# Effects of Water and Cold Stresses in Castor Bean (*Ricinus communis)* Phospholipases C and D Activities

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Castor bean is an industrial culture explored in function of its seeds oil. The modern industry uses the oil extracted from its seeds in the manufacture of many products like explosives, plastics, fertilizers and cosmetics, as well as laxatives and antimicrobial preparations. Nowadays, castor bean has also been seen as a promising matter for biodiesel. Growth of land plants is affected by water stress that induces various biochemical and physiological responses. Plants adapt to water stress in order to survive under these environmental stress conditions. Abscisic acid (ABA) is a hormone involved in responses to cold and water stress. Recent evidence indicates that a conserved response to ABA is increasing the levels of PA (phosphatidic acid). PA has only recently been identified as an important signaling molecule in plants. PA is generated via two distinct phospholipase pathways: directly by phospholipase D (PLD) or produced via the sequential action of phospholipase C (PLC) and diacylglycerol (DAG) kinase (DGK). In order to investigate the defense response in castor bean against abiotic stresses, we analyzed the effect of cold and drought upon the PLC and PLD activities. We observed that both PLD activities were increased after drought stress. On the other hand, PLC activity was reduced after dehydration. Cold treatment increased PLD activities with differences in terms of time of exposure. PLC activity only was increased 60 minutes after treatment. Our results could indicate that different phospholipases were implicated in maintaining high levels of PA during signaling events after abiotic stresses like cold and drought.

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