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Review of Green Synthesis: "Activated Charcoal" to Reduce Sebum Levels in Oily Facial Skin

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Abstract: Skin is the outermost organ and has a close relationship with a person's psychological mechanisms because the skin is an important asset to support one's appearance, especially facial skin. That way the skin must be protected and cared for in the right way. One of them is treatment by using a face mask. the purpose of this study was to see that Activated Charcoal can reduce sebum levels in oily facial skin. From several related articles. The journal being reviewed is titled The Use of Charcoal Masks for Acne Facial Skin Care and the Effect of Applying "Activated Charcoal" Masks to Reduce Sebum Levels on Oily Facial Skin. There is no difference in reaction to the skin after being applied to facial skin. Facial skin tenderness reaction obtained the highest average score with a score of 3.67 and the lowest with a score of 3.00. facial skin conditions obtained the highest average score with a score of 3.93 and the lowest with a score of 3.20. a decrease in facial skin oil levels obtained the highest average score with a score of 3.87 and the lowest with a score of 3.07 Activated charcoal masks show a very efficient effect on the skin. Based on the average diagram of research data using ''Activated Charcoal'' masks to reduce sebum on the oily facial skin on facial skin softness/smoothness after application, the highest average score was obtained with a score of 3.67.

Keywords: Charcoal,sebum, skin oily,face,facial.

Introduction

The skin is the outer part of the body that covers the organs of the human body. The skin has a function as a body protector, sense of touch, excretory tool, body temperature regulator, absorption, and means of communication. Therefore the skin must be protected and cared for properly, if the skin is not cared for properly the skin will be damaged. Healthy skin is clean and moist skin, beautiful skin also has a smooth surface, and there are no holes or prominent acne scars. For that facial skin care can be done using a charcoal mask (Hedde, 1985). Facial skin care according to Kussantati (2008: 191) facial skin care is a natural provision if every increase in age brings consequences for a decrease in the quality of the body. Public interest is large enough to return to using products with natural ingredients that have been known for a long time for their efficacy for beauty, besides the risks posed are relatively mild. Using a mask is one way to protect and nourish the skin that everyone can do alone. Masks made from activated charcoal or 'Activated Charcoal' are currently popular for dealing with skin problems such as reducing oil, and dirt on the face and dealing with facial skin with acne. The dictionary defines charcoal as a black porous residue obtained from the destructive distillation of animal or vegetable materials in a limited supply of air. Charcoal, or more precisely 'Charcoal' can be produced from various synthetic materials, such as polymers, as well as from natural sources. (Harris, P. 2013). The porous texture of activated charcoal positively captures and attracts negatively charged molecules such as poisons, chemicals, and gases. Since activated charcoal is not absorbed by the body, it carries its surface-bound toxins out of the

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body. It is this chemical absorption process that makes it so effective and allows it to remove toxins and unwanted elements. Apart from that, the benefits of activated charcoal are natural teeth whitening, facial masks and cleansers, acne treatment, hair cleansers, and shampoos, digestive cleansing, alcohol poisoning treatment, air filtration, and insect bite scar removal.(Fahruri & Megasari, 2020)

Making activated charcoal is carried out in two stages. The first stage is the formation of amorphous and porous charcoal at low temperatures. The second stage is the activation process to remove the carbon that coats the surface of the charcoal so that the porosity of the charcoal increases. Charcoal activation to produce activated charcoal can be done in two ways, namely by chemical means and glasses. Chemical activation is done by immersing the charcoal in a solution of chemical compounds before heating. Charcoal activation by physical means usually uses weak oxidizing agents, including water vapor (HO), CO2 gas, and nitrogen. Activated charcoal has become popular in the cosmetic industry and is found in a variety of products including facial cleansers, soaps, and masks.(Guerrero 1970)

In addition, facial skin can be protected by applying various cosmetics specifically intended for facial applications, which can be in the form of creams, serums, lotion face masks, peel-off masks or powder masks. Masks are cosmetic preparations for facial skin care which have the benefits of providing moisture, improving skin texture, rejuvenating skin, tightening skin, nourishing skin, softening skin, cleansing skin pores, brightening skin tone, relaxing facial muscles and curing acne and acne scars (Fauzi, 2012: 155).

Besides that, charcoal has also been used for cosmetics such as deodorant, absorbing bad odors, harmful gases and also in shoe soles to absorb bad odors. The unpleasant odor can be lost because of the absorption power of the charcoal. Charcoal has also made its way into the cosmetic world as in a natural acne treatment, bamboo charcoal soap has been used in many Asian countries for centuries. (Dwivedi, Jain, Patel, & Sharma, 2014)

The next research was by John K. Brooks, Nasir Bashirelahi, PhD, Mark A. Reynolds, DDS, PhD in a study entitled "Charcoal and charcoal-based dentifrices". In this study researchers used activated carbon to make toothpaste. In making it, the researchers added additional ingredients, namely neutral soap; glycine; calcium carbonate; magnesium carbonate; sodium salicylate; sodium; benzoate; saccharin; pepper, clove, cinnamon, and anise oils; and distilled water. This toothpaste is proven safe and effective to use (Brooks, 2017).

