Knowledge of genetic diversity is important as it forms the basis for designing breeding programmes and making rational decisions on sustainable utilization of animal genetic resources. This study was designed to assess the efficiency of blood protein polymorphism as a rapid tool for assessing genetic diversity, using seven blood proteins (transferrin, albumin, haemoglobin, esterase A, esterase C, carbonic anhydrase and X-protein) and 457 indigenous fat-tailed (351) and fat-rumped (106) hair sheep in Kenya from 7 populations, with 40 Merino as controls. Transferrin was analysed using polyacrylamide gel electrophoresis and starch gel electrophoresis was used to analyse the other six loci. Of the seven loci analysed, two — carbonic anhydrase and X-protein — could not be interpreted. The five interpretable markers, however, showed low levels of polymorphism in allele numbers and heterozygosity. Multilocus mean F_{ST} values of 0.083 indicated a moderate genetic differentiation between the populations analysed. The Dm and Da genetic distance estimates showed the indigenous sheep populations in Kenya to be closely related genetically, with the dendrogram failing to resolve indigenous sheep into fat-tailed sheep and fat-rumped hair sheep. Due to its costs and modest equipment demands, blood protein polymorphism can be used as a rapid tool to assess genetic diversity and prioritize breeds to be analysed by microsatellite DNA markers.