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β-GLUCOSIDASE ACTIVITY OF SOYBEAN EPICOTYLS IN GERMINATION

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Resumo:

Isoflavones are compounds with benefits for human health and they are the mainly forms of glycosides in vegetables.

β-glucosidase (β-D-glucoside glucohydrolase, E.C.3.2.1.21) hydrolyses β-D-glucosides releasing glucose and forming aglycone isoflavones. The aglycone isoflavone is the most bioavailable form of the glycosides. β-glucosidase that converts glycosidics isoflavones into aglycones can be originated from the metabolism of either fungi or bacteria, and other different processing methodologies.

The aim of this work was to investigate the β-glucosidase activity in soybeans Epicotyls during 168h of germination to obtain an alternative source of enzyme for purification and application.

Seeds of soybean the cultivar BRS 257 were germinated following the standard method, by utilizing two germination chambers (one with photoperiod of 10 h of light and the other without light) at the temperature of 35 ºC and relative humidity of 100% for different periods of time (72, 96, 120, 144 and 168h).

The epicotyls start to appear at 72h, they were separated for each experimental time and were freeze-dried.

β-glucosidase from the epicotyls was extracted with citrate buffer containing NaCl (0,1M, pH 4,5).

Soluble protein content was determined as described by LOWRY, et. al., and expressed as gram per 100 g of sample in dry basis (%). β-glucosidase activity was determined using p-nitrophenyl-b-D-glucopiranoside as substrate, as described by Matsuura and Obata and expressed as units of activity per gram of sample in dry basis (UA.g-1).

β-glucosidase specific activity was the ratio between β-glucosidase activity and soluble protein content and it was expressed as UA per gram of soluble protein (UA.g-1SP).

In the cotyledons of soybean seeds before germination, the protein content was 15.36%, the β-glucosidase activity was 146.64 UA.g-1 and the specific activity was 0.97 UA.g-1SP.In the seeds germinated under light conditions, the β-glucosidase activity of the epicotyls increased from 72h of growth to presented the maximum activity at 144h (3.84x103 UA.g-1); at 168 h, the β-glucosidase activity started to decline.

In samples that were germinated without light, the β-glucosidase activity increased from 72h to reach its maximum activity at 96h (3.14x103 UA.g-1), and declined at 120 and 144h.

It was observed that activitity increased again at 168 h (2.72x103 UA.g-1 with no significant difference when compared to 96h).

The specific activity was higher at 144h of light germination (8.69 UA.g-1 SP), almost 9 times higher than the cotyledons β-glucosidase specific activity.

During the development of plant, the photosynthesis can give some energetic advantages for development of epicotyls into first leaves of plants rich in nitrogen.

This advantage confers accelerated growth allowing the plant to become self-sufficient quickly and be able to respond to environmental conditions.

In plants, β-glucosidase activity involves, among several processes, the mechanisms of defense against microbes, insects and parasitic plants.

β-glucosidase activity of epicotyls germinated under light was 26 times higher at 144h than cotyledons without germination and 1.22 times higher than those germinated without light for 96h, showing that epicotyls from soybean germinated with light over 144h would be a good source of β-glucosidase.