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## Estimations of contents of iron oxides using geostatistical methods in two hillslope curvatures of an Alfisol under sugarcane

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The spatial characterization of Fe oxides (hematite and goethite content) has usually been made by Ordinary Kriging (OK) considering the variogram parameters. However, OK softens local details of the spatial variation, overestimating small values and underestimating high ones. Thus, Trans-Gaussian Kriging (TGK) becomes an alternative to have a robust estimation of the variogram, reducing outlier effects. The objective of this study was to evaluate OK and TGK algorithm performances in estimating and mapping goethite and hematite iron oxides in two hillslope curvatures on an Alfisol in Catanduva, Sao Paulo State, Brazil. Two sampling areas were selected, one concave landscape and another convex landscape. Then, over each area, a 1-ha sample grid with regular spacing of 10 x10 m, totaling 121 sample points of soil per area, was selected. The mineralogical analysis was performed in each sample to determine hematite and goethite contents. Moreover, to meet TGK criteria, data were previously converted to standard normal transformation, whereas OK data were not transformed. The TGK estimates presented improved accuracy mapping from 0.84 to 11.1% for the Gt and from 8.23 to 0.76% for the Hm content in concave and convex hillslope curvature, respectively. In general, the TGK estimates reproduced the best results. Moreover, the conditional cumulative distribution function and experimental variogram were better reproduced by TGK estimates than OK. The TGK is recommended for estimation of a more stable robust variogram in Fe oxide mapping with strong variability, when higher efficiency and accuracy are required. Hillslope curvatures influenced the interpolation efficiency and accuracy of interpolation. Relief classification is as much important as the variogram modeling for a greater efficiency and it would improve digital modeling of Fe oxides. The OK maps for Fe oxides should be cautiously used due to its uncertainty, especially in different hillslope curvatures mappings.

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## Design, development and evaluation of topical liposomes of benzoyl peroxide and herbal drug resveratrol for treatment of acne

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Liposomal formulations have been successfully used in the treatment of a number of dermatological diseases including acne. Benzoyl peroxide is a potent antibacterial used commonly for the treatment of acne either alone or in combination. But it suffers from side effects like skin redness, irritation, itching, and oedema. In this present study benzoyl peroxide alongwith a herbal drug Resveratrol was encapsulated into liposomes, for topical applications. Pre Formulation and compatibility studies of both drugs by UV and FT-IR, DSC and XRD indicated no incompatibility between both drugs and excipients. Liposomes were prepared by thin film hydration technique using phospholipid, cholesterol and drugs in different ratios. Concentration of phospholipid, cholesterol and Hydroxy Propyl- $\beta$ -Cyclodextrin was optimized by Experimental response surface design (Box Behnken Design (BBD)). These formulations were prepared and evaluated for the Entrapment Efficiency (EE%) of benzoyl peroxide and resveratrol. The optimized liposomal formulations was further evaluated for particle size, zeta potentia, FT-IR, XRD and TEM. The particle particle size with PDI value less than 0.3 indicated uniform particle size distribution, -ve zeta potential indicated Brownian motion stability between the particles and TEM showed the presence of outer coating of bilipid layer entrapping the drugs with an optimum size in the range of 150-350 nm. Liposomal suspension was lyophilized to make it more stable.

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