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Determination of the Diffusion Coefficient of Urea Solution Using Double Exposure Digital Holographic Interferometry (DEDHI) to Study Plant Growth*

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-In this paper we have used double exposure digital holographic interferometry (DEDHI) technique to determine the diffusion coefficient of urea in pure distilled water at 27°C (room temperature) and it is used further to predict urea movement in soil by considering concentration of urea solution and diffusion coefficient to study early plant growth. We have recorded several consecutive digital holograms of diffusing solutions of urea and pure distilled water at different time instantaneous on the CCD chip and processed with H-Digital numerical reconstruction software in computer. It is observed that as the concentration of urea solution increases from 0 to 4 M, diffusion coefficient 'D' of urea slightly increases from 12.2 to $13.8 \cdot 10^{-6}$ cm²/s, which considerably affects the growth of the plants.

Keywords: digital holographic interferometry, diffusion coefficient, urea, molecular diffusion.

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