Charcoal has almost no moisture content because it is activated in situations of little oxygen and high-temperature air and also in these conditions it has pores; which makes it very efficient and useful in controlling humidity. the presence of chemical functional groups on the surface of activated charcoal such as C = O, C2-, and C2H-. The quality of activated charcoal is indicated by the value of the absorption of Iod, which is based on the provisions of SNI 06-3730-1995 activated charcoal is considered quality when the value of the absorption of Iod is close to 750 mg / g (Putri, 2015).

Materials and Methods

This journal review describes the excerpts of methods for making charcoal extract, material preparation, and skin testing. from several related articles. The journal being reviewed is entitled The Use of Charcoal Masks for Acne Facial Skin Care and the Effect of Applying "Activated Charcoal" Masks to Reducing Sebum Levels on Oily Facial Skin. (Fahruri & Megasari, 2020) (Vitrie et al, 2019)

Preparation of Tools and Materials for Making Charcoal Extract

In making extra charcoal, the two journals that we refer to use the same method steps. The materials used to make charcoal are old palm shells, bamboo, wood, coal, or coconut shells which are burned without oxygen to make charcoal. The equipment used is steel bowls, large drums, gloves and masks, and heating machines.

Making Charcoal Extract

In the manufacture of extracts, the two journals we refer to use the same method of steps, the first is to prepare the natural product extract using charcoal heating for 3-5 hours to very high temperatures

(1,800°F) in a multi-step process to make it highly porous. In the second journal, 1 kg of old oil palm shells is made or as needed. Put the charcoal in a big drum and burn it for 6 hours. At the last 20-30 minutes cover the drum with a lid. After 20 minutes open the lid, then pour water over it until the fire is about to go out and let it sit for 3 hours or until the smoke dissipates and the charcoal is not hot. Crush the charcoal into small powders. Then put it in a steel bowl and heat it in a heating machine at 800-1000°c, which takes up to 2 hours. When it reaches 1000°c, pour the charcoal into an aluminum container and let it sit for about 30 minutes until it's not hot (Wibowo et al, 2017).

Charcoal Extract Characterization

This study used a literature review method and SEM (Scanning Electron Microscopy) qualitative test using a JEOL JSM-6360LA equipped with an EDS (energy dispersive spectrometer) JEOL ED 2300 system and experiments on making Charcoal. Based on the results of making charcoal, shows that the charcoal produced has a slightly rougher texture compared to the charcoal purchased on the market because the charcoal produced is crushed manually and does not use a charcoal crusher. Charcoal that has been activated has a more flexible texture so it will be easier to destroy. Charcoal that has been activated is the same as charcoal on the market, has no odor, and is the same black color as charcoal in general. The produced charcoal has a fairly high carbon content, followed by other contents such as Si, Cl, and Ca with a small percentage. (Wibowo et al, 2018)

Results and Discussion

Skin Reaction

Based on the average diagram of research data using the 'Activated Charcoal' mask to reduce sebum on oily facial skin for facial skin reactions after application, an average value equal to a score of 4.00 is obtained in the application of X1 (one treatment in one week)), X2 (two treatments in one week), and X3 (three treatments in one week) which means there is no difference in the reaction after being applied to facial skin in the three treatments. The SEM characterization resukt can see at figure 1

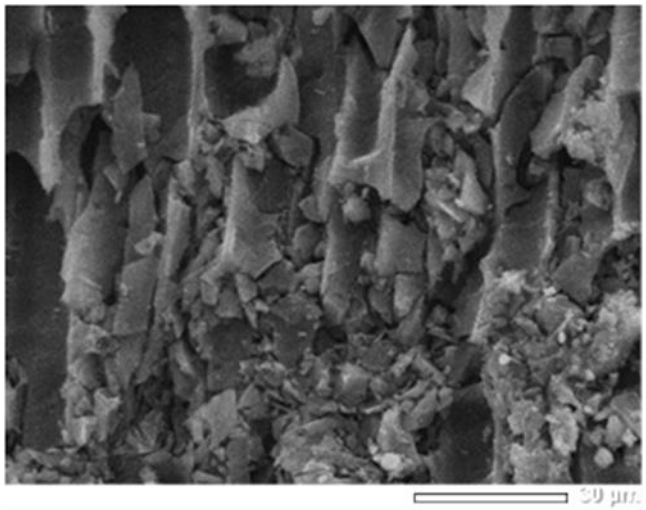

Figure 1. Characterization results using SEM (Vitrie, *et al*, 2019)

