Synthesis of antibacterical cationic dyes and dyeing of acrylic fabric

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The present work is concerned with the synthesis and characterization of novel antibacterial cationic dyes via combining the traditional dyes and functional finishes -together through chemical linkages.Two series of antibacterial cationic dyes (IB IHD:IIB-IIHD) were synthesized by incorporating 1-amino anthraquinone (a) and 1,4-diamino anthraquinone (A) with chloroacetyl chloride to give intermediate 1-chloroacetamido) 9,10- anthracendione (b) and 1,4- bis (chloroacetamido) 9,10-anthracendione (B)with good yields. The resultant intermediate was reacted with N, N-dimethyl (butyl, heptyl, octyl, decyl and hexadecyl) amine at 95 0c for 3h in DMF as solvent to give the final products. The structures of all dyes were fully characterized by FT-IR, 1H and 13C-NMR analysis. The color features of the dyes -were studied in terms of □max in aqueous solutions, it was found that all the di -substituted dyes showed a greater bathochromicity compared to the mono substituted ones. The acrylic fabrics were dyed by traditional cationic dyeing procedures. Factors affecting dyeing properties of acrylic fabric were studied, the results showed that:-- All the mono – substituted dyes showed higher K/S values than the di- substituted dyes.- Better K/S value was obtained at pH 3, while the lowest value obtained at pH 6.- Higher K/S value was obtained at 100 0C for dyeing bath.- Above 3 % dye concentration vary slight improvement in K/S value takes place.- Increasing time of dyeing from 15 min to 60min led to increasing in K/S value.- The fastness properties of acrylic fabric dyed with synthesized antibacterial cationic dyes were evaluated. All dyes exhibited good fastness to washing and perspiration depending on the amount of dye fixed. The dry crocking fastness was better than the wet crocking fastness. However the light fastness of the dyed acrylic ranges from vary good to excellent.Finally all the dyed fabrics exhibited antibacterial efficacy against Gram-positive (S.aurus) and Gram- negative (E.Colie) bacteria, and di-substituted dyes usually showed higher activities than mono-substituted dyes. It was also found that less than 8 carbons in the QAS alkane chain led to low antibacterial activities, it was also found that these antibacterial dyes provided higher antibacterial efficiency against Gram-negative (E.Colie) than Gram-positive (S.aurus) bacteria.