

ABSTRACT

The global incidence of herbicide resistance has reached an alarming rate, similar to that observed for antibiotic resistance. This research aims to investigate the emerging synergistic effects of three widely used herbicides: Glufosinate, Paraquat, and Glyphosate. The combinations of these herbicides have demonstrated promising synergistic effects, which could provide a feasible solution to herbicide resistance arising from unregulated reliance on a single mode of action. According to preliminary *in silico* findings, the herbicide combinations of Glufosinate (Glu) and Paraquat (Par), as well as Glyphosate (Gly) and Paraquat (Par), are potentially synergistic, but have not been shown in wet lab experiments. As a result, in this research, the Glu-Par and Gly-Par synergism will be tested against a chosen dicotyledon (*Nicotiana tabacum*) and a monocotyledon (*Cyperus rotundus*). The experiment begins by preparing three readily available herbicide types and their combined formulations and by treating *lembang* soil-grown plants for comparative evaluation with a negative control, a positive control, and herbicide combinations at different ratios. The treatment before (pre) and after (post) germination were analyzed using green color analysis in ImageJ, which may highlight the synergistic effects of Glu-Par and Gly-Par mixtures. The experimental results showed that the herbicide combination treatment groups in two different treatment settings effectively suppressed the growth and development of two target model plant groups, monocots and dicots.

Keywords: *Herbicide, Glufosinate; Glyphosate; Paraquat; Synergism*