Enhanced Anti-melanoma Bioefficacy of Flavonoid Loaded Gold Nanoparticles Prepared from the Plant *Madhuca longifolia* on the Mice and Human Melanoma cell lines

Saurabh Yadav[1], Mukti Sharma[1], Narayanan Ganesh[2], Shalini Srivastava[1] and ManMohan Srivastava[1]*

1. Department of Chemistry, Faculty of Science, Dayalbagh Educational Institute, Dayalbagh, Agra-282005, **INDIA**
2. Jawaharlal Nehru Cancer Hospital & Research Center, Bhopal-462001, **INDIA**
Email: dei.smohanm@gmail.com

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ABSTRACT

The present communication warrants the potential enhancement in anti-melanoma bioefficacy of flavonoid's loaded gold nanoparticles (F@AuNp) compared to native leaf extract of the plant Madhuca longifolia. A family of four flavonoids has been ascertained in the leaves ethanolic extract of the target plant using HPLC-ESI-QTOF-MS analysis. In-vitro anti-melanoma bioefficacy has been measured against two melanoma cell lines (B16F10 and A375) using MTT bioassay. Noticeably, the native leaves extract and flavonoid's loaded gold nanoparticles did not show any toxicity towards normal lymphocyte cells highlighting their safe and non-toxic nature. Statistically significant (p<0.05) enhancement in the anti-melanoma bioefficacy (82.75% against B16F10) and (81.49 %) for A375 melanoma cell lines compared to native leaves extract (66.39% and 63.44%) has been successfully achieved, attaining the level near to reference drug (94.31% and 91.52%). The pathway of observed anti-melanoma efficacy of F@AuNp has been discussed based on our experimental findings on percent inhibition in mice and human melanoma cell lines, production of intercellular reactive oxygen species, release of nitric oxide, increased caspase-3 activity and melanogenesis. The native leaf extract of Madhuca longifolia and its flavonoid's loaded gold nanoparticles possess excellent prospect for the development of eccentric and complimentary herbal nanomedicine for the scaling-up the anti-melanoma bioefficacy.

Graphical Abstract
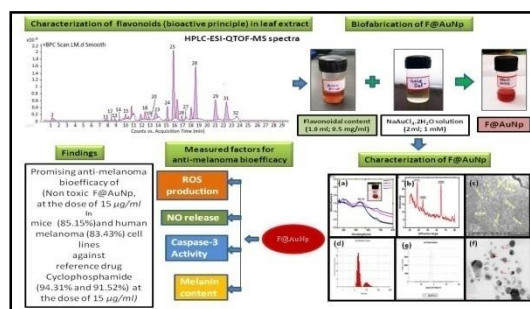
Keywords: *Madhuca longifolia*, Bioactive principle, F@AuNp, B16F10, A375 melanoma cell lines.

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