Parkpoom Punyadee 2008: Acetolactate Synthase Activity in Selected Imazapyr-Resistant Sugarcane Cells. Master of Science (Agricultural Biotechnology), Major Field: Agricultural Biotechnology, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Tosapon Pornprom, Ph.D. 71 pages.

Selection of sugarcane (*Saccharum* spp.) cells resistant to imazapyr was carried out using callus and cell suspension induced from the tight young furled leaves of sugarcane clone K 95-282. The callus and cell suspension were cultured on modified MS medium supplemented with 3 mg/L 2,4-D, 500 mg/L casein hydrolysate, 100 mg/L myo-inositol, 10 % coconut water and pH 5.70. A sugarcane cell line from K 95-282 resistant to 1 μM imazapyr was obtained after 420 days of selection, using a stepwise selection with increasing concentrations of imazapyr from 0.1 to 1 μM. It was referred to as 1 μM imazapyr-resistant sugarcane cell line. The results indicated that the resistance index of the resistant cells line was 116.7-fold higher than that of the normal cells. To establish the biochemical mechanism of resistance to imazapyr, acetolactate synthase (ALS) activity was determined in normal and resistant cells. Based on I_{50} value, ALS activity of the resistant cells was 6.5-fold higher than that of the normal cells at various concentrations of imazapyr from 0.01 to 100 μM. These results suggested that the biochemical mechanism of imazapyr resistance in the sugarcane cell line appeared to be an alteration at the target site, based on the ALS activity, leading to less sensitivity to imazapyr.

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