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Significance of chemical wash on natural dyed wool for carpets

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Natural dyes in carpet industry have been tried as a revived area of interest, in deference with the growing demand in importing countries for nearly a decade now. Natural dyes can be deemed to be more eco-friendly provided the dyeing technology and mordanting aspects are well understood and regulated at the shop floor level so that the fastness properties of the natural dyes are improved on one hand, and the use of metallic mordants are restricted to the minimum and safe levels, on the other.In the present study, wool was dyed using different natural dyes and mordants to obtain a wide gamut of colours. A shade card of these natural dyes was developed on wool using selected mordants. The colour values of natural dyed wool were analyzed in terms of L*a*b* values. Samples were assessed in terms of the colour fastness to washing, rubbing and light.The effect of chemical washing on colour values and fastness properties of natural dyes on wool was studied. There were significant changes in colour values of most of the natural dyes after chemical washing. The colours however, remain stable after chemical washing. The wash and rub fastness for all the dyes was good except for few after chemical washing. The light fastness of all the natural dyed samples was good and above 3. Hence, it is observed that it is possible to select a gamut of colours for carpets from the shade cards of natural dyed wool yarns.

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Efficiency of ball milled South African bentonite clay for remediation of acid mine drainage

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The feasibility of using vibratory ball milled South African bentonite clay for neutralisation and attenuation of inorganic contaminants from acidic and metalliferous mine effluents has been evaluated. Treatment of acid mine drainage (AMD) with bentonite clay was done using batch laboratory assays. Parameters optimised included contact time, adsorbent dosage and adsorbate concentration. Ball milled bentonite clay was mixed with simulated AMD at specific solid: liquid (S/L) ratios and equilibrated on a table shaker. Contact of AMD with bentonite clay led to an increase in pH and a significant reduction in concentrations of metal species. At constant agitation time of 30 min, the pH increased with the increase in dosage of bentonite clay. Removal of Mn^{2+}, Al^{3+}, and Fe^{3+} was greatest after 30 min of agitation. The adsorption affinity obeyed the sequence: SO_4^{2-} (221.8 mg g^{-1}) > Mn (30.7 mg g^{-1}) > Al (30.5 mg g^{-1}) > Fe (30.2 mg g^{-1}). The pH of reacted AMD ranged from ≈3 to 6. Bentonite clay showed high adsorption capacities for Al and Fe at concentration < 500 mg/L, while the capacity for Mn was lower. Adsorption capacity for sulphate was >50%. Adsorption kinetics revealed that the suitable kinetic model describing data was pseudo-second-order hence confirming chemisorption. Adsorption isotherms indicated that removal of metals fitted the Langmuir adsorption isotherm for Fe and sulphate and the Freundlich adsorption isotherm for Al and Mn, respectively. Ball-milled bentonite clay showed an excellent capacity in neutralising acidity and lowering the levels of inorganic contaminants in acidic mine effluents.

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