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Genotoxicity of Nanoparticulate Zinc Ferrite – Possible Application in Plant Biotechnology

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Nanoparticulate matter, mainly nanoparticles containing metal ions could represent a promising biotechnological tool when preliminary testing could indicate the ability of inducing chromosomal changes in the plant tissues. Chemical route was applied as synthesis method of $ZnFe_2O_4$ powder with nanometric size, thus enabling plants to internalize the particles through endocytosis for further lysosomal digestion. Surface modification with long chain molecular shell was chosen to ensure nanoparticle stability in water dispersion. We present the results of some genetic effects induced by such prepared zinc ferrite nanoparticles as diluted suspension when supplied to agrotechnical plant species of large interest namely sunflower. Various and numerous chromosomal aberrations were identified that could be perpetuated in the form of genetic mutations through adequate biotechnology. Quantitative analysis emphasized remarkable influence of $ZnFe_2O_4$ nanoparticles on meristem tissues of freshly germinated seeds which suggested possible new biotechnological tool based on nanotoxicity application in genetics research.