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TITLE

Nanoparticle assisted enhanced biosynthesis of haloarchaeal caroteinoid pigments: Preconcentration of pigments through Pt nanoparticle based liquid-liquid microextraction for MALDI-MS analysis

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The application of nanomaterials is in great demand in medicine and general biology for various applications such as killing the pathogens, fluorescent biological labels, drug and gene delivery, bio detection of pathogens, detection of proteins and DNA, tumor destruction via heating (hyperthermia), phagokinetic studies. Although NPs have been reported in all of the above disciplines, to date, no report exists on the potential use of nanoparticles to enhance the synthesis of any bio-molecules which are beneficial to human beings. In the abstract, we report for the first time, the use of TiO2 and NiO NPs for enhancing the carotenoid production by the extremophilic haloarchea, Haloferax mediterranei. Although NiO NPs did not contribute much, TiO2 NPs at adequate optimal concentrations of 375mg/L results in a 95% increase in the carotenoid yield compared to the control. The caroteinoid pigments extracted from H.mediterranei cells treated with TiO2 were separated by thin layer chromatography (TLC) plates and using a simple bordering mode to limit the diffusion of the pigments, we succeeded in direct analysis of the pigment spots on TLC using MALDI-MS. Further, we have also used Liquid liquid microextraction (LLME) combined with Pt NPs functionalized with ODT for directly extracting the pigment molecules from the crude extract without the use of TLC technique for MALDI-MS analysis. Thus, this paper clearly demonstrates two novel applications of NPs regarding the enhancement of carotenoid production and also in enabling LLME of the pigment from the crude pigment extract for MALDI-MS analysis.

Biography

Yajun Dr. Mani, a core biologist with bachelors, masters, M.Phil and PhD degrees from University of Madras, India joined the Agricultural Biotechnology research centre, Academia Sinica, Taiwan in 2010 as post doctoral scientist. His research area has been in aspects involving extremophilic archaea and cell cycle regulation of Chlamydomonas, an unicellular model eukaryote. In 2011, he joined National Sun Yat Sen University as post doc. His key interest lies in the area of cancer biology and he focuses on nanoparticle based induction of apoptotic stimulators. Mani has authored more than 10 research papers in peer-reviewed standard SCI journals.