

Consumers' Acceptance of Sustainable Apparel Products Made of Bacterial Cellulose Materials

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Research has identified several barriers that prevent acceptance of sustainable goods and apparel by consumers including lack of expertise about effects of sustainable products on the environment, difficulty in finding sustainable products, high prices, and negative perceptions of sustainable apparel as being non-fashionable and unattractive (Gleim et al., 2013). It is essential to assess consumers' acceptance and evaluation of sustainable products in product design and development stage, to ensure that consumer preferences and needs are being considered and the product is successful when introduced to the market. While bacterial cellulose (BC) has been proposed as a potential eco-friendly material for apparel production, there is no research exploring consumer acceptance of this BC material used in apparel. Therefore, the aim of this study was to explore consumers' acceptance for the use of a bacterial cellulose-based sustainable nonwoven fabric in apparel or other related products, which was newly developed as a part of the larger project.

An online survey including both open- and close-ended questions was conducted with a convenience sample of 166 college students at one of the U.S. mid-western universities. Visual images of a newly developed BC nonwoven material and a vest prototype made of this material were used in the survey. After viewing these images, participants were asked questions on their thoughts about BC material. Survey questions also included their expectations and perceptions towards the BC material as well as apparel made of this material, and demographic information. The close-ended questions except demographic information items were measured using a 7-point Likert scale. The quantitative data were analyzed using SPSS 21 to perform basic descriptive statistics and paired t-test. The qualitative data from open-ended questions were analyzed using content analysis approach.

A total of 132 valid responses were used for the data analysis. Participants' ages ranged from 18 to 52 with the mean age of 23.5. About 84% and 16% of the participants were females and males, respectively. The majority was White/European American (68.2%), followed by Asian (17.4%), Latino or Hispanic American (7.6%), and other ethnicities (6.8%). Majority of participants thought the vest was made of leather, rawhide, paper, or plastic. They described the texture of the vest as "stiff, like leather." Participants viewed the texture of BC material as likely thin ($M=5.24$), stiff ($M=4.55$), slick ($M=4.39$), hard ($M=4.35$), and harsh ($M=4.33$). They viewed the surface of BC material toward smooth ($M=4.70$), pure ($M=4.04$), shiny ($M=3.91$), even ($M=3.84$), and slightly opaque ($M=3.56$). Most participants were concerned about the color and texture of BC material. They suggested providing more color variations and solutions for possible discomfort caused by hard and stiff texture of the material.

Overall, study participants had positive attitude towards BC material ($M=4.29$) based on the rating scale from "poor (1) to excellent (7)"; however, their average response to anticipated

acceptance of this material by general consumers was just slightly above medium ($M=3.79$), using the rating scale from “not at all (1) to extremely acceptable (7).” Participants had positive perceptions towards BC material, especially considering the material as very unique ($M=6.25$) and interesting ($M=6.07$). They also thought this material is usable ($M=4.67$) and durable ($M=4.26$), but their willingness to purchase the products made of BC material was in a medium range ($M=3.47$). According to the planned behavior theory, positive perception leads to positive attitude, which leads to positive behavioral intention. However, only a medium acceptance rate of BC material was found in this study. This could be attributed to participants’ doubts about the actual texture of BC material, as they did not have the opportunity for actual physical inspection of the material (e.g., tactile).

The study also examined participants’ expectations and perceptions about (a) the currently available sustainable materials and products made of those and (b) products made of BC material. No significant gap was found between their perceptions and expectations for sustainable products (a) currently available in the market and (b) made of BC material ($t=1.935$, $p=0.06$; $t=-1.918$, $p=0.057$), respectively. However, participants’ expectations and perceptions were significantly higher for the products made of sustainable materials currently available in the market than for the products made of BC material. This indicates that participants do not anticipate that the products made of BC material can be yet marketable and comparable to other sustainable products.

Among the study participants, 32.6% considered switching from their favorite brands or stores to other brands that sell environmentally friendly products, and 16.7% of them would not switch the choice of their brands. About a half (50.7%) were not sure about this matter, indicating consumers’ acceptance of environmentally friendly products is still immature, so the market for the products made of sustainable materials still needs growth. Around 28% of the participants were willing to pay a 5% price premium to buy sustainable products and 21% would like to pay more than 10% price premium of the products, indicating that more than half of the participants are willing to pay more for sustainable products. This finding encourages researchers to develop new sustainable materials to gain the market and better the planet. Novel, sustainable materials (e.g., BC material) could be continuously introduced to the market but consumer awareness of these types of materials should be first improved and reinforced.

The study results indicate that BC material has the potential to gain consumers in the future. Although participants did not perceive BC material as good as other currently available sustainable materials, they presented great interest in this material, providing ideas for its potential use like shoes, hats, accessories, packaging materials, or home furnishings (e.g., curtains). Further study should be done for further exploring the potential of BC material for a variety of products beyond apparel. Further consumer testing is also recommended involving study participant’s physical inspections of BC material by conducting sensory evaluation and wear testing of apparel products made of this material.

Reference

Gleim, M.R., Smith, J.S., Andrews, D., & Cronin, J.J. (2013). Against the green: A multi-method examination of the barriers to green consumption. *Journal of Retailing*, 89(1), 44-61.

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