Neutral detergent fibre (NDF) content of (a) maize stalks (60.9%), (b) maize cobs (86.7%) and (c) sugarcane tope (63.3%) was significantly higher than that of (d) sugarcane stalks (40.6%). DM digestibility (DMD) from in vitro digestible NDF and neutral detergent solubles was higher in (a) and (d) than (b) and (c). In vivo DMD was predicted from Van Soest in vitro DMD. In vitro DMD obtained by the 2-stage technique compared favourably with the Van Soest method, and the 2 techniques were successful under conditions at Kitale for predicting nutritive quality of high fibre roughages.