

# Drug Formulation & Bioavailability Congress

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## Formulation and evaluation of hair enhancing cream derived from propolis ethanolic extract

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Propolis is a resin-like material used by bees to fill large gap holes in the beehive. It has been found to possess anti-inflammatory property, which stimulates hair growth in rats by inducing hair keratinocytes proliferation, causing water retention and preventing damage caused by heat, ultraviolet rays, and other microorganisms without abnormalities in hair follicles. The present study aimed to formulate 10% and 30% propolis hair cream for use in enhancing hair properties. Raw propolis sample was tested for heavy metals using atomic absorption spectroscopy; zinc and chromium were found to be present. Likewise, propolis was extracted in a percolator using 70% ethanol and concentrated under vacuum using a rotary evaporator. The propolis extract was analyzed for total flavonoid content. Compatibility of the propolis extract with excipients was evaluated using differential scanning calorimetry (DSC). No significant changes in organoleptic properties, pH and viscosity of the formulated creams were noted after four weeks of storage at 2-8 °C, 30 °C and 40 °C. The formulated creams were found to be non-irritating based on the modified draize rabbit test. *In vivo* efficacy was evaluated based on thickness and tensile strength of hair grown on previously shaved rat skin. Results show that the formulated 30% propolis-based cream had greater hair enhancing properties than the 10% propolis cream, which had a comparable effect with minoxidil.

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## Bioavailability and antihyperglycemic effect of Metformin transfersome vesicles in transdermal patch delivery system

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Metformin, a prominently prescribed anti-hyperglycaemic agent has been proven to increase life span of both diabetic and non-diabetic individuals. It decreases glucose production and absorption, and increases body's response to insulin. However, it is slowly and incompletely absorbed in the gastrointestinal tract; and it has a low permeability. It is available in oral tablet and it takes 6 hours for the drug to be completely absorbed. It is taken 2 to 3 times a day as a maintenance drug, depending on patient's condition. Gastrointestinal side effects have also been reported in nearly 30% of patients. With these impediments, different drug delivery systems have been developed. The use of transfersomes in transdermal patch offers the potential advantage of improving the bioavailability of the drug. Metformin transfersome vesicles were prepared using sodium cholate and phosphatidylcholine 50%, with particle size 168 nm. Drug entrapment efficiency was determined using HPLC and it was found to be 94.96%. Plasma concentration of metformin in hyperglycemic-induced rabbits treated with metformin transfersome patch was significantly higher than controls ( $p=0.001$ ). The post treatment glucose level of hyperglycemia-induced rabbits applied with metformin transfersome patch ( $p=0.002$ ) showed significant decrease in glucose level relative to untreated alloxan-induced hyperglycemic rabbits. The study showed that metformin transfersome vesicles in transdermal patch delivery provide enhanced antihyperglycemic effect and bioavailability over metformin transdermal patch.

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