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Effects of Repeated Washing to Absorbency and Breathability of Reusable Potty-Training Pants

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Structured Abstract

Background: The increasing demand for sustainable and reusable baby products has led to the growing use of reusable potty-training pants as an alternative to disposable diapers. Although these products are designed for repeated use, frequent laundering may alter their functional performance, particularly in terms of absorbency, moisture management, and breathability. However, limited studies have systematically evaluated how repeated washing affects these critical comfort-related properties.

Methods: This study investigated the effect of repeated washing on the absorbency and breathability of reusable potty-training pants from three different brands of varying price range (non-branded, brand A, and brand B). Samples were subjected to 0, 2, 5, and 10 domestic washing cycles under controlled conditions. Gravimetric absorbency testing was conducted according to ISO 9073-6, while breathability performance was evaluated using the Moisture Management Test (AATCC 195) and Water Vapor Permeability Test (ISO 15496). All tests were performed in a textile laboratory environment, and the results were analysed comparatively to assess changes in fabric performance with increasing washing cycles.

Results: The findings showed that all samples exhibited good liquid absorbency; however, noticeable variations were observed after repeated washing. The non-branded and brand A demonstrated a significant increase in absorbency after 10 washing cycles, indicating the removal of hydrophobic finishing agents and enhanced fabric hydrophilicity. In contrast, brand B showed relatively stable absorbency values across all washing cycles, suggesting better structural stability. Moisture management performance remained generally low for most samples, with only slight improvements observed after repeated laundering. Water vapor permeability results indicated minor changes, suggesting that breathability was moderately retained despite multiple wash cycles**.**

Conclusion: In conclusion, repeated washing significantly influences the absorbency behaviour of reusable potty-training pants by altering fibre surface characteristics and fabric structure. While absorbency tended to improve after extensive laundering, breathability properties showed limited variation. These findings highlight the importance of material selection and fabric construction in ensuring long-term performance. The study provides useful insights for parents in selecting durable reusable products and for manufacturers in improving product design to enhance sustainability and user comfort.

Keywords: Reusable potty-training pants; repeated washing; absorbency; moisture management; breathability

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