



Expression of genes related to tolerance to low temperature for maize seed germination

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ABSTRACT. The aim of this study was to characterize maize lines tolerant to cold temperatures during the germination process. Seeds from lines with different levels of tolerance to low temperatures were used; 3 lines were classified as tolerant and 3 as susceptible to low germination temperatures. A field was set up to multiply seeds from selected lines. After the seeds were harvested and classified, we conducted physiological tests and analyzed fatty acid content of palmitic, stearic, oleic, linoleic, linolenic, and eicosenoic acids. In proteomic analysis, the expression of heat-resistant proteins, including catalase, peroxidase, esterase, superoxide dismutase, and α -amylase, were evaluated. Transcript analysis was used to measure the expression of the genes *AOX1*, *AOX2*, *ZmMPK-17*, and *ZmAN-13*. The material showing the highest susceptibility to low germination temperatures contained high saturated fatty acid content. Expression of α -amylase in seeds soaked for 72 h at a temperature of 10°C was lower than expression of α -amylase when soaked at 25°C for the same amount of time. We observed variation in the expression of heat-resistant proteins

in seeds of the lines evaluated. The genes *AOX* and *Zm-ANI3* were promising for use in identifying maize materials that are tolerant to low germination temperatures.

Key words: Abiotic stress; Fatty acids; Proteomics; Transcriptomics; *Zea mays*