

FINAL PROJECT

**THE EFFECT OF GLYCEROL ADDITION ON THE
TENSILE BEHAVIOURS AND UV TRANSMITTANCE
OF BIOCOMPOSITE FILMS WITH POLYVINYL
ALCOHOL MATRIX AND VARIATIONS OF
GAMBIER**

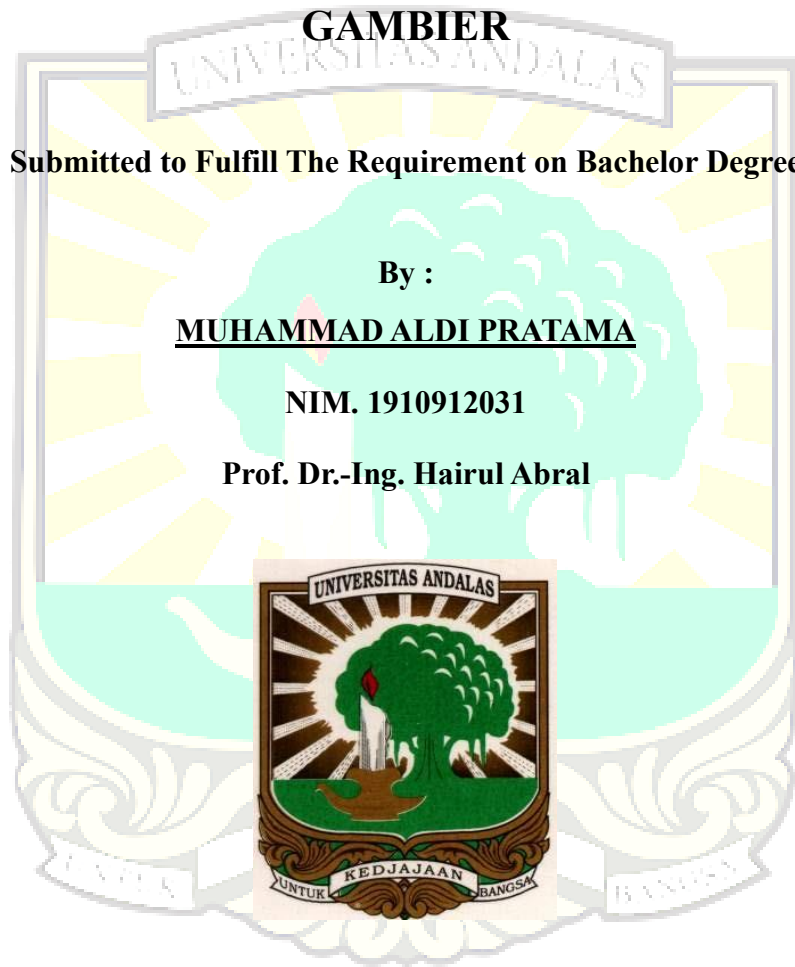
Submitted to Fulfill The Requirement on Bachelor Degree

By :

MUHAMMAD ALDI PRATAMA

NIM. 1910912031

Prof. Dr.-Ing. Hairul Abral



DEPARTMENT OF MECHANICAL ENGINEERING

FACULTY OF ENGINEERING

ANDALAS UNIVERSITY

PADANG

2024

ABSTRACT

The plastic we use today is made from non-degradable petrochemicals which can pollute the environment because it is difficult and takes a very long time to decompose. Biocomposites are considered as an ecological choice aimed at limiting the environmental impact of plastics. In this study, polyvinyl alcohol (PVA) is used because it has good biocompatibility and non-toxic properties. Biocomposite research needs to be studied to reinforce the properties of PVA. Gambier contains of a catechin which has the ability of anti-flame, anti-oxidant, anti-UV, and also anti-bacterial. Glycerol is used as a plasticizer to decrease the stiffness, increase the elongation, and improve the anti-UV ability of the PVA/Gambier biocomposite films.

In this study, there were three variations of gambier concentrations, which are 2%, 3%, and 5%, with 10% of PVA, and 3% of glycerol in 100 gram aquades. This study was conducted to determine the effect of additional glycerol on the variations of Gambier with PVA matrix biocomposite film of PVA/Gambier biocomposite film. Tensile testing was carried out using an ASTM D638-14 type 5 standard. Transmittance UV Testing for UV-Light Absorption Testing of this biocomposite sheet follows ASTM D1003-00.

The addition of gambier increases the tensile strength and modulus elasticity values. The decrease in tensile strength and modulus of elasticity in films with a gambier concentration of 5% occurs due to agglomeration and accumulation of excess polyphenolic compounds, thereby reducing the tensile strength and modulus of elasticity. Adding glycerol to the biocomposite film increases the elongation at break because of the plasticizing effect of glycerol reducing the stiffness and improving the free volume of the polymeric chains. Adding glycerol to the biocomposite film is increasing the UV protective effect and makes the film darker than the film without glycerol.

Keyword : PVA, Uncaria gambir, Glycerol, Tensile Testing, UV