

# Effects of Indole Amides on Lettuce and Onion Germination and Growth

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Auxins, such as indole-3-acetic acid (IAA), are important in plant germination and growth, while physiological polyamines, such as putrescine, are involved in cell proliferation and differentiation, and their concentrations increase during germination. In this work, novel indole amides were synthesized in good yields by monoacylation of morpholine and unprotected symmetrical diamines with indole-3-carboxylic acid, a putative metabolite of IAA, possessing no auxin-like activity. These amides were tested for their effects on seed germination and growth of the radicles and shoots of *Lactuca sativa* (lettuce) and *Allium cepa* (onion) seedlings, at 100.0, 1.0, and 0.01  $\mu\text{M}$  concentrations. Germination was generally stimulated, with the exception of amide **3**, derived from morpholine, at 100  $\mu\text{M}$ . On radicle and shoot growth, the effect of these compounds was predominantly inhibitory. Compound **3** was the best inhibitor of growth of lettuce and onion, at the highest concentration. Amides, such as propanil, among others, are described as having herbicidal activity.

*Key words:* Phytotoxic Activity, Indole-3-carboxylic Acid, *Lactuca sativa*