

The Agricultural Product Innovative Design of Convenient Finger-Stall Scrub Sponge

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Abstract

When washing dishes using rectangular general scrub sponges commonly available in the market, it's often difficult to clean corners and it's not easy to hold dishes for cleaning because they are wet and slippery while being washed. Therefore, this study designed a finger-stall scrub sponge fitting users' thumbs and index fingers, so that users can wear the product conveniently on their fingers to wash dishes easily and rapidly. Also, users don't have to apply a lot of force using their middle fingers, ring fingers, or little fingers. The R.O.C. utility model patent application for this new product has been approved. And the team won a bronze medal in the 2012 international innovative invention poster competition with this product. In the future, the team will continuously and actively participate in international invention competitions and industrial expositions with this product to strive for opportunities of technical licensing and mass production.

Keywords: *Agricultural Product, Scrub Sponge, Convenient Finger Stall.*

1. Introduction

Features of agricultural products include: (1) unprocessed raw materials: agricultural products are mostly original raw materials. Only a small of part of them are fruits and vegetables which can be eaten raw while the rest are used for further processing; (2) a great quantity: agricultural products usually come in a great quantity with expensive costs of transportation and storage; (3) becoming stale easily: agricultural products may become stale easily. They must be delivered to markets in a short time after they are mature. Otherwise there has to be a good way to process and store them; and (4) unstable quality: influences of climate on agricultural products are huge. Therefore, qualities of agricultural products may change annually or seasonally. The features of production of agricultural products include: (1) increasing total quantity of output: in the long run,

the total quantity of agricultural product output is increasing; (2) large variation of annual quantities of output: quantities of output of agricultural products in different years may differ because of different climate conditions; and (3) seasonal output: quantities of output of agricultural products change every year due to strong influences of seasons [11].

The main factor behind an agri-business' ups and downs and rise and fall is its products. Products are the primary measure of marketing and the starting point of marketing mixes. When a corporate hasn't decided the products to be sold, prices, channels, and promotional programs can't be decided either. All valuable things an agri-business provides to its potential customers, including tangible products and intangible services or ideals, are products. Agricultural processors increase values added through maintaining products for longer times, making them more convenient, and improving their qualities. The key to the marketing systems of agri-businesses is to change external appearances of agricultural products. By changing original external appearances of agricultural products, they can be transported, stored, and sold more conveniently. According to durability, products can be categorized into: (1) nondurable products, (2) durable products, and (3) services. According to purposes of purchase, products can be categorized into: (1) consumer products, such as convenience products, shopping products, specialty products, and black products; and (2) industrial products, such as direct materials, capital goods, materials, and services. For consumers, a brand is a part of a product; it is a name, a design, or other feature which can be used to identify goods. For agri-businesses, brands help to lengthen customer loyalty and increase chances of purchase. Of course, delicate packing is a key to draw consumers' attention [6].

2. Literature Review

2.1 Snake Melon

The scientific name of a snake melon is luffa cylindrical. It is a Cucurbitaceae plant from India, also called a sponge cucumber. Sponge cucumbers are widely planted in East Asia. They are very common food vegetables. Their features include: strong root systems, climbing stems, five-sided shape, green color, flowering both main and side vines, offshoot tendrils, adventitious roots, palm-shaped or heart-shaped leaves, and napping. They are monoecious with yellow corolla. Male flowers are racemes, while female ones are solitary. Their ovaries are inferior. When the first female flower blooms, on most stems female flowers may bloom as well. Their fruits are like cucumbers, of lengths between 20cm and 100cm and diameters between 3cm to 10cm. Their surfaces are rough with several blackish green vertical ditches. When they are mature, they are dried gradually, while their seeds are still supported by surrounding fiber, thus creating empty spaces. Ends of fruits can be opened like lids. As wind blows, seeds are spread out due to centrifugal force [3].

The functions of snake melons include: (1) resisting scurvy: the high vitamin C content can help resist scurvy and prevent various vitamin C deficiencies; (2) brain improvement and cosmetology: the high vitamin C content is helpful for development of children's brains and health of middle-aged and old people's brains. Vine jus has the unique function of keeping skin elastic, removing wrinkle for cosmetology purposes; and (3) anti-virus and anti-allergy: their extracts can prevent epidemic encephalitis B. Also a type of bryonolic acid substances with anti-allergic function can be extracted from tissue culture media [3].

