

5.SUMMARY AND CONCLUSIONS

5. Conclusions

In this study, the UV Shielding property and Comfort properties of the two woven structures – Satin and Twill produced by using three fibres: regenerated cellulosic fibre- Viscose, and manufactured fibres such as Polyester and Lycra filament, three yarn counts: 13 Tex, 20 Tex and 37 Tex, and four blend proportions of: Polyester/Viscose 75/25, 60/40, 45/55 and Polyester/Viscose/ Lycra 70/25/5, were investigated.

- For all blend ratio chosen for study, it has been observed that with increase in weft density weight increases, air permeability decreases and UPF value increases. It has been observed that for every blend ratio chosen the percentage transmittance decreases for every wavelength with increase in weft density and shows best protection in UV-B and UV-A region.
- All the samples are rated as excellent sun protective fabric as (UPF >50⁺) with adequate air permeability. Air permeability is a critical parameter as it contributes to the comfort level of the wearer⁶⁷. Addition of Lycra by just 5 percent increases the UPF value significantly for all the samples. Yarn produced with all four blend ratios exhibits better performance in terms of sun shielding and comfort properties. All the samples provides extremely good protection from UV-B which are rather more health hazards even where proportion of polyester and viscose is almost equal (45/55).
- Overall samples woven with Satin weave shows higher UPF than with Twill weave.
- Considering common limit thread density for Satin and Twill samples, it shows that for every blend ratio as count becomes finer air permeability increases and UPF value decreases.
- It has been observed than UPF is highly influenced by firstly count then PPI, then weave and blend ratio.
- All Dyed fabrics shows significant increase in UPF value (around 2000) compared to RFD samples which itself falls into the range of excellent sun shielding fabrics. All

Dyed fabrics shows very good protection from UVA and UVB rays as percent transmittance is 0.05 percent for all samples. It has been observed that nearly 18 samples from each Satin and Twill weave exhibits excellent rating in terms of OMMC along with huge increase in UPF value after dyeing.

- Even though the clothing may only have a UPF rating 50⁺ as allowed in various standards, actual measurement of all samples are ranging from 100-2000 and so are suitable for protecting people of higher sensitivity and risk such as welding where worker have close proximity to a high – intensity welding arc.
- The regression analysis performed showed that R^2 of the derived regression equations were very high for both the Twill (92.09% to 99.26%) and the Satin (94.07% to 98.20%) RFD fabrics. The p-value for the blend ratio, yarn tex and picks per inch was less than α -level 0.05, which means that the effect of blend ratio, yarn tex and picks per inch on UPF was significant.
- For all the weft counts used in Satin Dyed Fabrics correlations between air permeability, fabric weight and fabric thickness and the Overall Moisture management capacity are linearly related since the Pearson correlations are close to +1 and -1.
- For Twill fabrics woven using 20 Tex and 13 Tex as weft, correlations between air permeability, fabric weight and fabric thickness and the Overall Moisture management capacity are linearly related since the Pearson correlations are close to +1 and -1.
- All the fabric samples produced varies from medium to heavy weight which can be very useful as a work wear fabrics for people who have to remain long time in outdoor due to their occupation like persons from defense, construction industry, farmers, fishers, skiers etc. and is capable of protecting the wearer even with highest UV index of (10-12).
- Researcher succeeded in developing the excellent sun protective fabric with comfort properties by reducing diffuse component of UV radiation by modifying the fabric

absorption properties, and reducing direct transmission through the spaces between yarn in the fabric by changing the constructional parameters by optimal combination of thickness, weight per unit area, weave, thread density, yarn count, yarn type (Blend ratio) and fibre selection⁶⁸.

FUTURE SCOPE OF THIS WORK

Present study is limited to use of Viscose fibre for blending with polyester to get the blended yarn suitable for weaving fabric with excellent sun shielding property along with comfort. Work can be further extended for second and third generation of viscose and to develop the fabric suited to different end uses which can be used as personal protection from UV radiation.