

BIOSYNTHETIC ACTIVITIES ARE NOT INVOLVED IN GERMINATION AND METABOLIC SEED REACTIVATION PROMOTED BY FUSICOCCIN

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Fusicoccin (FC), a well studied plant toxin which has been suggested to act directly at plasmamembrane level by stimulating proton pump, promotes seed germination. The effect of the toxin on germination is in relation with proton extrusion stimulation. This activity in fact is accompanied by the increase in potassium uptake and the hyperpolarization of negative transmembrane electric potential. Membrane activation can promote seed germination through wall loosening dependent on the acidification of the free spaces and the increase in the osmotic potential following from potassium uptake and metabolic activation. The effect of FC on the reactivation of the biosyntheses, which starts during germination, can be studied by the increase in the RNA and DNA levels. FC, in agreement with its effect on membrane functions greatly stimulated fresh weight increase of the embryo axes of radish seeds (*Raphanus sativus*) with respect to the control up to 48h germination (+108% at 24h and +20% at 48h). The increase in the RNA level was slightly inhibited by FC during early 24h incubation (-6%), in the following period the inhibition of RNA increase was higher (-65%). FC inhibited also DNA increase in the first 24h, in the following period DNA level decreased in the presence of the toxin. Protein synthesis, measured as long term incorporation of tritium administered as labelled water, was slightly inhibited by FC in the early 24h (-26%) and the inhibition was higher in the following period (-62%).

Since the FC effect on the reactivation of the biosyntheses might be in relation also with the enhanced water uptake, the effect of the toxin in the presence of high osmotic pressure treatment which reduces water uptake, can clarify the effect of the toxin on biosyntheses.

FC stimulates fresh weight increase in the presence of high osmotic potential (0.3 Osm mannitol): fresh weight increase was very similar to the one in water. The toxin in the presence of high osmotic pressure greatly reduced RNA and DNA increase. The inhibition was higher with respect to the seeds incubated in FC in the absence of high osmotic pressure. Nevertheless the inhibiting effect of the toxin in all the conditions investigated stimulated the increase in the level of the calcium modulator protein calmodulin. These results suggest that FC in germinating radish seeds inhibited the activation of the biosyntheses. This effect might be due to a direct action of FC on the activation of biosynthetic activities or, more probably, indirectly to the non physiological stimulation of membrane functions which produces an unbalancement of the cellular metabolism or of the water relations.