

Microbial enzymatic treatment of baby diaper front sheet to enhance liquid transport

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Modern disposable baby diapers and incontinence products have made an important contribution to the quality of life of millions of people. A front sheet material for a diaper or other absorbent hygienic product has to keep the skin dry. Such a material therefore needs to swiftly transport liquid. The resulting main properties for a coverstock (front sheet) are instant wettability and durable hydrophilicity. In the present research, a biocatalytic modification of baby diaper front sheets has been investigated as an appealing alternative, since it could be performed without damaging the fibres using environmentally friendly and energy saving process conditions. Recently the potential of enzymes for surface hydrophilisation and/or functionalisation is flourishing. In this research, the enzymes used for the surface hydrophilisation of the front sheets of baby diapers were cellulases and pectinases. The enzymatic treatments were carried out individually also in combinations. The hydrophilicity of the treated diaper front sheets was evaluated by two tests namely drop penetration and wicking test. Moisture regain of the samples was calculated by the oven dry method. In addition to hydrophilisation, an attempt has also been made by incorporating the skin friendly antimicrobial compounds in order to make the front sheets resistant against microorganisms causing infections. Investigations were also made to study the impact of enzymatic treatment on the antibacterial activity of the diaper front sheets. The antibacterial activity of the samples was assessed by standard AATCC methods against the test organisms *Escherichia coli* and *Staphylococcus aureus*. The results of the drop penetration and wicking test clearly indicated the increase in hydrophilicity of the enzyme treated diaper front sheets. Rather than individual enzymes, enzyme in combination showed notable increase in the hydrophilicity. The results of the antibacterial tests revealed that the diaper front sheets were active against microorganisms. Apart from hydrophilicity, there has been marked increase in the antibacterial activity of the enzyme treated diaper front sheets than the untreated front sheets. From the overall results it could be concluded that enzymatic treatment of the diaper front sheets is an eco-friendly way of improving the hydrophilicity of the diaper front sheets.

Biography

R. Rajendran has been appointed as the Principal of PSG College of Arts & Science since 20.01.2012. He is a post graduate in Applied Microbiology; Doctorate in Microbiology specialized in Textile Microbiology/Biotechnology and is shortly going to acquire his Doctor of Science in Microbiology. His research, teaching and Industrial consultancy experience is more than two decades. He has completed three major research projects and currently leading 3 major research projects. He has so far authored 97 research papers in peer-reviewed national and international journals, 121 research papers in the proceedings of national and international conferences/seminars and co-authored 18 books. He has won many awards and honors to his credit. To name a few, he won the Academic Excellence Award by PSG Management during 2004, 2005 and 2006, awarded as the Eminent Scientist by Textile Research Division, National Research Center, Cairo, Egypt, April 2009 and he has a number of best research paper awards at various international / national scientific forums. He has been invited to present his research findings as a plenary / guest / invited lectures in a number of international scientific research forums at Egypt, Sudan (Khartoum), Tunisia and in Sri Lanka.

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