DEVELOPMENT OF MAGRA WOOL - NYLON BLENDED HAND KNOTTED CARPETS

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ABSTRACT

Rajasthan is one of the important carpet wool producing states. It produces about 10 m kg of wool annually and contributes significantly to the carpet production. Among the different carpet wool producing sheep, Magra is one of the best breeds producing excellent quality carpet wool. In this study, attempt was made to blend Magra wool with different proportions of nylon viz. 95:5, 90:10 and 85:15 in order to improve the abrasion resistance of the carpet. Nylon blended yarns as well as the pure Magra wool yarns were used to produce the carpet. The carpets made from Magra wool-nylon blends showed lower abrasion loss compared to pure Magra wool. The carpets made from 10:90 nylon-wool proportion gave very good appearance compared to 100% wool. However, carpets made from blended yarns containing more than 10% nylon showed poor recovery after dynamic loading. **(Indian Journal of Small Ruminants 2011, 17(2): 207-209)**

Key words: Abrasion loss, Carpet, Dynamic loading, Magra wool, Nylon

Indian wool is graded as the best carpet wool providing excellent resilience, lustre and performance. Rajasthan is one of the important carpet wool producing states in India. It produces about 10 m kg of wool annually and contributes significantly to the carpet production. Carpet wool producing sheep breeds in Rajasthan are Magra, Chokla and Marwari. Among them, Magra sheep is the best breed producing excellent quality carpet wool. Magra wool in pure form gives excellent resiliency property to the carpet (Gupta et al., 1987; Arora et al., 1999). However, the carpet from Magra wool shows higher abrasion loss due to higher percent of medullated fibres (Gupta et al., 1998; Patni et al., 1996). In order to improve the abrasion resistance and other functional properties of the hand-knotted carpets produced out of Magra wool, a study was attempted on the possibility of blending nylon with Magra wool.

MATERIALS AND METHODS

Magra wool from Arid Region Campus (ARC) of Central Sheep and Wool Research Institute, Bikaner was used for the present study. The fibre characteristics were determined using standard procedure as per Indian Standard Specification IS:744 (BIS, 1966). The wool was blended with 3 denier nylon fibre in three proportions viz.5:95, 10:90 and 15:85. The pure Magra wool as well the three nylon blends were then spun into yarns of 3.5 Nm fineness on woollen spinning system. The prepared yarns were used to produce hand-knotted carpets of 144 knots per square inch with pile height of 10 mm. The carpets were given chemical finishing treatment using the standard technique. The fineness and medullation per cent of fibres were determined using projection microscope. Yarn strength and elongation were determined on Universal tensile tester (Instron) using 500 mm test length and speed 100 mm/ min. Carpet thickness, compressibility and resiliency were determined using thickness gauge. Abrasion loss per cent of carpets was calculated at 1000 cycles of rubbing using WIRA abrasion tester. Dynamic loading tester was used for determining thickness loss and recovery of carpets after dynamic loading cycles of 1000.

RESULTS AND DISCUSSION

Average fibre diameter, medullation and staple length of Magra wool were 34.55 µ, 42% and 6.47 cm, respectively. The hetero and hairy fibre contents were 20 and 22%, respectively. The yarn strength (g/tex) and elongation (%) of Magra wool – nylon blended yarns are shown in Fig.1. It was observed that the yarn strength improved with nylon blending up to 15% and beyond this level the tenacity and elongation of the yarn reduced significantly. The results indicated that blending of nylon up to 10-15% level improved the spinnablity as well as yarn quality in terms of tensile strength and elongation.
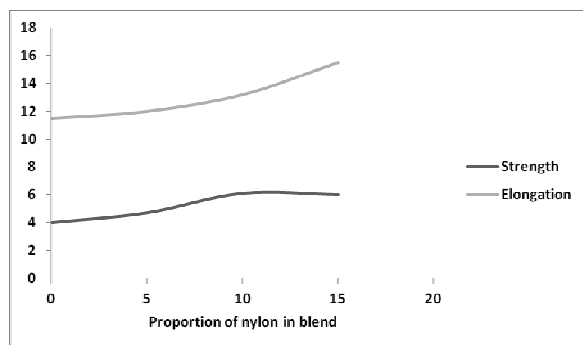

Fig. 1. Effect of nylon blending on yarn strength and elongation

As depicted in Fig. 2, the thickness (mm) of the carpets increased with increase in proportion of nylon in the blends. The measurement of abrasion loss per cent of carpets showed that carpet made of pure Magra wool had more than 2.5% loss at 1000 cycles, which significantly reduced after blending with nylon (Fig. 3). Magra wool carpet showed higher abrasion loss due to the presence of 22 % hair in the fibre.

