

HALAL COSMETIC CRITICAL INGREDIENTS: AN OVERVIEW OF ANIMAL BASED INGREDIENTS

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ABSTRACT

The halal cosmetics market is rapidly expanding and offers a unique perspective on the beauty and personal care industries. With an emphasis on goods that comply to Islamic principles and values, the market is growing as customers seek halal-certified cosmetics that correspond with their religious and ethical views. Since the production and manufacturing of cosmetics is dominated by non-halal cosmetic manufacturers, there is no guarantee that they use all halal ingredients in the making of cosmetic products. Not all manufacturers will disclose the source of the animal-based ingredients of their cosmetic products. There is a high possibility that the animal-based ingredients in the cosmetic products made of non-halal animal such as pig or its derivatives or from halal animal that is not slaughtered according to Islam. Therefore, this paper summarizes existing literature on critical ingredients used in the manufacturing of halal cosmetics. The identification of the status of critical cosmetic ingredients may provide a technical guideline among manufacturing in complying the raw material control requirements of the Malaysia Halal Management System (MHMS).

Keywords: Animal, Halal Cosmetic, Ingredients, Zooceuticals

1.0 INTRODUCTION

Muslim population began to grow across the year, not only in Malaysia, but also in other country. Based on Kettani (2009) the growth rate of Muslim population has increased to 99% in 2021. Meanwhile, in 2015, it was also found that one of the regions with fastest growing rate for halal market is the Asian market, which has increased to more than US\$70 billion, which is the second highest after the Western European market (M. Hassali et al., 2015). The numbers must have increased over the year because a study shows that the halal cosmetics market reached a value of US\$ 27.31 billion in 2021. The market is projected to reach US\$ 54.06 billion by 2027, which is a very huge number (Group, I., 2022). The growth of the halal market is also due to the increase of awareness on halal products. Muslims has acknowledged the importance of making sure that all the products that they want to consume is made from halal ingredients.

Elsner and Maibach (2005) in their book entitled, Cosmeceuticals and Active Cosmetics, Drugs Versus Cosmetics stated that there is different opinion on the definition of cosmetics between Europe and Japan. Europe defined cosmetic products as any substance or preparation meant to be applied to the skin, hair, nails, lips, external sexual organs, teeth,

and mucous membranes of the oral cavity with the sole purpose of cosmetic enhancement or mostly to washing, perfuming, altering their look, eliminating unpleasant bodily odours, safeguarding, or maintaining their condition, meanwhile Japan defined cosmetic products as any item meant to be used in conjunction with applying anything similar to the human body, such as rubbing or spraying, enhancing attractiveness, fostering cleanliness, and changing look for maintaining the health of the human body, the skin, and the hair, if the article's impact on the human body is minimal. The definition of a cosmetic in Japan barely differs from the definition in Europe. A cosmetic may be mildly active and have medicinal activity according to both definitions. This is in direct contrast to the definition of a cosmetic in the USA.

A cosmetic according to national Pharmaceutical Regulatory Agency, Ministry of Health Malaysia, can be defined as "any substance or preparation intended to be placed in contact with various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with teeth and the mucous membranes of the oral cavity, with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odours and/or protecting them or keeping them in good condition" (NPRA, 2022). Cosmetics can be makeup, skin care, hair care products or body care products that can enhance the beauty and appearance of a person.

Meanwhile, halal cosmetic according to Halal Cosmetics General Requirement (MS2634:2019) can be defined as any cosmetic products that contain only permitted ingredients according to Shariah law and fatwa, and also must fit these criteria:

- i- Does not consist or contain any part of matter of any animal that is prohibited by Shariah law and fatwa for a Muslim to consume, or it has not been slaughtered according to Shariah law;
- ii- Free from anything that is categorized as *najs* according to Shariah law and fatwa;
- iii- Not intoxicating according to Shariah law and fatwa;
- iv- Free from any part of human being or its yield which are not allowed by Shariah law and fatwa;
- v- Not hazardous and poisonous;
- vi- Free from any instrument that is contaminated with *najs* according to Shariah law along the processing line;
- vii- Does not been in contact with, mixed or in close proximity to any materials that fails to satisfy items i and ii, along the preparing, processing line and storing process

Consumers use cosmetics products to enhance their beauty and appearance. They also prefer to have healthy skin and have a better appearance rather than making an effort to know what are the potential side effects of the products that they use. Interestingly, it was also found that most of the Muslims consumers still concern about the ingredients of the cosmetics products they used, whether it has haram ingredients or not. They also agree that halal products have a higher quality ingredient, which make them confident to use the products (Jihan, 2014).

