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RESEARCH PAPER

ADVANCE RESEARCH JOURNAL OF
C R P
IMPROVEMENT
Volume 7 | Issue 1 | June, 2016 | 32-39
••••• e ISSN-2231-640X

Synthesis of inorganic nanoparticles for the enhancement of seed quality in groundnut cv. VRI-2

DOI:
10.15740/HAS/ARJCI/7.1/32-39
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■ K. KRISHNA SHYLA AND N. NATARAJAN¹

AUTHORS' INFO

Associated Co-author :

¹Department of Seed Science and Technology, Tamil Nadu Agricultural University, COIMBATORE (T.N.) INDIA

Author for correspondence:

K. KRISHNA SHYLA
Department of Seed Science and Technology, Tamil Nadu Agricultural University, COIMBATORE (T.N.) INDIA
Email: shylaja.agri@gmail.com

ABSTRACT : The present study was carried out to assess seed quality parameters by using inorganic nanoparticles (NPs) viz., zinc oxide (ZnO), silver (Ag) and titanium dioxide (TiO₂) were synthesized by chemical method and characterized by using Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM). Among the three nanoparticles, ZnO NPs possessed the least size of 35-45 nm, while the maximum of 100 nm was observed in TiO₂ NPs. Fresh seeds of groundnut were treated with NPs of ZnO, Ag and TiO₂ each @ 750, 1000 and 1250 mg kg⁻¹ of seed and stored for 12 months under ambient condition. After 12 months of storage, seeds treated with ZnO NPs @ 1000 mg kg⁻¹ enhanced germination (77%), vigour index (3067), electrical conductivity (0.347 dSm⁻¹), catalase (0.421 µg H₂O₂ mg⁻¹ min⁻¹) enzyme activity and reduced lipid peroxidation activity (0.089 OD value) against the control (66%, 2328, 0.379 dSm⁻¹, 0.385 µg H₂O₂ mg⁻¹ min⁻¹ and 0.112 OD value, respectively). The present investigation clearly demonstrated the effect of inorganic NPs of ZnO @ 1000 mg kg⁻¹ and Ag @ 1250 mg kg⁻¹ of seeds in maintaining the quality of aged groundnut seeds.

KEY WORDS : Synthesis of nanoparticles, SEM, TEM, Groundnut seed quality

How to cite this paper : Shyla, K. Krishna and Natarajan, N. (2016). Synthesis of inorganic nanoparticles for the enhancement of seed quality in groundnut cv. VRI-2. *Adv. Res. J. Crop Improv.*, **7** (1) : 32-39, DOI : 10.15740/HAS/ARJCI/7.1/32-39.

Paper History : Received : 01.02.2016; Revised : 22.03.2016; Accepted : 26.04.2016