

## **Effect of a chemical analogue of autoinducers of microbial anabiosis on the Ca<sup>2+</sup> response of mycelial fungi**

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### **Abstract**

The microbial alkylhydroxybenzenes (AHB), autoinducers of anabiosis, or d1 factors, participate in stress response of mycelial fungi, as determined from changes in intracellular Ca<sup>2+</sup> concentration. By using the genetically modified strain *Aspergillus awamori* 66A, which produces a recombinant Ca<sup>2+</sup>-dependent protein aequorin, the dynamics of Ca<sup>2+</sup> was studied in the cytosol of cells exposed to mechanical shock in the presence of the protective doses (0.001-0.01% w/vol) of a chemical AHB analogue, 4-n-hexylresorcinol. Like under stressful conditions, Ca<sup>2+</sup> concentration increases in the cell cytosol in response to enhanced AHB level in a growing fungal culture; thus, AHB is perceived by cells as a stress signal. The level of cell response, which was determined from the amplitude of luminescence dependent on the Ca<sup>2+</sup> concentration in cytosol was related to the physiological age of the cells and AHB concentration. Micromycete preincubation with AHB was found to protect cells from subsequent stress; this was reflected in the Ca<sup>2+</sup> response. The protective AHB effect was manifested as (1) a significant decrease in the amplitude of luminescence and, thus, in Ca<sup>2+</sup> accumulation in the cytosol during subsequent mechanical stress (as compared to the control-mechanical stress only); (2) development of the secondary Ca<sup>2+</sup> response, which was not observed in the control; (3) a high level of Ca<sup>2+</sup> retained in the cytosol for a long time in the presence of AHB (as compared to the control without preincubation with AHB). The mechanisms underlying the AHB effect on the Ca<sup>2+</sup> transport systems are discussed.

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### **Keywords**

Alkylhydroxybenzenes, *Aspergillus awamori*, Ca<sup>2+</sup> dynamics, Mycelial fungi, Protection from stress, Recombinant aequorin, Stress