

Abstract

In this paper, we describe a study concerning the determination of some characteristics of soybean seedlings and the detection of acid phosphatase activities towards different substrates during the germination. Enzyme activities with *p*-nitrophenylphosphate (*p*NPP) and inorganic pyrophosphate (PPi) as substrates were detected from the 5th and 7th days after germination, respectively. Acid phosphatase activities with tyrosine phosphate (TyrP), glucose-6-phosphate (G6P) and phosphoenol pyruvate (PEP) were also observed but to a lesser extent. Under the same conditions, no enzyme activity was detected with phytic acid (PhyAc) as substrate. The appearance of phosphatase activity was coincident with the decrease of inorganic phosphate content during germination; over the same period, the protein content increased up to the 5th day, decreased until the 8th day, and remained constant after this period. Relative to phosphatase activity in the cotyledons, the activities detected in the hypocotyl and roots were 82% and 38%, respectively. During storage the enzyme maintained about 63% of its activity for 3 months at 5 °C. The specificity constant (V_{max}/K_m) values for *p*NPP and PPi were 212 and 64 $\mu\text{kat mM}^{-1} \text{mg}^{-1}$, respectively. Amongst the substrates tested, PPi could be a potential physiological substrate for acid phosphatase during the germination of soybean seeds. Abbreviations: G6P, glucose-6-phosphate; PAGE, polyacrylamide gel electrophoresis; PEP, phosphoenol pyruvate; PhyAc, phytic acid; *p*NPP, *p*-nitrophenylphosphate; PPi, inorganic pyrophosphate; TyrP, tyrosine phosphate