Acta Biologica Szeged 17 (1—4), pp. 123—126 (1971)

# CHANGE IN THE PEROXIDASE ENZYME ACTIVITY IN THE LEAVES OF WHEAT AND BARLEY SEEDLINGS

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(Received April 20, 1971)

## Introduction

Peroxidase catalyes the oxidation of indolacetic acid as plant growth hormone and vice versa, the indolacetic acid changes the peroxidase activity in the plant tissues. Simultaneously with aging, the hormone supply grows weaker, making possible the appearance of a new isoenzyme in intact plants (Ockerse—Siegel—Galston, 1966).

It is indicated by preliminary investigations that after removing the roots of seedlings, in the detached leaves the activity of several enzymes grew higher, taken as a function of time, in this way that of peroxidase, as well (Kisbán, 1964).

In this paper we are investigating how the enzyme activity of peroxidase changes in the leaves of wheat and barley seedlings after removing the root, and as a result of various treatments.

## Materials and Methods

The experiments were carried out with seven-day wheat seedlings „Bánkúti 1201" and „MFB" seedlings (hybrid barley of Martonvásár). The plants were grown under conditioned circumstances (Horváth—Lasztity, 1965). The root of seedlings grown in light and etiolated was removed on the seventh day. The detached leaves were placed into running tap water, the tap water solution of $10^{-2}$ M kinetin, the tap water solution of 0,02 M KCN. The etiolated leaves, together with the rooted controls, were placed in light, too.

Dikorint, the soda-salt of 2—4 dichlorophenoxiacetic acid was used in a 666 p. p. m. concentration.

The enzyme, after the seedlings had been derooted and treated, was measured, taken as a function of time, in 5 to 7 repetitions, according to the method of Solymossy—Farkas, 1963.

## Discussion and evaluation of experimental results

We demonstrate in Fig. 1 the results of enzyme activity measured in the detached leaves of wheat seedlings and of rooted cotrol plants, taken as a function of time.

We have observed in the detached leaves in every case a higher peroxidase activity than in the rooted controls. On the injured surface the respiration is of higher degree. As a result of hydrogenperoxyde, being present in large quantities and accumulated owing to the extraordinary metabolism, the per-

oxidase enzyme shows a higher activity that may have been a consequence of allosteric stimulation, as well.

In Fig. 2 we sum up the enzyme activity measured in the leaves of etiolated isolated and intact wheat seedlings, taken as a function of time.

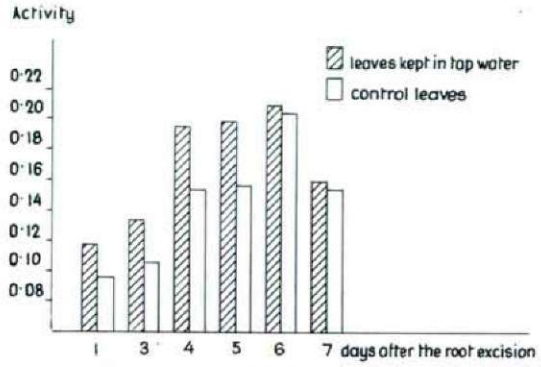


Fig. 1

It is obvious that after removing the root, the enzyme activity is already on the first day higher than it is in the rooted control. The difference continues till the seventh day. The decrease appearing on the seventh day, at both variants, already refers to a lack in nutrient supply.

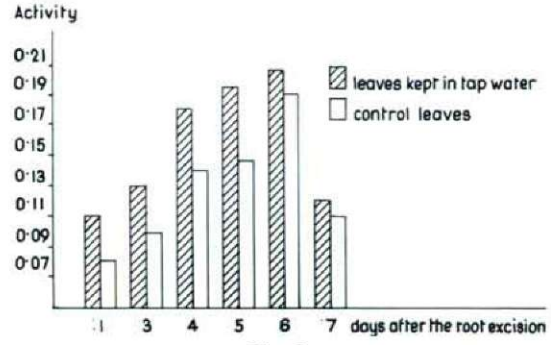


Fig. 2

In Fig. 3 we compare the enzyme activity of leaves kept in kinetin-, KCN-solution and in running tap water to the control, on the fourth day of treatment.