2.2 Scrub Sponge

Fresh snake melons can be used as food vegetables. However, some farmers would keep some snake melons themselves and pick them after they are dried and yellowed and their flesh is fibrotic. Then, they smash the front ends of snake melons and skin these melons to squeeze out seeds inside for next sowing. The rest parts are cleaned and sundried to make

natural scrub sponges. Scrub sponges with coarse fibers can be used to clean things, which those with fine fibers can be used for bath. Scrub sponges can be used to clean filth using their friction. There are coarse ones and fine ones. In order to avoid damaging things to be washed, users can try their scrub sponges on the back sides of things to be washed to make sure their materials wouldn't be damaged.

Advantages of scrub sponges: (1) removing filth immediately; (2) low price; (3) various choices, including natural scrub sponges and those made of chemical fibers such as acrylic and nylon fibers. Disadvantages of scrub sponges include: (1) sticky filth easily stuck in larger holes of scrub sponges; and (2) wet issues with scrub sponges combined with sponges. Scrub sponges can be used to clean filth because of the friction from their coarse surfaces. However, friction is an advantage, but also a disadvantage sometimes. For example, using scrub sponges with carborundum to wash things may scratch the surfaces of those things. This must be considered while purchasing a scrub sponge [1].

2.3 Related Research

With the improvements in living standards, more and more importance has been placed on brand images created by enterprises and consumers' awareness, resulting in more attention paid to labeling places of origin for agricultural products. Some scholar tried to use the GPS and the encrypted anti-counterfeiting system to precisely position to agricultural products within 10 meters to identify their anti-counterfeiting labels in order to provide unique information regarding these agricultural products. The precise was 98% [2]. Also, a scholar performed a survey with 538 farmers regarding their willingness of producing safe agricultural products. The result shows that prices of safe agricultural products, production scales, government subsidies, technical supports, and involvement of organizations of industrial management of agriculture were all significantly and positively related to farmers' willingness, while farmers' ages and family income were significantly and negatively related [9].

From the global point of view, the amount of agricultural product trading has been increasing. More and more importance has been placed on issues

such as making good use of lands and water, environmental protection, quality of agricultural products, and health functions of agricultural products. Therefore, farmers have to be very strict when it comes to production, processing, and transportation of daily foods. They have to provide consumers the safest foods, make sure effectiveness of marketing channels, and create good brand images [8]. In addition, due to the decreasing trends of prices of some agricultural products, more and more marketing for features and differences of agricultural products has been done in markets for the purpose of earning more money. Of course, farmers and trading companies would look for prices with higher profits. Thus, the management of supply chains for agricultural products of high values and high differences is getting stricter [5].

3. Innovative Product Design

3.1 Innovative Design

The innovative design process include consideration of customer's requirements, proposing initial improvement suggestion, selecting a final concept, creating a control chart, and communicating with the engineering department, the manufacturing department, and outside suppliers. In the aspect of management, (1) for technology-oriented products, the core is technology or abilities required for achieving certain technical task; and (2) for user-oriented products, the core is interface functions and aesthetic appearance. Other things to be considered for innovative design include user interface, emotional appeal, repair ability, proper use of resources, product differentiation, quality evaluation, practicability, appearance, easiness for repair, low cost, and presentation of quality [7].

The overall process of an enterprise developing a new product based on a creative idea include the following steps: (1) having an insight into future environment and conducting analyses; (2) making cross-product evaluations or evaluations on social changes; (3) sensing customers' future potential demands and making pre-judgments; choosing management strategies and technical tactics and making responses; (5) conducting detailed and true market surveys; (6) collecting various creative ideas

for products; (7) holding new product launch and making modifications based on discussions; (8) confirming feasibility of creative products and technical concepts; (9) tracing implementation details and progress of R&D department; and (10) testing pilot products and making modifications, then arranging mass production and marketing [4].

3.2 Product Development

To develop a product, the processes including market survey, designing, experiment, analysis, trial production, and production. Quality behaviors of design can be the mapping from the psychological space (soul value or psychological meaning of a product) to the physical space (physical shape or features of a product). Based on this concept, when a target is expanded from a design behavior into product development, it becomes a behavior of creating a state or attribute of the product with the value and meaning being the development goal. This design model is composed of the attribute space and state space of the physical space and the meaning space and value space of the psychological space. An attribute is a characteristic which can be recorded in writing or drawing, such as sizes, materials, and colors of products. A state is a property in mechanics, chemistry, and electrics, and changes and vicissitude with time. A product's state depends on the occasion in which the product is used. A meaning of a product is a property people recognized from an attribute or a state of the product, such as product function and product image. A value is a product meaning people cognize. It is individual, social, and cultural useful cognition [10].

