Stability and Shelf Life Studies of Cinnamon Coffee Body Scrub

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Abstract
A body scrub is a popular treatment that is basically a facial for the body. It is also an exfoliating cosmetic preparation and applied to the body to cleanse the skin. It exfoliates and hydrates your skin, leaving it smooth and soft. A body scrub is done with an abrasive material, usually coffee or sugar mixed with some kind of massage oil and an aromatic like essential oils. In this study, a preliminary on the formulation of cinnamon coffee body scrub have been conducted. In this work, the active ingredient from the coffee and cinnamon are used and formulated into scrub base and cream base. The coffee and cinnamon is added into the base with two different percentages which is coffee (18% w/w and 12.5% w/w), cinnamon (7% w/w and 12.5% w/w) and stored at two different storage temperatures (27°C and 45°C). To evaluate the stability of the cinnamon coffee body scrub formulated the physical analysis were conducted in terms of stability, colour, and spread ability. Sensory analysis also had been conducted to identify the, texture, odour, and colour more preferable. From the observation, the results show that coffee body scrub formulation of 18% w/w and 12.5% w/w exhibit better stability compared to the 7% w/w and 12.5% w/w cinnamon coffee body scrub formulation.
Keywords: scrub, formulation, separation, shelf life

1.0 Introduction

A body scrub is a popular facial that is basically for body treatment. It is also an applied to the body to cleanse the skin and an exfoliating cosmetic preparation. It leaving it smooth, soft, exfoliates and hydrates your skin. A body scrub is done by using the material usually using coffee or sugar mixed an essential oil and some kind of an aromatic like essential oils and massage oil. The combination of exfoliation, cleansing and massage provides benefits that go beyond what a bar of soap can do. Coffee is rich in antioxidants, making it an awesome anti-inflammatory ingredient. It contains caffeine, which draws out excess moisture from your skin, causing it to look and feel smoother and firmer. Coffee use as main ingredient in this scrub acts as a mild

exfoliates, removing dead skin cells and exposing fresh, soft skin. Meanwhile, a cinnamon acts as antibacteria helps to protect your skin. It also brings blood to the surface of the skin, helping to smooth out any lines that may be present.

In Seoul National University study in 1981, notes Live Strong , the coffee have benefit to give a good skin such as reducing inflammation and redness. In another study from the University of Tennessee in 1978, adding caffeine to anti-inflammatory creams increased its effectiveness as a skin caring agent (Alison F. Stallings; 2009). Caffeine, when applied topically to the skin, constricts the blood vessels under the skin and helps reduce swelling and eye back. According to Organic Authority, rubbing the grounds coffee on skin will remove dead skin cells and leave with smoother skin. Addition an olive oil for a more luxurious coffee ground and olive oil scrub. According to Beauty Banter, the dark grinds of coffee beans can be used to brighten up dull skin.

Cinnamon spice is commonly used in so many years ago, one of the highly prized spices for its fragrance, medicinal and culinary properties. This delightfully exotic obtained traditionally from the inner brown bark Cinnamomum trees have a sweet-flavoured spice is dried rolls into tubular-sticks, known commercially as "quill." The cinnamon plant is a small, evergreen bushy tree belonging to the family of *Lauraceae* or laurel within the genus, *Cinnamomum.* This novel spice is native to Sri Lankan island but also grow in many other countries such as Indonesia, Myanmar, Bangladesh, India, and China. It is of a golden-yellow colour, with the characteristic odour of cinnamon and a very hot aromatic taste. The pungent taste and scent come from cinnamaldehyde (about 90% of the essential oil from the bark) (Pinky et all ; 2017) and, by reaction with oxygen as it ages, it darkens in colour and forms resinous compounds. Other chemical components of the essential oil include ethyl cinnamate, eugenol (found mostly in the leaves), beta-caryophyllene, linalool, and methyl chavicol Cinnamon can also be used to nourish the scalp.

