.H., M.M., Ph.D.