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Appropriate Fomesafen (5-(2-chloro-4-(trifluoromethyl)-phenoxy)-N-(methylsulfonyl)-2-nitrobenzamide) rate for enhancing isoflavones concentration in soybean

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Isoflavones have been implicated in many health-related effects. Postemergence herbicide of diphenyl group is known as simulator for enhancing phenolic compounds such as isoflavones in soybean plant. This research was to investigate the proper application rate of herbicide fomesafen for soybean variety (CM60; rust tolerant). The experiment was conducted at CMFCRC, Chiangmai in both dry and rainy seasons during 2013-2014. It was split plot design in RCB with four replications. Main plot consisted of two application times; R1 and R5 stage of development when compared with untreated control. Sub plot consisted of three application rates; 62.5, 125, and 187.5 g.ai ha⁻¹. Results revealed that the application of fomesafen at the R1 stage gave the same results at the R5 stage. Total isoflavones concentration in soybean seed applied with the rate of 187.5 g.ai ha⁻¹ were higher than those applied with the rate of 62.5 and 125 g.ai ha⁻¹. The concentration increased 34.4-52.2 μg g⁻¹ (51.8-65.2 %) and 32.9-34.9 μg g⁻¹ (29.6-35.9 %) when compared with untreated control in dry and rainy seasons, respectively. In dry season, 187.5 g.ai ha⁻¹ of fomesafen application also illustrated the highest concentration of each individual isoflavone in both groups of glucoside and aglycone whereas the variation of aglycone group and genistin concentration showed in rainy season. The use of fomesafen did not result in differences in soybean yield of all treatments except some yield components which showed slight reduction of node per plant and seed size in dry season, 2013 and rainy season, 2014, respectively. Furthermore, the production cost gently increased (0.05 USD ha⁻¹) from usual.