Patcharawalai Chalermchaimontree 2011: Effects of Neonicotinoid on Germination and Vigor of Rice (*Oryza sativa*) Seed. Master of Science (Agronomy), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Wanchai Chanprasert, Ph.D. 109 pages.

This research evaluated the effects of 2 neonicotinoids, thiamethoxam and imidacloprid on seed germination and seedling vigor of rice seed (Khao Dawk Mali 105) and on some physiological changes, i.e., phenolic compounds, soluble protein, amylase and specific activity of amylase enzyme in rice seedling 1-5 days old. Experiment 1, four rates of thiamethoxam 0, 2.5, 5.0 and 7.5 ml/25 kg seed in 3 liters of water were compared and it was found that thiamethoxam at the rate of 5.0 ml gave the best result in terms of seed germination and seedling vigor. In experiment 2, unaged and aged seed were treated with thiamethoxam at the rate of 5.0 ml (Cruiser® 25 WG) per 25 kg of seed in 3 liters of water and imidacloprid at the rate of 5 g (Gaucho® 70 WS) per 25 kg seed in 3 liters of water comparing with non-treated control. The results showed that both neonicotinoids obviously increased seedling vigor which was related to the increases of phenolic compounds and protein content in rice seedling aged 1-5 days old. However, amylase enzyme increased only in 1, 4 and 5-day old seedlings and specific activity of amylase responded inconsistently to neonicotinoid seed treatment in unaged seed, while the specific activity of amylase clearly decreased in seedlings of aged seed treated with nenonicotinoids. It can be concluded that phenolic compounds and soluble protein content played an important role while amylase enzyme showed partially activity for increasing seedling vigor in neonicotinoid-treated seed. There may be some other enzymes that involved in increasing seedling vigor of rice seed treated with thiamethoxam and imidacloprid.

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