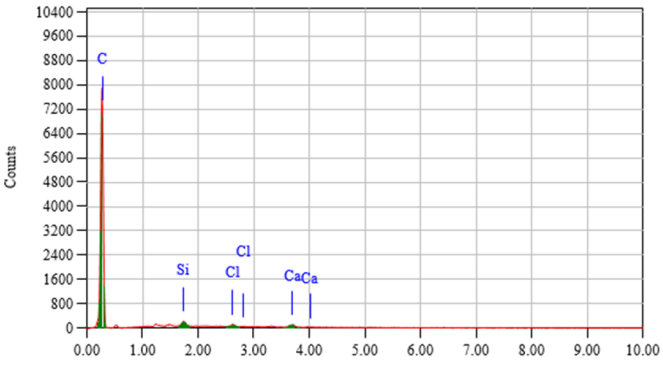

Figure. 2 content in charcoal (Vitrie, *et al*, 2019)

Table. 1 content in charcoal (Vitrie, *et al*, 2019)

Element	(keV)	Mass %	Erro %	Atom %	K
C K	0.277	99.17	0.38	99.70	99.0441
Si K	1.739	0.31	0.28	0.13	0.3218
Cl K	2.621	0.21	0.29	0.07	0.2578
Ca K	3.690	0.31	0.45	0.09	0.3763
Total		100.00		100.00	

Reaction Softness / Smoothness of the Skin

Based on the average diagram of research data using the 'Activated Charcoal' mask to reduce sebum on oily facial skin for softness/smoothness of facial skin after application, the highest average value is obtained with a score of 3.67 in the application of X3 (three treatments in one week).

While the lowest average score is 3.00 in the application of X1 (one treatment in one week).

Skin Conditions

Based on the average diagram of research data using the 'Activated Charcoal' mask to reduce sebum on oily facial skin for facial skin conditions after application, the highest average value was obtained with a score of 3.93 in the application of X3 (three treatments in one week). While the lowest average value with a score of 3.20 in the application of X1 (one treatment in one week)

Decreased Sebum Levels

Based on the average diagram of research data using the 'Activated Charcoal' mask to reduce sebum on oily facial skin against a decrease in skin oil levels after application, the highest average value was obtained with a score of 3.87 in the application of X3 (three treatments in one week)). While the lowest average value with a score of 3.07 in the application of X1 (one treatment in one week).

Figure 2. Diagram of the average decrease in sebum levels (Fahruri & Megasari, 2019)

Table 2. Requirements for the quality of activated charcoal (SNI. 063730-1995) (Fahruri & Megasari, 2019)

No	Description	Unit	Condition	
			Grain	Powder
	The part that is lost at 950°C heating	%	Max 15	Max 25
	Water content	%	Max 4,5	Max 15
	Ash content	%	Max 2,5	Max 10
	Uncomposed section		It didn't turn out	It didn't turn out
	Absorption of I_2	Mg/gram	Min 750	Min 750
	Pure activated carbon	%	Min 80	Min 65

Conclusions

Facial skin has a close relationship with a person's psychic mechanism because the skin is an important asset to support one's appearance. That way the skin must be protected and cared for properly and in the right way. Healthy skin is clean and moist skin, beautiful skin also has a smooth surface, and there are no holes or prominent acne scars. Several studies have shown that people who suffer from acne skin disease will interfere psychologically and affect their quality of life, therefore charcoal masks are made to treat facial skin with acne because they have good adsorbing properties. Charcoal is made from materials that contain carbon and then goes through a pyrolysis process or heating at a temperature of 800-1000°C to enlarge its pores so that its absorption power increases. There are two ways to activate charcoal, namely by chemical and physical activation. After being activated, the charcoal was tested for its content through a qualitative SEM (Scanning Electron Microscopy) test using a JEOL JSM-6360LA equipped with an EDS (energy dispersive spectrometer) JEOL ED 2300 system.

1. Gives a warm feeling when the mask is applied

Based on the results of SPSS calculations, the feeling of warmth when the mask is used produces a high average value, namely, it gives a feeling of warmth when wearing the mask. With a value of 5.5, the comparison before using the mask is with an average value of 4.5. Because it has a balanced ratio, the application of an 'activated charcoal' mask to reduce sebum levels on oily skin has a warm feeling on facial skin.

2. Skin Firmness

Based on the results of SPSS calculations, the resulting firmness of the facial skin shows a high average value, which gives a good effect and feels tight after using the mask with a value of 6.5 compared to the lowest average of 4.5. Because

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