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THE 13TH INTERNATIONAL INNOVATION, INVENTION & DESIGN COMPETITION 2024

EXTENDED ABSTRACTS

e-BOOK

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UV-SHIELD CAP2CARRY

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ABSTRACT

UV-Shield Cap2Carry is an innovative and multi-functional product. This product combines the concept of a cap and a bag. This product is designed to provide UV protection UV rays have potential dangers to human health. Excessive exposure to UV rays can cause skin damage, including premature aging, dry skin, sun spots, and the risk of skin cancer. This product is presented to prevent aging by using UVP 50 Polyester material which functions to avoid sunlight. This product uses bamboo cotton, which protects hair from bacteria and absorbs sweat. Hair will remain intact while wearing this hat. It can also be used as a bag that can carry items practically. This bag will be designed to contain many items. Even though this product looks small, the bag will function to include a lot of items. This multifunctional product has a stylish design suitable for outdoor activities such as walking, running or on holiday. The UV-Shield Cap2Carry combines comfort, style, and functionality in one innovative and practical product. Thus, the UV-Shield Cap2Carry product is a useful and multifunctional choice.

Keywords: Cap, Bag, UV Shield, Multifunctional Product

1. INTRODUCTION

The UV or ultraviolet index is a simple reading related to the sun's strength in terms of UV rays in a particular area. The index was created by a Canadian scientist in 1992 and then modified by the World Health Organization working alongside the United Nations World Meteorological Organization in 1994. The higher the UV Index, the greater the skin and eye damage dose rate due to UV radiation. Consequently, the higher the UV Index, the less time it takes before skin or eye damage occurs.

The extreme sun index made those out in the sun take protective measures to guard against UV exposure by using umbrellas and wearing hats or sunglasses. According to the NAE (Alapján-, 2016) agency, it is common for the UV index to reach very high and extreme levels between 11am and 3pm on a day with little cloud cover. The months of February, March, April and September tend to see the highest UV radiation. Those venturing outdoors should also slather on sunscreen of at least SPF 30 every two hours. According to the agency, it is common for the UV index to reach very high and extreme levels between 11am and 3pm on a day with little cloud cover. Especially in Jakarta, Indonesia the UV index has touched the number 9 for the past few days (20,21,22 of April) and the average UV index is at 5.75 to 7.25. Jakarta's average UV index in April can reach 12, which is extreme and the risk of getting skin cancer while sunbathing is very high.

The use of certain clothes can be one of the reasons to prevent UV index, some types of clothes provide special features like Ultraviolet Protection Factor or UPF (Arpansa, 2002). These sun-protective clothes may have a label listing the UV protection factor (UPF) value (the level of

protection the garment provides from the sun's UV rays, on a scale from 15 to 50+). The higher the UPF, the higher the protection from UV rays. This UV protection cloth can also be used in other things like hats, anti-UV jackets, and umbrellas. In this case, the hat application can be useful for sun protection of the head, ears, face and neck to prevent sunburn in the face area.

In this project, UPF cloth will be implicated as a based feature for our product named Cap2Carry. Cap2Carry is designed to block harmful ultraviolet (UV) rays from the sun, shielding face, scalp, and neck from sunburn and reducing the risk of skin damage and skin cancer. By blocking UV rays, Cap2Carry helps prevent premature aging of the skin, such as wrinkles, sunspots, and sagging, keeping your skin looking healthier and younger. Cap2Carry is also made from comfortable and lightweight material such as bamboo cotton as a special feature to prevent bacteria growth and odor-free agents, this feature is particularly advantageous in hot and humid conditions or during strenuous outdoor activities. Not only as a UV-Shield hat, Cap2Carry has multiple uses including the mini bag to carry things, so the user can use Cap2Carry in different ways as needed.

2. METHODOLOGY

2.1 Market Analysis

The UV-Shield Cap2Carry market analysis begins with identifying the target audience and understanding the needs of potential consumers. The main target market for this product is people who engage in outdoor activities and care about protecting themselves from the harmful effects of UV radiation including people who enjoy outdoor sports or travel enthusiasts. Then conduct market research by gathering insights on consumer behavior, preferences, and buying patterns.

