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Metabolomic evaluation of in vitro 31P Nuclear Magnetic Resonance (NMR) in maize seedlings treated with humic acids

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We reported changes on distribution of P containing soluble metabolites from maize root seedlings treated with humic acids (HA) by in vitro 31P NMR techniques. We observed that plants treated with HA had shown an increase of the phosphatidyl choline species. These compounds are involved with integrity and fluidity properties of plasma membrane. Moreover, HA root-treated decreased its nucleoside triphosphate (NTP) content with consequent increase of ADP and inorganic phosphate, which was compatible with literature reports indicating higher plasma membrane H+-ATPase activity. Finally, we also detected an increase on glycose-6-phosphate content in root seedlings treated with HA suggesting changes in glycolitic pathways as previously reported by Nardi et al. (2007). P-bound soluble metabolites determination by 31P NMR seems to be useful to detect changes on plant metabolites induced by HA.