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Analysis of the Bending Behaviour of Lightweight Woven Fabrics for Muslimah Hijab Applications After Repeated Laundering

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Structured Abstract

Background: The performance and comfort of hijabs are closely related to the mechanical behaviour of the fabrics used, particularly bending behaviour and drapability. Lightweight woven fabrics are commonly preferred for Muslimah hijab applications due to their comfort, breathability and aesthetic appeal. However, repeated laundering may change fabric stiffness and draping characteristics, which can affect long-term wearability and user satisfaction. Despite the growing demand for durable and comfortable hijab fabrics, limited studies have specifically examined the effect of repeated laundering on the bending behaviour and drapability of lightweight woven fabrics for hijab applications. Therefore, this study aims to investigate the changes in bending length, flexural rigidity and drape coefficient of selected lightweight woven fabrics after repeated laundering and to relate these findings to user perceptions.

Methods: Four types of lightweight woven fabrics commonly used for hijabs were selected. The fabrics were subjected to 0, 1, 3 and 5 laundering cycles using standard washing procedures. Bending behaviour was evaluated through measurements of bending length and flexural rigidity, while drapability was assessed using the drape coefficient and number of nodes. In addition, a survey questionnaire was conducted among hijab users to obtain information on their preferences related to fabric stiffness, drapability and comfort.

Results: The results showed that repeated laundering generally increased fabric stiffness, as indicated by higher bending length and flexural rigidity values after washing. Correspondingly, drape coefficient values increased, reflecting reduced drapability of the fabrics. The extent of these changes differed among fabric types, indicating that fabric structure and material composition influence the ability of fabrics to retain their draping performance after laundering. Some fabrics maintained better flexibility and drapability compared to others. The survey findings supported the experimental results, where most respondents preferred lightweight and flexible fabrics that drape well and feel comfortable for daily hijab use.

Conclusion: This study demonstrates that repeated laundering has a significant impact on the bending behaviour and drapability of lightweight woven fabrics used for hijabs. Fabrics that retain lower stiffness and better draping performance after washing are more suitable for hijab applications. The findings provide valuable insights for textile manufacturers and designers in selecting and developing fabrics that balance comfort, durability and aesthetic performance for hijab products.

Keywords: Lightweight Woven Fabrics, Hijab, Bending Behaviour, Drapability, Repeated Laundering

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