The proportion of man-made fibres in the world structure of textile raw material is constantly increasing and at present it is about 45%. The fact that in the developed capitalist countries about 15 kg of man-made fibre is consumed per person of the population on the average per year while in the world this figure is scarcely 3 kg indicates that high stability is assured in the future for the development of manufacture of this type of textile raw material. It is to be noted that the reason for the rise in output volume of man-made fibres is not so much the limited possibility of obtaining natural fibres as it is the high consumer properties of the man-made fibres.

In distinction to natural fibres, man-made fibres can be produced in the form of tows, fibres of a required cut length, of various linear densities, dyed, dull or bright, structurally crimped, texturized or smooth, and also with a wide selection of physico-mechanical properties. Thanks to this, man-made fibres are used in practically all articles for national consumption, and today it is difficult to find clothing, shoes, or interior objects in which they have not been used. Many articles are entirely made from chemical raw materials since they cannot be produced from natural fibres in view of their specific functional purposes.

Man-made fibres give articles crease resistance, form stability, high wear resistance, comfort, various external effects, and good coloristic appearance, i.e., all those things which is difficult or impossible to attain using natural fibres. Particularly great is the effect from using in articles various mixtures of man-made fibres with natural ones, where defects in the properties of one are compensated for by the advantages of the others. For example, now it is difficult to imagine woolen costume or dress fabrics without a content of Lavan or Nitron, which give them high form stability and crease resistance.

Our country is one of the very largest producers of viscose fibres and yarns in the world, since we produce more than 20% of this form of textile raw material (~430,000 metric tons per year), and in this undoubtedly the credit goes to the "Khimvolokno" NPO as the basic treating branch of the scientific organization. Practically all viscose manufacturing units operate on domestic equipment and by technological processes which were developed by scientists and specialists of the "Khimvolokno" NPO.


In linear density, physico-mechanical properties, quality, and consumer properties, the assortment of viscose fibres and yarns produced by this branch of industry is not inferior to the assortment of leading foreign companies. At present, more than 60 forms of yarns are produced by plants in the artificial fibre branch and almost 30 of staple and tow fibres, which are processed by all branches of the textile industry into thousands of articles of woven fabrics, tricotage cloth, and nonwoven materials. Having a high hydrophilicity, viscose fibres and yarns in mixture with synthetic ones give articles comfort, while the synthetic component confers wear resistance and crease resistance.

The main consumer of viscose yarns is the silk branch of the textile industry, which processes more than 60% of its production. Linings, clothing, corsets, decorative blankets, blanket-type, Jacquard, and other types of fabrics are produced using these fibres; these are intended for articles having a mass demand.

Second in volume of demand for viscose yarns is the tricotage branch, the share of which is 30% of its production. Outer and inner fabrics and also stocking or sock articles containing viscose yarn as a component or entirely of it are always being used in increased demand by the population thanks to their high comfort in socks and good external appearance.

The textile—haberdashery branch, which consumes about 6000 metric tons of viscose yarns, makes from them various lace articles, trimmings, tapes, braids, lacing for clothing, and so forth.

It is necessary to note that the work carried out in recent years in the "Khimvolokno" NPO in the region of improving viscose textile yarn technology has been directed toward raising their quality and reducing the linear density both of complex yarns and also of their elementary components. Thus, in just the 5 years, the mean linear density of yarns over the branch has been reduced by 1.5 units, which has permitted the textile industry to considerably reduce the material volume of articles. Simultaneously with this, there has been a constant decrease in defects and improvement in uniformity of dyeing by viscose yarn prepared by the centrifugal method. The adoption of the continuous method of preparing viscose textile yarn on machines of the PNSH type by the man-made fibre branch and also of the process of warping from the cakes onto sectioned reels and warping rolls has given textile operators the opportunity to raise dyeing uniformity of viscose fabrics and tricotage cloths and to reduce the amount of scrap with respect to this particular property.

In the course of the last ten years, new rewinding machines have been developed and introduced into industry with participation of the Institute: the commercial packaging of viscose complex yarns has been increased from 1.8-2.0 to 2.7-3.0 kg. In recent years, articles from man-made fibres and yarns which approach articles from natural fibres in their properties have been put to use with a high consumer demand.

New processes for preparing threadlike viscose—polyamide yarns and yarns with a mixed effect have been worked out by plants in the man-made fibre branch. In the very near future, aerodynamically texturized combined yarns will be able to replace those man-made yarns whose demand has been diminishing, for example, smooth Kapron yarns.

The combination of the high hygienic properties of viscose yarns with the strength and elasticity of Kapron yarns makes it possible to obtain combined yarns with good service properties. Suits, shirts, and dresses of fabrics made up from such yarns are characterized by a good external appearance and artistic—coloristic make-up. Combined textile yarns with a mixed effect which are produced from different colored viscose yarns or pneumatically combined yarns containing Kapron yarns of different linear density give tricotage articles an effective external appearance.

In addition to the advantages enumerated above, viscose textile yarns are also characterized by a number of technological advantages: they are processed without difficulty on textile equipment, and the process itself has a minimum number of technological transitions.

Among the defects of viscose yarns, we may list first of all nonuniformity in dyeing, which is built in the very process of the centrifugal method of preparing them, and also an insufficiently high bulk, even at relatively low twists.

These defects are absent in yarn produced from viscose staple or tow fibres, the volume of output of which considerably exceeds the output of yarns. In the USSR, for example, almost five times as much viscose fibre is produced as yarn; this is brought about by the relatively low cost and large functional opportunities of this form of textile raw material.

The main consumers of viscose fibres are the cotton industry (55%), the silk industry (20%), the wool industry (15%), the linen industry (5%), and manufacture of nonwoven materials (5%).

Viscose fibres are used to make purely staple yarns and yarns mixed with other man-made and natural fibres; from these there are then produced hundreds of articles of various fabrics and tricotage cloths.

The broad scales of application of viscose fibres and yarns are determined by the following advantages:

- as compared with synthetic fibres — by the comfort of articles, caused by the high hydrophilicity in combination with softness and the lack of static development; ease in printing and dyeing fabrics and tricotage cloth; and by the lack of pilling and the good thermal stability (the fibre does not melt);