The development of transgenic crops expressing insecticidal toxin genes from the bacterium *Bacillus thuringiensis* (Bt) can control targeted pests and increase crop yields. However, there is considerable concern that target insect develops resistance to Bt crops or secondary pest becomes primary pests in Bt crops planting region. The difference of Bt protein in different tissues of Bt crops is directly correlated to low susceptibility of target pests or secondary pests. In the present study, polyphagous pests *Spodoptera litura* larvae, fed on leaves or kernels of two Bt corns (5422Bt1, 5422CBCL) expressing Cry1Ab and their near-isoline (5422), were used to investigate enzymes activities in midgut of larvae. Moreover, Cry1Ab content in different tissues of Bt corns, Cry1Ab ingestion and activation in larvae midgut were determined. When *S. litura* larvae were fed on leaves of Bt corns, enzymes activities of catalase (CAT), superoxide dismutase (SOD), adenosine triphosphatase (ATPase), peroxidase (POD) in midgut were higher than 5422 leaves treatments, and the highest levels were all detected in 5422Bt1 treatments. On the contrary, activities of above enzymes in midgut from 5422 kernels treatments were higher than that of Bt corns treatments, and the lowest levels were all detected in 5422Bt1 treatments. Enzyme-linked immunosorbent assay (ELISA) results showed that significantly more Cry1Ab was detected in leaves of Bt corns than in kernels. In addition, less Cry1Ab was ingested by larvae fed on kernels of Bt corns without activating 130 kDa protoxin into 65 kDa active fragment as compared with leaves treatments, and significantly more Cry1Ab was ingested by larvae from 5422Bt1 than 5422CBCL treatment. Therefore, different Cry1Ab content in different tissues of Bt corns and pests’ ingestion and activation of Cry1Ab can cause the difference of enzymes activities in midgut, which may lead to *S. litura* larvae low susceptibility to Bt corns.

**Keywords:** Cry1Ab, secondary pest, Bt corn, *Spodoptera litura*