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Triamcinolone acetonide dry powder inhalation: A new approach for treathing asthma

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Introduction: Drug delivery by inhalation is routinely employed for the treatment of localized diseases such as asthma and other pulmonary conditions. Dry powder inhalers (DPIs) are pharmaceutical dosage forms of increasing popularity which are considered one of the important delivery devices capable of delivering respirable drugs to the lungs. Inhaled corticosteroids (ICSs) are effective in controlling inflammation and improving lung function and asthma symptoms and are recommended as first-line therapy for asthma patients. There is considerable evidence that treatment with antiinflammatory ICSs reduces morbidity and mortality in asthma. The objective of this study was to develop triamcinolone acetonide (TA) dry powder inhalers using spray drying and characterize the powder in terms of aerolization, flow and dissolution properties in order to determine which formulations could be the most suitable for pulmonary delivery.

Preparation & Characterization: Mannitol (50%) and leucine (10, 20 and 30%) were dissolved in 20 ml distilled water. 250 mg TA was dissolved in 2 ml of acetone, added into 20 ml mannitol and leucine solution. The mixture was then spray-dried with constant stirring using a Büchi nanospray dryer B-90 (Büchi Laboratory-Techniques, Flawil, Switzerland). The formulations were characterized using scanning electron microscopy, zeta potential, X-ray powder diffraction, fourier-transform infrared spectroscopy, differential scanning calorimetric, thermogravitational, tapped density analysis. The *in vitro* aerosolization performance was investigated using next generation impactor (Copley).

Result & Discussion: The optimized formulation developed in this study exhibits good *in vitro* aerosolization properties. According to FTIR analysis, there were no changes in the structure of TA induced by spray drying process. SEM images of DPI formulations showed almost good structures with particle size 1-5 µm. A dry powder prepared by spray-drying offered great promise as a formulation for the lung delivery of TA.

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Gel trial formulation of Tinospora cordifolia (Willd.) Miers. stem ethanolic extract and evaluation of its anti-inflammatory, wound-healing and skin irritation activities

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Tinospora cordifolia (Menispermaceae), commonly known as "Makabuhay", is known for its immense application in the treatment of various diseases in the traditional ayurvedic literatures. This medicinal plant, which is found in most or in all islands of the Philippines has wide array of physiological roles, thereby signifying the versatility of the plant. However, there was no scientific evidence justifying the use of *T. cordifolia* as an anti-inflammatory and wound-healing gel formulation. Thus, this study was initiated to formulate, characterize and evaluate the effectiveness of crude plant extract incorporated in gel base, in concentrations of 5% (w/v) and 10% (w/v) as a wound healing and anti-inflammatory gel preparations. Seven gel formulations were prepared and the physical attributes were observed to identify one formulation with desirable characteristics. The viscosity, pH, spreadability, consistency and homogeneity of the selected formulation were examined. Both gel concentrations were assessed using incision wound model in Sprague-Dawley rats and formalin-induced rat paw edema method, which showed significant increase in tensile strength ($p<0.05$) of the wound compared to curiosin gel and decrease in mean paw size ($p<0.001$) of the rats compared to voltaren as reference drugs, respectively. The 10% gel concentration has more enhanced wound healing and anti-inflammatory activity compared to the 5% gel concentration exhibited in both tests. In parallel, scratch and patch tests in albino rabbits were performed to determine primary skin irritation effect. Both 5% and 10% *T. cordifolia* gels exhibited negligible irritant property, thus, they can be used safely as topical preparation to treat wounds and inflammation.

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