ACETIC ACID APPLICATION TO ENHANCE DROUGHT TOLERANCE IN SOYBEAN

Elizandra Carneiro Andreata[1];Isabel Duarte Coutinho[2]; Silvana Regina Rockenbach Marin[4]; Caroline Fonceca Belinato[3]; Mayla Daiane Corrêa Molinari[1];Daniel de Amorin Barbosa[1];Alexandre Lima Nepomuceno[4], Luiz Alberto Colnago[2]; Liliane Marcia Mertz-Henning[4]*

[1]State University of Londrina - UEL; PPGGBM - Postgraduate Program in Genetics and Molecular Biology, Londrina - PR. [2]Embrapa Instrumentation Nuclear Magnetic Resonance Laboratory, São Carlos - SP. [3] State University of Maringá - UEM; PBA - Postgraduate Program in Environmental Biotechnology.[4]Brazilian Agricultural Research Corporation - Embrapa Soja, Londrina - PR.

* elizandraandreatta12@gmail.com

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Soybean is one of the commodities of major economic importance in nowadays. However, the presence of abiotic factors, such as water deficit (WD), is one of the impasses to be overcome by crops in the agricultural sector. Studies conducted up to now suggest that the exogenous application of acetic acid may be an interesting alternative to mitigate the effects of drought on the plants how maize, colza, and Arabidopsis thaliana. Thus, tolerance to water deficit (WD), is mediated by a chemical priming due to the application of acetic acid causing a mechanism of "Epigenetic memory", due to pre-exposure to stress, allowing plants to prepare for coping with an adverse condition. The objective of the present investigation was to evaluate the effect and changes of the metabolites in plants of soybean subjected to a previous treatment of exogenous acetic acid followed by water deficit. The experiment was carried out in a greenhouse in a 2 x 4 x 2 factorial scheme, with two genotypes (BR 16 and Embrapa 48), four doses of acetic acid (0, 10, 20 and 40 mmol) and two water conditions (WD and control), in randomized blocks with nine replicates. When they reach the stage V3, the pretreatment of the acetic acid solution was applied by capillarity, in the concentrations of 0, 10, 20 and 40 mmol, for nine days, while the control group remained under ideal irrigation. After 7 days under stress, foliar samples were collected, lyophilized, for further analyses of metabolites by nuclear magnetic resonance (1H NMR) spectroscopy, the data obtained were subjected to analysis of main components. The present study revealed that the cultivar BR16 did not present a cluster between the different treatments. On the other hand, for the samples of the cultivar Embrapa 48, wherever differences were identified between the WD and control treatments, mainly in the concentrations of 20 and 40 mmol, showing higher levels in the spectrum reading in plants subjected to acetic acid application and grown under ideal irrigation (control). In general, significant changes signals were observed levels in the of control samples, were corresponding to citric acid, while the WD samples showed a higher correlation with fumaric acid, lactic acid, glucose, and amino acids.