

ABSTRACT

Salsabila Shofia Ramadhani. 24020222140080. ***The Effect of Drying Temperature Differences on the Antimicrobial Activity of Tempe Rhizopus sp. R7 Formulated into Herbal Powder.*** Under the guidance of Sri Pujiyanto and Anto Budiharjo.

Fermented tempe by Rhizopus sp. R7 contains bioactive compounds with potential as natural antimicrobial agents. Developing tempe into herbal powder requires an appropriate drying process to prevent heat-induced degradation of active compounds. This study aimed to determine the effect of drying temperature variations (50°C, 60°C, and 70°C for 6 hours) on the antimicrobial activity of tempe powder against Escherichia coli, and to identify bioactive compounds through GC-MS analysis. Antimicrobial testing was conducted using the well diffusion method with 96% ethanol extract. Results showed that drying temperature significantly affected antimicrobial activity ($F = 17.50$; $p = 0.003$). A temperature of 60°C produced the highest inhibition zone ($18,75 \pm 1,33$ mm, strong category) and the lowest moisture content (9.597%), meeting the Indonesian Herbal Pharmacopoeia standard ($\leq 10\%$). A temperature of 70°C yielded the lowest activity ($14,83 \pm 0,30$ mm) due to thermal degradation and case hardening. GC-MS analysis identified 41 compounds in the 60°C sample, with linoleic acid (60.62%), palmitic acid (18.20%), and linoleyl alcohol (5.57%) as major components working synergistically through multitarget mechanisms against E. coli. A drying temperature of 60°C is recommended as the optimal condition for producing Rhizopus sp. R7 tempe herbal powder.

Keywords: tempe, herbal powder, drying temperature, antimicrobial, Rhizopus sp. R7, Escherichia coli, GC-MS.