

ダイズ種子胚軸の発芽過程における酵素活性の 増大について

奥 田 慎 一*

On the Increase in Enzyme Activities in Embryonic Axes of Soybean Seeds during Germination

Shin-ichi Okuda

Abstract

The changes in enzyme activities in embryonic axes of soybean seeds during germination were investigated. After 48 hr of germination, the activities of 6-phosphogluconate, glucose-6-phosphate, and L-isocitrate dehydrogenases were 2~4 times as high those of embryonic axes from dry seeds. The activities of L-glutamate and meso-D-diaminopimelate dehydrogenases and of L-isocitritase, however, were still low. The activities of L-malate dehydrogenase and acid phosphatase increased strikingly after germination, and the activities of the germinated axes were about 80 (at 48 hr) and 27 (at 40 hr) times, respectively, those of embryonic axes from dry seeds. The elevated activity of acid phosphatase was due to *de novo* synthesis of enzyme protein in the embryonic axes, not to activation of the enzyme protein, or to transfer of the enzyme protein from germinating cotyledons. Acid phosphatase activity in embryonic axes increased in a very early stage of protein synthesis in the axes. The pronounced increase in L-malate dehydrogenase activity was mainly due to activation of the enzyme protein by imbibition, not to *de novo* synthesis of enzyme protein, or to transfer of the enzyme protein from germinating cotyledons. Expression of protein in embryonic axes of soybean seeds during germination was discussed.

はじめに

生物は通常80%前後の水分を含んでおり、多くの生命活動が水系中で営まれている。これに反し、種子の含水量は10%程度にまで低下し、普通の生物は生命を維持できないような極度の脱水状態にある¹⁾。乾燥して親植物から離れた種子は一時的な休息期に入るが、この間にも完熟への過程をたどり、発芽への用意を整える。従って、種子の保存状態により発芽率の低下をもたらすことがある。

完熟した種子の代謝活性は実質的にゼロとな

っているが、種子が適当な条件のもとで吸水すると胚は活性化され、種子中に貯蔵された栄養分を利用して成長を開始する。これが種子の発芽であり、肉眼的には幼根(芽)が種皮を破って突出するのが観察される(図1)。従って、

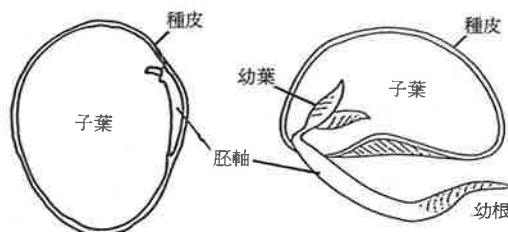


図1 双子葉無胚乳種子の芽生え

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* 食品工学研究所