

Acknowledgements

The study covers a part of the research activities of the programme P2-0213 Textiles and Ecology, supported by ARRS (Slovenian Research Agency).

References

1. Oxenham W. Fasciated yarns - a revolutionary development?. *JTATM*, 2001; 1: 1-7.
2. Basal G, Oxenham W. Vortex spun yarn vs. Air-jet spun yarn. *Autex Res. J.*, 2003; 3: 96-101.
3. Kyaw SA, Takahashi M, Nakajima M, Matsuo T and Matsumoto T. Structure and Properties of MVS Yarns in Comparison with Ring Yarns and Open-End Rotor Spun Yarns. *Text. Res. J.* 2004; 74: 819-826.
4. "Vortex, a new type of yarn", http://www.muratec-vortex.com/1_1.html/ (accessed 20 September 2013).
5. "The various spinning method. Air-Jet spinning development", <http://www.rieter.com/cz/riepedia/articles/alternative-spinning-systems/the-various-spinning-methods/air-jet-spinning/development/> (accessed 22 September 2013).
6. Erdumlu N, Ozipek B and Oxenham W. Vortex spinning technology. *Text. Progress.* 2012; DOI:10.1080/00405167.2012.739345.
7. Rameshkumar C, Anandkumar P, Senthilanthan P, Jeevitha R and Anbumani N. Comparative studies on ring rotor and vortex yarn knitted fabrics. *Autex Res. J.* 2008; 8: 100-105.
8. Yesim B and Banu U. N. Comparison of the effect of Cotton Yarns Produced by New, Modified and Conventional Spinning systems on Yarn and Knitted Fabric Performance. *Text. Res. J.* 2008; 78: 297-303.
9. Ortlek HG. and Onal L. Comparative study on the characteristics of knitted fabrics made of vortex -spun viscose yarns. *Fiber. Polym.* 2008; 9: 194-199.
10. Seo MH, Realf ML, Pan N, Boyce M, Schwartz P and Backer S. Mechanical Properties of Fabric Woven from Yarns Produced by Different Spinning Technologies: Yarn Failure in Woven Fabric. *Text. Res. J.* 1993; 63: 123 - 134.
11. Rengasamy RS, Ishitaque SM, Das B R and Ghosh A. *Indian J. Fibre. Text.* 2008; 33: 377-382.
12. Lord PR and Radhakrishnaiah P. Comparison of Various Woven Fabrics Containing Friction, Rotor, and Ring Spun Cotton Yarn Fillings. *Text. Res. J.* 1988; 58: 354-362.



INSTITUTE OF BIOPOLYMERS AND CHEMICAL FIBRES

LABORATORY OF ENVIRONMENTAL PROTECTION

The Laboratory works and specialises in three fundamental fields:

■ R&D activities:

- research works on new technology and techniques, particularly environmental protection;
- evaluation and improvement of technology used in domestic mills;
- development of new research and analytical methods;

■ **research services** (measurements and analytical tests) in the field of environmental protection, especially monitoring the emission of pollutants;

■ **seminar and training activity** concerning methods of instrumental analysis, especially the analysis of water and wastewater, chemicals used in paper production, and environmental protection in the paper-making industry.

Since 2004 Laboratory has had the accreditation of the Polish Centre for Accreditation No. AB 551, confirming that the Laboratory meets the requirements of Standard PN-EN ISO/IEC 17025:2005.



Investigations in the field of environmental protection technology:

- Research and development of waste water treatment technology, the treatment technology and abatement of gaseous emissions, and the utilisation and reuse of solid waste,
- Monitoring the technological progress of environmentally friendly technology in paper-making and the best available techniques (BAT),
- Working out and adapting analytical methods for testing the content of pollutants and trace concentrations of toxic compounds in waste water, gaseous emissions, solid waste and products of the paper-making industry,
- Monitoring ecological legislation at a domestic and world level, particularly in the European Union.

A list of the analyses most frequently carried out:

- Global water & waste water pollution factors: COD, BOD, TOC, suspended solid (TSS), tot-N, tot-P
- Halogenoorganic compounds (AOX, TOX, TX, EOX, POX)
- Organic sulphur compounds (AOS, TS)
- Resin and chlororesin acids
- Saturated and unsaturated fatty acids
- Phenol and phenolic compounds (guaiacols, catechols, vanillin, veratrols)
- Tetrachlorophenol, Pentachlorophenol (PCP)
- Hexachlorocyclohexane (lindane)
- Aromatic and polyaromatic hydrocarbons
- Benzene, Hexachlorobenzene
- Phthalates
- Carbohydrates
- Glycols
- Polychloro-Biphenyls (PCB)
- Glyoxal
- Tin organic compounds

Contact:

INSTITUTE OF BIOPOLYMERS AND CHEMICAL FIBRES
ul. M. Skłodowskiej-Curie 19/27, 90-570 Łódź, Poland
Małgorzata Michniewicz Ph. D.,
tel. (+48 42) 638 03 31, e-mail: michniewicz@ibwch.lodz.pl