

Barrier Cream Formulations to Reduce Skin Permeation of Nicotine as a Preventive Measure for Green Tobacco Sickness

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Abstract: Purpose Green tobacco sickness (GTS) is a prevalent problem among tobacco farm workers due to prolonged exposure to nicotine from tobacco leaf and leaf sap during harvesting. GTS can display symptoms such as mild to severe vomiting, fatigue, nausea and fluctuations in the heart rate in workers [1,2]. The development of a barrier cream that prevents environmental nicotine absorption would be highly beneficial. The purpose here was to evaluate the effectiveness of two topically applied barrier cream formulations in preventing nicotine permeation through skin in the in-vitro setting using Yucatan minipig skin Methods Yucatan minipig skin (250 μ m thick) was placed inside an in-line flow through diffusion cells (at 32°C), and 0.9% saline solution used as the receiver solution (at 37°C). Prior to placing the skin sections in the diffusion cells, 40 μ l of investigational barrier cream formulations was gently rubbed on the surface. The diffusion cells were loaded with 0.5 mL of 0.75 mg/mL nicotine solution in the donor compartment and receiver samples were collected at a 2 h interval for a total of 24 h. The permeation data was plotted as the cumulative amount of nicotine (nmol) collected in the receiver compartment as a function of time. Results Formulation A significantly reduced the absorption of nicotine through the pig skin (Figure1), where lag time was 3.5 h compared to that of formulation B and just the skin alone (Table1). The percent reduction, which represents percent difference between treated skin and untreated skin for each concentration, was significantly higher for formulation A compared to formulation B. Thus concluding that formulation A may successfully block nicotine permeation through skin over a period of 24 h. Conclusion The data indicates that application of such a barrier cream may significantly reduce the permeation of nicotine through skin when exposed for 24 h. Future experiments will be dedicated towards testing the effectiveness of these barrier cream formulations on human skin when exposed to green tobacco leaf extract and be able to demonstrate their significance in reducing nicotine exposure through the skin in tobacco farmers and farm workers.

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