The compressibility and resiliency properties of the carpets are depicted in Fig 4. Carpet made from pure Magra woollen yarn showed 31% compressibility compared to 35% and 30% in the carpets made from Magra:nylon (90:10) and Magra:nylon (85:15), respectively. Similarly the resilience of carpet made from pure Magra woollen yarn was 34% compared to 40%

and 37% in the carpets made from Magra: nylon (90:10) and Magra:nylon (85:15), respectively. The results indicated that both compressibility and resiliency of carpets improved with the nylon blending up to 10% level. However, blending of nylon beyond 10% level reduced these properties.
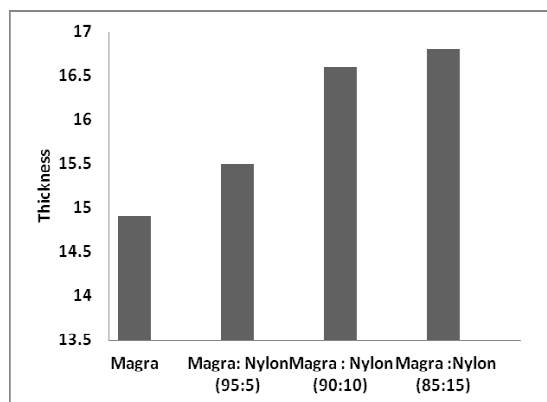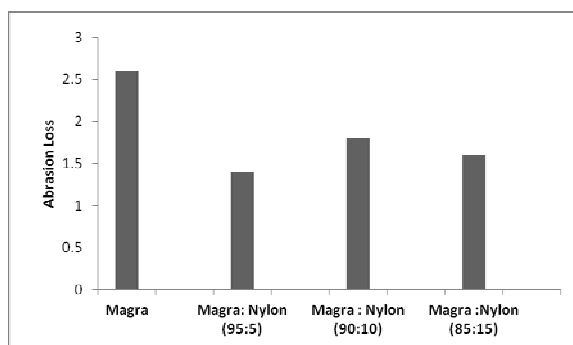

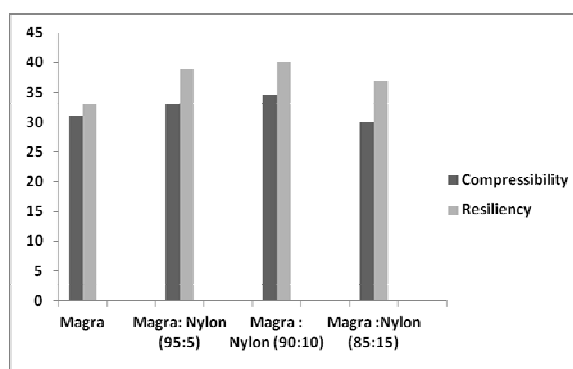Fig. 2. Thickness of carpets

Fig. 3. Abrasion loss in carpets

Fig. 4. Compressibility and resiliency of carpets

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The results of carpet thickness losses after dynamic loading indicated that thickness loss after dynamic loading was 6% which increased to 7-10% after blending with nylon (Fig. 5). Hence, it can be concluded that blending of nylon adversely affected dynamic loading behaviour of carpet. The results of recovery after dynamic loading revealed that recovery in thickness after dynamic loading of carpets reduced significantly by blending nylon up to 10% level (Fig. 6). However, above 10% level of nylon blending, the recovery in thickness after dynamic loading was improved.
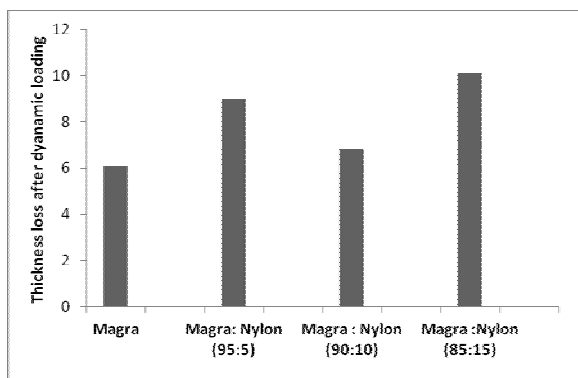

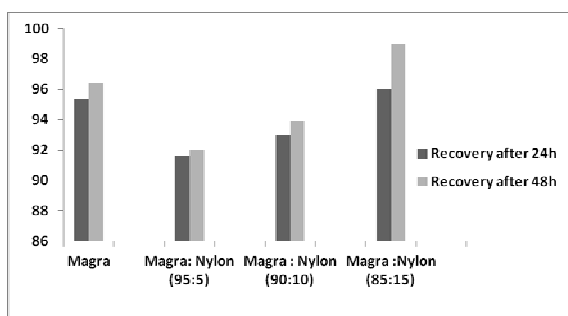Fig. 5. Thickness losses after dynamic loading

Fig. 6. Recovery in thickness after dynamic loading

In conclusion, the results indicated that Magra wool can be blended with nylon up to 10% in order to improve the abrasion resistance of the carpets. The blending of nylon also improved the compressibility and resiliency properties of carpets. However, blending of nylon reduced the recovery in thickness after dynamic loading of carpets.

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