

Technology Frontier

News Bite on PolyU's Innovation

Worsted yak yarn and fabrics Sustainable and eco-friendly fibre that rivals cashmere

The word "cashmere" is synonymous with softness, gentleness and warmth in English language. But yak wool, heralded as the new cashmere, is causing quite a stir in the fashion industry because of its qualities similar to cashmere, but only at a fraction of its price. However, it has been difficult to make yak fibres into a fine worsted yarn because of their short length, until researchers from Institute of Textiles and Clothing (ITC) developed a new spinning method that improves strength, hairiness and evenness of yak yarn. The method also applies to other fibres such as cotton and wool and the cost incurred in equipment modification is low.



Dr Bingang Xu



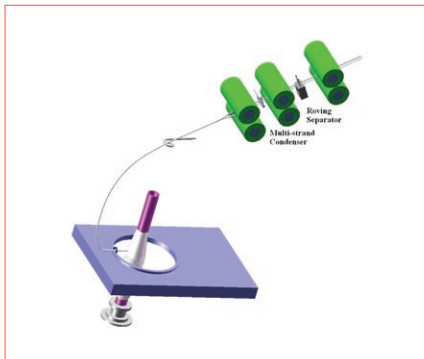
Yak fibre, yak yarn and yak fabric

Cashmere has been the material of choice among fashionistas and those discerning few because of its lightness, softness and warmth. But there is a new kid on the block that threatens its claim to the throne in the textile world – yak fibre. Yes, the shaggy bovid always shown in pictures with the snow-capped Himalayas in the background. While their outer fibres are long and coarse, their down undercoat is almost as soft as cashmere, being slightly warmer and more breathable than cashmere. However, yak down fibres are very short in length so that it is difficult to obtain a fine yarn with good strength, low hairiness and smooth surface from them. In light of this, Dr Bingang Xu, Associate Professor, Institute of Textiles and

Clothing (ITC), led a research team to develop a new spinning method and investigate the optimal fabrication parameters for fine worsted yak yarns and fabrics. Yak wool could also be the next big thing in the sustainable and eco-friendly textile category, while supplementing the income among the impoverished and remote communities in China.

Advantages of yak fibre

The hair of the shaggy animal may look coarse and hard, but its fine down fibre is almost as soft as cashmere, one of the softest wools known in textile industry. "Yak down fibres range from 16 to 20 microns in diameter, whereas cashmere fibre measures less than 18.5 microns.



Schematic view of the new yarn spinning system



The development of fine worsted yak yarns and fabrics won a gold medal in the 45th International Exhibition of Inventions of Geneva.

That means yak down is almost as soft as cashmere, with the potential to be knitted into luxury clothing items. Besides, yak fibres are more breathable and warmer than cashmere and merino wool. All in all, yak down fibre makes very comfortable fabric that is soft, warm and breathable, but it costs much less than cashmere," said Dr Xu.

Yak fibre is also an eco-friendly and sustainable material in abundant supply. There are over 13 million yaks in China, accounting for 80% of the global yak population. They mostly live in the Himalayas and Tibetan Plateau under extreme environment not fit for other livestock. "Environmentally speaking, the animals are indigenous to the areas and they play a key part in the local ecosystem. By popularizing the use of yak fibre, this technology helps improve the livelihood of those underprivileged nomadic herders in the most inaccessible areas of China without harming the environment. This is a social impact that the project brings."

New spinning method

However, it has been challenging to convert yak fibres into fine yarns with high strength, low hairiness and

good evenness. "Yak down fibre is much shorter than cashmere or merino wool. That's why the nomads mainly use its outer fibres to make woollen products that are coarse and heavy. Before the fine down fibres can be used to make high-quality fabrics and sold as luxury items, we must find a way to make fine worsted yak yarns," said Dr Xu. His research team came up with a new spinning method using a multi-level spinning triangle to alter the fibre arrangement in the yarn. More fibres can be evenly and firmly incorporated into the yarn body so that it is stronger, less hairy and more even on the surface. "In fact, inexpensive modifications can be made to existing spinning machines to improve strength, hairiness and evenness of any yarn, including cotton or wool, with this new spinning method. We also investigated the optimal settings for existing knitting machine to produce high-quality yak fabric without any additional cost," he added.

In March 2017, the development of fine worsted yak yarns and fabrics won a gold medal in the 45th International Exhibition of Inventions of Geneva, Switzerland.