Effects of hydroxamic acids on electron transport and their cellular location in corn

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DIMBOA, the main hydroxamic acid in maize and wheat, is found mainly as a glucoside in intact maize plants; when the tissue is damaged a ?-glucosidase releases DIMBOA from DIMBOA-glucoside. The effects of DIMBOA and its glucoside were studied in maize mitochondria and chloroplasts. DIMBOA reduced electron transport in both mitochondria and chloroplasts with an ID50 of 1.8 and 1.2 mM, respectively. DIMBOA-glucoside had no inhibitory effect. The glucoside and the enzyme were both present in mesophyll parenchyma protoplasts. When these protoplasts were fractionated, DIMBOA-glucoside was found in the extravacuolar fraction, while the DIMBOA-?-glucosidase was in the vacuole. This seems to be an efficient mechanism to prevent aglycone toxicity in vivo.