BOOK OF ABSTRACTS

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CENTRO DE DÉCUMATECNOLOGIATEXTIL
FOREWORD

Unfolding the Future is the moto of the 20th International AUTEX Conference, held on 5th to 9th September 2021.

Recognized as a reference among the textile scientific community, the AUTEX conferences gather every year a large number of researchers that share their ideas and achievements in various research and educational projects.

At the beginning of this new decade, very important challenges are being faced concerning the sustainability of our planet, that directly impact the textile and fashion business. Also, the most recent global health threats enhance the societal relevance of textiles and the major contribute to protect people and overcome this menace to Humanity.

The Autex2021 Conference was the right place to unveil and show the novel approaches, concerning materials, technologies and business models, that are being thought and developed.

Through the great number of communications presented on 20th AUTEX, the state of the art of multiple themes related to textiles, from materials to technology, from design to merchandising, from education to products, from sustainability to circular economy, was actually revealed and unfold the future of this industrial sector and, as fibrous materials are more and more omnipresent, certainly Unfold our Future Way of Life.

Guimarães, 5th September 2021

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QUALITY ASSESSMENT OF DOUBLE JERSEY KNITTED FABRICS MADE OF DIFFERENTLY SPUN LYOCELL YARNS

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ABSTRACT
The number of European standards related to testing of knitted fabrics are low. Therefore, it is necessary to expand the research in the field of their quality assessment [1]. Knitwear and lingerie, that are worn in direct contact with the skin, are often made of man-made artificial fibres from cellulose (eg. viscose, modal or lyocell) which provide silky touch, better hydrophilicity and exceptional contact comfort. Knitted fabrics were usually made of single spun yarns produced by conventional ring spinning system. More recently in application were also spun yarns made by unconventional rotor and air-jet spinning systems. Different spinning systems provide spun yarns of different structure and properties. Therefore, in this paper three different circular weft double jersey knitted fabrics made of single lyocell ring, rotor and air-jet spun yarns of the same linear density (20 tex), all made of bright staple Tencel® fibres of linear density of 1.3 dtex and length of 38/40 mm, were used. With the purpose of analysing the influence of different spun lyocell yarns and the knitted fabrics processing level on their properties, the usage quality of raw and finished knitted fabrics were evaluated and their applicability assessed.

MATERIALS AND METHODS
Knitted fabrics samples were made using circular double-bed knitting machine with E17 gauge and needle bed diameter of 200 mm (8 inches). All dry relaxed knitted fabrics (raw samples) were finished in the production plant: firstly washed thoroughly at 40°C, further with addition of stabilization agent at 95°C, then rinsed, cold washed with neutralization and softening; and dried at 150°C with a passage rate of 0.15m/s. After the conditioning (at temperature: 20 ± 2°C and air relative humidity: 65 ± 4%), along with basic characterisation, knitted fabrics usage quality were assessed by determination of breaking strength and elongation (EN ISO 13934-1), dimensional change after washing and drying in tubular form (EN ISO 6330, procedure 4M and A), permeability of fabrics to air (EN ISO 9237), their propensity to surface pilling (EN ISO 12945-2) and abrasion resistance (EN ISO 12947-2) using the Martindale abrasion tester.

Mass per unit area, thickness and total number of wales and courses per unit length of raw and finished lyocell knitted fabrics, along with the moisture regain, breaking strength and breaking elongation determined by the strip method (in length and with direction) are shown in Table 1.
RESULTS AND DISCUSSION

Air permeability and the breaking strength of finished knitted fabrics are changed primarily because of their dimensional and structural changes. After laundering, the overall deformability is lower and dimensional stability is improved in all finished fabrics. Lower propensity to surface piling was observed in knitwear made of lyocell air-jet spun yarns because of their lower hairiness and specific structure. Knitwear samples made of ring spun yarns, that are highly twisted on the surface, show better abrasion resistance.

CONCLUSION

On the basis of the results obtained, it was concluded that for selection of the lyocell spun yarn for knitted fabrics production is necessary to consider their structure and the characteristics, but also, the fact that yarn spinning technique, as well as the process of knitted fabric finishing significantly influence knitwear usage quality.

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