A proposal of a new product should contain: (1) introduction to the new product: applications, engineering spec, and product spec of the new product; (2) analyses of competitive products: analyses regarding functions, designs, applications, costs, and market shares; (3) evaluation of design goals: shapes, mechanical functions, choices of main parts, cost budgets, and reliability of the product; (4) evaluation on the technical abilities for the new product and participated R&D personnel involved; (5) required funds and various risk assessments; (6) schedule of product R&D and design and launch date; (7) profit estimation; and (8) feasibility evaluation report and quotation. And the phases of

development design of a new product include: (1) planning phase, (2) design phase, (3) design implementation and testing phase, (4) sample and quality evaluation phase, (5) small amount trial production phase, (6) official mass production and shipping phase, and (7) product after-sales service phase [11]. Operators can develop new products through strategies of increasing market shares or entering new markets. In current markets, for product development, operators may reduce product costs, improve quality, cooperation with supplies, and product replaceability, expand product lines, develop new applications of products, improve original technology, improve marketing, expand markets, and product diversification [4].

4. Design Results

The finger-stall scrub sponge can be made using either natural or artificial scrub sponges through sawing to make shapes of thumbs and point fingers. The finger-stall scrub sponge is convenient to wear and remove. And through them users can apply forces more easily. The finger-stall scrub sponge is especially suitable for washing dishes. The R.O.C. utility model patent application for this new product has been approved. And the team won a bronze medal in the 2012 international innovative invention poster competition with this product. In the future, the team will continuously and actively participate in international invention competitions and industrial expositions with this product to strive for opportunities of technical licensing and mass production (Figure 1~4).

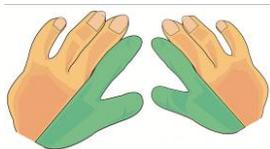


Fig. 1

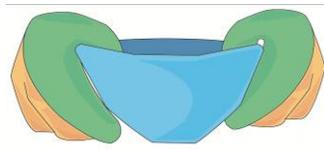


Fig. 2



Fig. 3



Fig. 4

5. Conclusions

5.1 Discussions

The convenient finger-stall scrub sponge was designed by making improvements based on usage problems, in hopes of helping users to wash dishes more conveniently and efficiently. It was also helpful for the idea of green energy to save water and electricity. The advantages of this innovative product design include:

- (1) Care for users' needs: The creator cared about users' problems with washing dishes and thus came up with the improved design of a product easy to wear and remove, in hopes of helping users to wash dishes in a more comfortable way.
- (2) Creative idea of green energy: The creator made some improvements in the design of scrub sponges, in hopes of providing users a more efficient way to wash dishes, to achieve the goal of green energy through saving water and electricity.
- (3) Meeting market demands: People can't live without tableware, and therefore the dish-washing function of the finger-stall scrub sponge can meet market demands and can be mass-produced.
- (4) Easy production and manufacturing: The manufacturing process of this product is very simple. And its cost can be lowered after it is mass-produced. With a lower unit price and a novel design, the convenient finger-stall scrub sponge can definitely attract more consumers and motivate them to purchase this product.

5.2 Suggestions

The patent application of the convenient finger-stall scrub sponge has been approved. And this product won the bronze medal in an innovative design competition, making its marketing more convincing. However, this study still made several suggestions as references for follow-up improvements.

(1) Invention competition: The creator should actively participate in various international invention competitions to increase exposure of this creative work and accumulate more merits to create a high-quality image for the product.

(2) Industrial Expo: The creator should actively participate in industrial product exchange expositions to find willing partners to discuss follow-up manufacturing issues and strive for opportunities of technical licensing and mass production.

(3) School administration: The school should support innovative product designs in the process from patent application, model manufacturing, to participation in international competitions and offer subsidies. The school can even help find chances of technical licensing, to achieve the ultimate goal of implementing creative ideas in daily lives.

(4) Extending design: In the future, user experiments with different situations can be performed, so improvements in design based on different cleaning needs can be made, for the purposes of extending the design of the creative idea and increasing values in applications.

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