2.2 Marketing Strategy

UV-Shield Cap2Carry's marketing strategy will focus on creating awareness, generating interest, and driving sales. The marketing plan incorporates various channels such as online advertising, social media marketing, influencer collaboration, and participation in outdoor events and exhibitions. The product's key selling points, including sun protection, comfort, and stylish design, and multiway purposes will be highlighted in the marketing campaign.

2.3 Financial Analysis

Financial analysis will involve assessing costs related to product development, manufacturing, marketing, and distribution. A detailed budget will be prepared, taking into account expenses such as research and development, manufacturing costs, marketing campaigns, staffing, and overhead costs. Revenue projections will be made based on market research, pricing strategies, and sales forecasts. Then, an analysis of the financial viability and profitability of the product will be conducted to ensure a sustainable business model.

2.4 Business Plan Development

UV-Shield Cap2Carry's business plan will outline the overall strategy, objectives, and implementation plan of the product which includes sections on market analysis, product development, marketing strategy, financial analysis, and operations. This business plan will serve as a roadmap for the successful launch and growth of the product to provide clear direction for all aspects of the business. The business plan also includes contingency plans and risk mitigation

strategies to address potential challenges or uncertainties that may arise during the product's life cycle.

3. FINDINGS

3.1 Product Description

The UV-Shield Cap2Carry product has been successfully realized following the design and experiments that have been made. The operation of the UV-Shield Cap2Carry Product produces output to relieve luggage and allergies on sensitive skin to ultraviolet rays. The product design process is done offline through the dip-pad-dry-cure method. This design process uses product visualization based on predetermined materials. UV-Shield test on the material used by soaking the UV-Shield Cap2Carry product for 6 hours in UV solution and dried at room temperature. To test the ability of UV light to degrade stains, samples were irradiated with a 15-Watt UV lamp, which can be done using a laminar lamp for 5 hours. The total color difference before and after irradiation was done using a reflectance spectrophotometer.

3.2 Benefits

The benefit of the implementation of this activity is the creation of the product UV-Shield Cap2Carry which can be used as one of the media for the actualization and development of science and technology-based technology to provide solutions offered by innovative alternatives for textile companies in meeting the needs of clothing when used in everyday life. The presence of this product is expected to encourage innovation in the textile industry and textile products (TPT).

3.3 How to use

The use of materials in the process of coating chemical compounds on the fabric's surface, tailored to the size of the product used. This product is designed to help most people who are very busy with work by requiring a product that can be multifunctional to store daily items. Some people wash with disinfectant products containing chemicals, such as bleaching agents and alcohol. There are health hazard issues upon contact with these chemicals. They can only be cleaned in the short term, so repeated use of detergents results in environmental pollution caused by waste.

3.4 Advantages

UV-Shield Cap2Carry has great potential in minimizing the use of repeated products that result in environmental pollution and health hazards when skin contact with ultraviolet exposure contained in the sun, especially for users with low skin sensitivity to ultraviolet skin irritation. UV-Shield Cap2Carry is believed to have great potential to be commercialized and have the opportunity for the sustainability of product use if users want one of the functions and benefits of UV-Shield Cap2Carry in preserving the environment.



Figure 1 Design 3D UV-Shield Cap2Carry

4. CONCLUSION

Cap2Carry's UV-Shield product is an innovative product that addresses the problem of high use of detergent and skin allergy to ultraviolet. Through a photocatalytic process with the help of ultraviolet light such as sunlight, UV-Shield Cap2Carry products accelerate the reaction in special products that aim to remove the stains on the fabrics. Inhibit exposure to UV rays from directly hitting the skin. Tests were carried out in sunlight by measuring the UV light threshold value of the absorption of light on the surface of the products. The drying time of the product in sunlight is approximately 1-2 hours until the test is carried out.

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