Cinnamon helps with treatment to reduce an acne and pimples. Also acts like an exfoliating agent to stimulate the scalp and provide nourishment to hair follicles. Acne scars could dry out and skin could get rejuvenated. This paste can also de-clog pores and bring oxygen and blood to the surface. Bacteria can be killed by cinnamon has antiseptic properties which is the wound heals faster. Collagen also can be increase by using Cinnamon on the skin. It will increse the levels for up to six hours after it is applied. Breakdown of collagen causes the skin to lose elasticity and increases signs of aging. The compound cinnamaldehyde is the main component in cinnamon.

A cream is a topical preparation usually for application to the skin. Creams may be considered pharmaceutical products as even cosmetic creams are based on techniques developed by pharmacy and unmediated creams are highly used in a variety of skin conditions (dermatomes). Creams are semi-solid emulsions of oil and water. They are divided into two types: oil-in-water (O/W) creams which are 7 composed of small droplets of oil dispersed in a continuous

phase, and water-in-oil (W/O) creams which are composed of small droplets of water dispersed in a continuous oily phase. Oil-in-water creams are more comfortable and cosmetically acceptable as they are less greasy and more easily washed off using water. Water-in-oil creams are also more moisturising as they provide an oily barrier which reduces water loss from the stratum corneum, the outermost layer of the skin.

An object of the present intention was to prepare preparations of the oil-in-water type which have a very low viscosity and do not have the disadvantages of the prior art a further object of the invention was to discover ways of producing cosmetic or dermatological, as low-viscosity as possible, O/W emulsions which are stable towards increased electrolyte concentrations, and into which large amounts of polar oil components can be incorporated. It was also an object of the invention to find a method of stabilizing O/W formulations. (Yoshimaru Kumano; 1990) By far the most important type of product in the field of skincare compositions are emulsions.

In research by Ghosh, S., & Rousseau, D. (2009), emulsions are disperse two- or multi-phase systems, cosmetic emulsions consisting of at least one fatty phase and at least one water phase which are distributed in the form of very fine droplets in one another using emulsifiers. If the oil phase is finely distributed in the water phase, then this is an oil-in-water emulsion (O/W emulsion, e.g.milk). The basic character of an O/W emulsion is determined by the water, example is less greasy on the skin, is rather matting and absorbs more rapidly into the skin than a W/O emulsion. (Anja Miiller; 2000). Plus, research based on oil in water or water in oil had been done by some researcher. A water-in-oil type emulsioned solid composition containing an oil component such as a silicone oil, a solid wax and/or an oil-gelling agent, water, and a 8 polyoxyalkylene modified organopolysiloxane or a lipophilic surfactant and a hydrophobically treated powder, wherein the water content is 5% by weight or more, based upon the total amount of the composition.

2.0 Methodology

The purpose of stability testing cosmetic products is to ensure that a new or modified product meets the intended physical, and chemical quality standards as well as functionality and aesthetics when stored under appropriate conditions. Because the development cycle of cosmetic products is relatively short, and also, in order that the testing activity does not become economically disproportionate in view of the multitude of product launches each year, each manufacturer must have at their disposal tests that are adapted to their activity.

2.1 Materials

According to the suggested procedure of the company Sidratul Enterprise Sdn. Bhd., the first step of making this body scrub is by measuring all the materials such as cream base, butter, honey, cinnamon powder, coffee grain

and RO water. The butter, honey and RO water placed in a clean beaker. Then all the dry materials added (coffee grains and cinnamon powder). They were mixed well and heated for 20minutes at 70°C. Lastly the fragrance materials added. The fragrance added lastly to avoid vaporization during heating.

2.2 Methods

2.2.1 Accelerated Stability Test

Accelerated Stability Test - also known as normal or exploratory stability test. This test is a predictive study that can be used to estimate the expiry date of the product (D. Lerche & T. Sobisch; 2011). The product were keep in close container under different temperature 27°C and 45°C in incubator for 6 months.