Aging is inhibited by kinetin for a time but the enzyme activity is increased as compared to the control. Aging is increased by KCN in detached leaves, the decay of living parts is obvious. This process is accompanied by an increased

$H_2O_2$ production; the enzyme activity showed therefore, here, the greatest intensity as compared to the other variants.

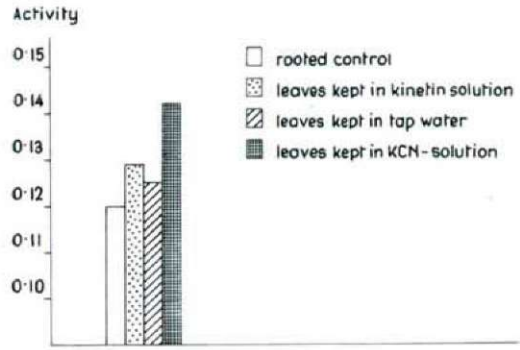


Fig. 3

In Fig. 4 it can be seen that as we grew the seedlings etiolated for seven days, then isolated the leaves and, together with the rooted plants, put them in light, the enzyme activity was increased in the rooted plants by the longer duration of the time of illumination. The detached leaves were in KCN-solution. The aging process of the detached leaves was accelerated very much by light and KCN; which was indicated by the strikingly high enzyme activity.

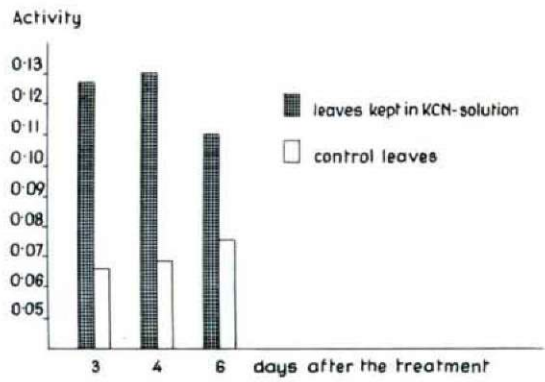


Fig. 4

It may be seen in Fig. 5 that Dikonirt, the soda-salt of 2—4 dichlorophenoxiacetic acid kept the enzyme activity on a high level, as compared to the control, for 1—8 days after germination. The applied very high Dikonirt concentration (666 p. p. m.) has induced a destructiv e change in the barley seedlings, obvious even phenotypically bringing about an aging in their metabolism.

Summing up our experimental results, it may be said, that both in the green leaves and in the etiolated ones, after the root system having been removed, the peroxidase enzyme activity increased, taken as a function of time. A similar activity increase was caused by 2—4 D. — KCN and light, applied jointly, have accelerated the process in etiolated leaves.

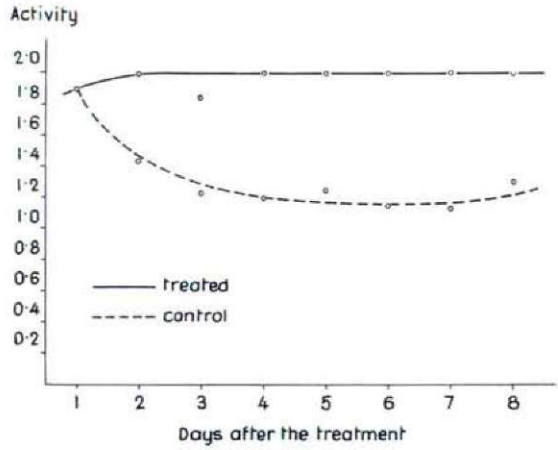


Fig. 5

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