

## ABSTRACT

The natural germination of oil palm seeds requires approximately 90–120 days due to physical dormancy caused by the hard endokarp layer. One potential method to enhance germination success is the application of plasma radiation combined with liquid organic fertilizer (LOF). This study aimed to analyze the effects of plasma radiation duration and LOF concentration and to determine the most effective treatment combination for improving oil palm seed germination. A completely randomized design (CRD) with a  $4 \times 5$  factorial arrangement and six replications was employed, involving plasma radiation durations (0, 15, 25 and 35 minutes) and LOF concentrations (0, 10, 20, 30 and 40 mL L<sup>-1</sup>). The observed parameters included germination percentage (germinated, dormant, moldy, and rotten seeds), germination time, and plumule and radicle length. Data were analyzed using analysis of variance (ANOVA) at a 95% confidence level, followed by Duncan's Multiple Range Test (DMRT). The results showed that plasma radiation for 35 minutes combined with 30 mL L<sup>-1</sup> LOF resulted in a 66.67% germination rate, reduced germination time to 23.33 days, increased plumule lengths to 10.78 cm and radicle lengths 6.27 cm compared to the control.

*Keywords: dormancy, germination, oil palm, plasma treatment, liquid organic fertilizer.*