2.2.2 Centrifugation Test

One of the suggested by Lachman L. et al, 1994 is the centrifugation test. This test predicts emulsion creaming for powder and liquid/cream products. A sample heated to 50°C is centrifuged at 11300rpm for 60 minutes. For temperature sensitive ingredients the top temperature can be adjusted to 40°C. The product must remain stable and any sign of instability shows the need for reformulation and it also indicate product tability if there are no layers (separations).

2.2.3 Freeze-Thaw

Freeze-thaw stability test (J. Wells; 1988, K. A. Connors et.al; 1986, W. Grimm et all; 1993) which involves cycling of product through 24 hours of freezing then 24 hours of thawing. Different lighting conditions involve a fluorescent light box and a natural light box to simulate sunlight. Samples prepared (3 tests, 1 control) by record the initial reading. The cycle readings must be record adn repeated for 3 cycle.

3.0 Result and Discussion

3.1 Centrifuge Test

In centrifuge testing of cinnamon coffee body scrub with two different formulations were heated to 50°C and centrifuged at 1130rpm for 60 minutes. Based on the observations, the effect of centrifuge results in no apparent physical changes occurred during centrifuge testing for cinnamon coffee body scrub. The product is stable because there is no layer (separations).This shows that the cinnamon coffee body scrub considered to have good mixing of water in oil.

3.2 Freeze-Thaw

In freeze-thaw testing of cinnamon coffee body scrub with two different formulations were stored at two different temperatures which involves cycling of the product through 24 hours of freezing then 24 hours of thawing for six days and in duplicate batches. Based on the observations, the effect of storage time result in no apparent physical changes occurred during storage for cinnamon coffee body scrub. This shows that the cinnamon coffee body scrub has good stability in terms its physical appearance. At a temperature of 0°C, the cinnamon coffee body scrub has the more solid-like structure compared to 27°C. This is when the cinnamon coffee scrub at 27°C has shiny surface.

3.3 Accelerated Stability Test

In storage testing of cinnamon coffee body scrub with two different formulations were stored at two different temperatures of 27°C and 45°C in duplicate batches. Based on the observations, the effect of storage time result in no apparent physical changes occurred during storage for cinnamon coffee body scrub. This shows that the cinnamon coffee body scrub has good stability in terms its physical appearance. Based on FDA(Food and Drugs Admistration) that 10 weeks at 45° C is equivalent to 1 year at ambient (~21° C) temperature. Thus, this cinnamon coffee body scrub fulfil the requirements and have no separations. At a temperature of 27°C, the cinnamon coffee body scrub has no changes in term of physical appearance compared to 45°C. This is when the cinnamon coffee scrub at 45°C has more shiny surface.

4.0 Conclusion

In this work, the cinnamon coffee body scrub has been successfully formulated at two different percentages which is coffee 18% w/w, and 12.5% w/w while cinnamon is 7% w/w and 12.5% w/w. The physical properties of the cinnamon coffee body scrub formulations were evaluated in terms of stability, colour, odour and texture. To evaluate the stability, cinnamon coffee body scrub were stored at two different storage temperatures (27°C and 45°C) within the storage time of 11 weeks. In selecting the best formulation, the semisolid preparation must have good stability to give assurance that the formulation is stable and last longer. The formulation must also last longer at different storage temperature and increasing storage time.

In selecting the best formulation, the semisolid preparation must have good stability to give assurance that the formulation is stable and last longer. The formulation must also last longer at different storage temperature and increasing storage time. From the observation, the results show that coffee body scrub formulation of 18% w/w and 12.5% w/w exhibit better stability

compared to the 7% w/w and 12.5% w/w cinnamon coffee body scrub formulation. As it can be observed from the stability assessment where the coffee body scrub formulations exhibit better stability at two different storage temperature of 27°C and 45°C throughout the 11 weeks but for cinnamon body scrub formulations stable at storage temperature of at 45°C, where there is no separation in cinnamon coffee body scrub. It shows that, this product can be stored at temperature below 45 °C and above 27°C.

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