

Comparison of Physicochemical Characteristics of Grade 1,2, and 3 Liquid Smoke Based on Plantation Waste

Anni Nur Aisyah, S.TP., M.Si. as a counselor

Dinda Eka Febriani

*Plantation Plant Cultivation Study Program
Departement of Agricultural Production*

ABSTRACT

Indonesia is an agricultural country with a rapidly growing plantation sector, particularly for coffee, coconut, and cocoa commodities. However, waste from processing these commodities has not been optimally utilized. Plantation waste such as coffee husks, coffee fruit skins, coconut shells, and cocoa pod skins have the potential to be processed into liquid smoke through a multistage pyrolysis and purification process. This study aims to compare the physicochemical characteristics of grade 1, grade 2, and grade 3 liquid smoke produced from four types of plantation waste. The study used a Factorial Completely Randomized Design (FARD) with two factors: raw material type and liquid smoke grade level, with a total of 36 experimental units. Observed parameters included process temperature, pyrolysis/distillation time, yield, color, density, and pH. Data were analyzed using ANOVA followed by a 5% LSD test. The results showed that the level of purification significantly affected all liquid smoke quality parameters. Grade 1 had the highest yield (86.29–89.94%), the clearest color, and a pH that met food standards, making it a potential natural preservative. Grade 2 has a medium yield and is suitable for agricultural applications, while grade 3 has the lowest yield, the most intense color, and a high tar content, making it recommended for non-food applications. Grade 1 coconut shells offer the most potential combination for natural preservatives or botanical pesticides.

Keywords: *Liquid smoke, plantation, pyrolysis*