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Seedling Emergence & Seedling Growth Test OECD-208

About the author

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Minal is a Senior Research Officer in the Ecotoxicology Section. She has good experience of conducting aquatic and terrestrial studies. She has professional experience of more than 15 years.

The OECD guideline - 208 is designed to assess the probable effect of the general chemicals, biocides, and crop protection products especially pesticides on seedling emergence.

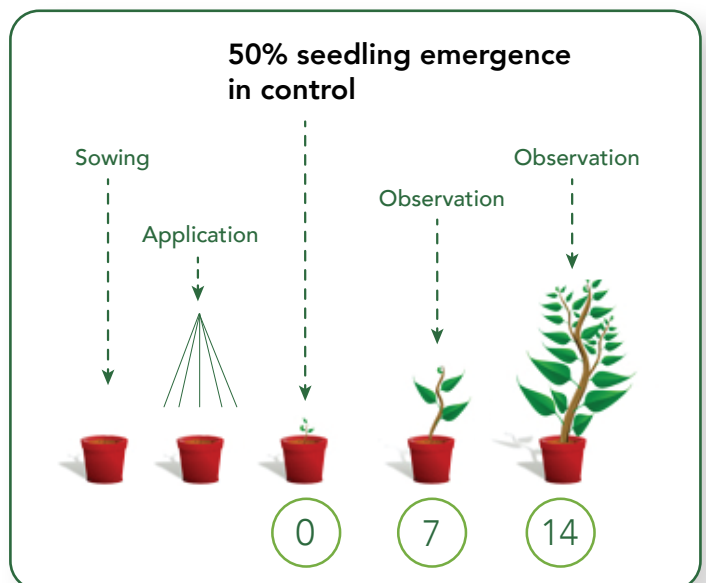
In favorable environmental conditions, as the embryo grows actively, the root comes out and propagates towards the soil, while the shoot emerges from the plumule negative geotropically and appears on the soil surface. This process is called seedling emergence.

Agriculture is the dominating land-use in the EU member states covering nearly half of the surface area. Using herbicides to reduce weed competition in agricultural areas can adversely affect Non-Target Terrestrial Plants (NTTP) growing in field margins. According to the EFSA Scientific Opinion on NTTPs an important protection goal is to maintain the biodiversity of plant species in agricultural areas. EFSA recommends to include also non-crop species mentioned in OECD guidelines (OECD 208 and 227) in the testing and to assess not only vegetative but also generative endpoints during the plant life-cycle such as flowering and seed production.



The objectives of this study were to evaluate the feasibility of assessing generative endpoints of crop and non-crop species for NTTP regulatory testing under greenhouse conditions and to assess if generative endpoints are more sensitive than vegetative endpoints.

Recently, JRF has validated effects of boric acid on terrestrial plants seedling emergence and seedling growth rate. Seedling emergence test defined as the potential effect of the test item on higher plants during early critical stages on their development in which test item sprayed on a soil or on the surface of the soil with calibrated sprayer and evaluated for effects following usually 14 days after 50% emergence of the seedlings in the control group.



Plants were observed daily for emergence, mortality and phytotoxicity up to 14 days after 50% emergence of the seedlings in the control group.



Evaluation Parameters

At the end of the study the parameters monitored and recorded are as follows:
At the end of the test, individual length of plant shoot of surviving seedlings was measured. Shoot of each plant were harvested from the soil surface and then measured.



After shoot length were measured, plants were dried, cooled at room temperature, and weighed. Total plant biomass (i.e. dry weight) were measured and recorded.



Outcome

Based on rate-response values for the shoot length inhibition, biomass inhibition, and emergence of the plants, it can be concluded that boric acid application shows rate-dependent inhibitory effect on seedling emergence and seedling growth of cucumber, mung bean, wheat, and corn plants.

References:

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2. Lewkowski, J., Malinowski, Z., Matusiak, A., Morawska, M., Rogacz, D., & Rychter, P. (2016). The effect of new thiophene-derived aminophosphonic derivatives on growth of terrestrial plants: a seedling emergence and growth test. *Molecules*, 21(6), 694.
3. OECD. (2006). Terrestrial plant test: Seedling emergence and seedling growth test. OECD guideline for testing of chemicals no. 208.