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Phytochemical Characterization and Anti-Acne Potential of Cassia fistula and Plumeria obtusa Extracts Against *Cutibacterium acnes*

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Abstract

The *Cassia fistula* and *Plumeria obtusa* extracts were evaluated for their anti-acne efficacy against the key pathogen in acne vulgaris, *Cutibacterium acnes*, with respect to their phytochemical composition. This research explores plant derived, antimicrobial and antioxidant properties with the increasing antibiotic resistance and toxic effects of conventional treatments. Flavonoids, alkaloids, terpenoids, polyphenols, steroids, glycosides were chemical compounds identified in phytochemical analysis of the extracts already known to be bioactive. The bioactive constituent's resveratrol, cinnamic acid and plumericin along with derivatives from andrographolide received validation through Nano Liquid Chromatography coupled Tandem Mass Spectrometry (Nano LC/MS/MS) analysis. Higher concentration of resveratrol was seen in *Plumeria obtusa,* which have higher potential for pharmacological activity seen as compared to the *Cassia fistula*. *Plumeria obtusa* showed better free radical neutralization (IC50 = 1050.91 µg/mL) than by the DPPH radical scavenging assay. Both extracts have a biocompatibility demonstrated by their cytotoxicity evaluation using Vero cells and then used in dermatological application. Microdilution assays showed that *C. acnes* was significantly inhibited with *Plumeria obtusa* having superior activity over *Cassia fistula*, which were attributed at higher polyphenol and flavonoid content only. These findings lend support for therapeutic use of these plant extracts in acne. *Plumeria obtusa*, showing better antimicrobial and antioxidant activity than other species, becomes a promising candidate of phyto therapeutic formulation. Additional investigations utilizing *in vivo* evaluations and development of formulation is then necessary to achieve clinical applicability and to confirm effectively. *Cassia fistula* and *Plumeria obtusa* extracts were evaluated which has higher potential.