

MODE OF ACTION OF BOA: A MULTIFACETED APPROACH

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BOA has been considered as an allelochemical for many years, including real measurable effect in the field. In the last five years, we have approached the modes of action of BOA using several physiological, biochemical and molecular techniques. BOA seems to show a multiple mode of action. Biochemical analyses have demonstrated that BOA produces stress symptoms in the target plant. Flow cytometry has been used to show alterations in the cell cycle in roots, including both decrease in the speed of the cycle and the total number of mitosis.

Microarrays have been used to study the early changes in DNA expression patterns, showing more than 200 genes significantly up or down-regulated, involving several important functions. 2D electrophoresis has been used to show the expression of several stress proteins in long ecophysiological and realistic experiments. Other primary effects have been shown (membrane leakage, ATPase change in activity, changes in water status parameters, stress metabolites, etc.). As a summary of the different effects, we can conclude that BOA affects simultaneously many different physiological pathways, but there is an important recovery of the affected processes when BOA is not applied continuously. Some of the symptoms could be due to general oxidative stress. The secondary well known effects on germination and growth can probably be explained as a result of this multiple mode of action. Field effects could only appear when a continuous release of the allelochemical is produced.