2.0 SOURCE OF COSMETIC INGREDIENTS

Cosmetics may consist of a variety of ingredients such as water, organic solvent, oil, vitamins and others. Some of these ingredients can be made of animals, plants or chemical (NPRA, 2022). Meanwhile, halal ingredients are ingredients that is in accordance with the shariah law, which makes the ingredients to be free from animal-derived ingredients that are from Haram sources, permitted animals that are slaughtered according to Shariah law and free from certain amount of alcohol (Sugibayashi et al., 2019). Ingredients derived from pigs,

carnivorous animals, or animals not slaughtered according to Islamic law are considered haram (forbidden). For example, gelatin from pork or non-halal slaughtered animals is not permissible. Meanwhile, ingredients from permissible animals such as cows, sheep, and chickens, must be slaughtered in a halal manner, which includes specific methods and prayers.

In order to create halal cosmetic products, manufacturer must ensure the ingredients are from the halal source only. Ingredients in cosmetic products are a very complex mixture, hence cosmetic manufacturer need to evaluate the ingredients and their corresponding source before development and production, critically. The quality of halal cosmetics is heavily influenced by the substances used in their production. Manufacturers are responsible for ensuring the safety of halal ingredients. Manufacturers collaborate with suppliers to ensure halal-certified ingredients are delivered. To ensure halal compliance, raw ingredients, actives, and excipients should be sourced from certified suppliers. Ingredients must be both halal and safe for intended use. This section covers common substances used in cosmetic products. These ingredients are classified haram, and critical.

2.1 Animal-Based Cosmetic Ingredients

Animal-based cosmetic ingredients or refers to zoocuticals refer to or zoological materials. The ingredients used in the manufacturing of the cosmetics are made of animal-based ingredients such as collagen, it is either from fish or pig (Cristiano &Guagni, 2022). Biocosmetics, cosmeceuticals, and natural cosmetics are more often used terms due to their ingredients. Ingredients are from natural sources (Fatima et al., 2020). Zoocuticals refers to all cosmetic goods for human use. These goods are not the same as "cosmetics for animals," which are intended for veterinary usage or pet skin/hair maintenance, but the cosmetics will be used by humans.

There are a lot of cosmetics ingredients that are derived from animals, and some of them can be categorized as halal critical ingredients since it can be made from non-halal animal, or from the animal that might not be slaughtered according to Islam (Sugibayashi et al., 2019). These cosmetic ingredients can be made from different kind of animal such as insects such as Snail & Cochineal, land animals such as pig and bovine, and marine animals such as fish (Fatima et al., 2020). There will be no halal issue if the source of animals used in the making of these cosmetics ingredients do not fall in the category of haram animals, which are pig, dog and its derivatives.

Nowadays, plant-based, chemically synthesised, or biotechnologically produced chemicals, such as hyaluronic acid, are increasingly replacing animal derivatives in cosmetics (Fatima et al., 2020). This is due to a lot of concern regarding animal-based cosmetic ingredients such as the increase of awareness on vegan cosmetic ingredients and the differences in religious and cultural belief of using animals in cosmetics (Le, 2019). Apart from that, there is also issue regarding the sustainability of cosmetic ingredients made from animals, compared to plants, because the source is much easier to get. Plus, the cost can be reduced if animal-based ingredients is substitute to plant-based or chemical ingredients.

2.2 Critical Cosmetic Ingredients

Not all animal-based ingredients are categorized as critical for halal cosmetics. There are ingredients that are commonly made from only halal animals, and not usually or suitable from pigs. In this article, several halal cosmetic ingredients that have a high possibility to be made of animals are being discussed. This discussion can be very helpful to manufacturers of halal cosmetic ingredients in choosing suitable ingredients and to be very careful with these ingredients.

2.2.1 Allantoin

Allantoin is a natural component found in plants, that is known for its moisturising, relaxing, and wound-healing effects. Even though allantoin is mostly derived from plants, it can also be derived from animals, and some from the animal urine. Allantoin, sometimes called 5-ureidohydantoin or glyoxyldiureide, is a chemical molecule with the molecular formula $C_4H_6N_4O_3$. It acts as a diuretic of glyoxylic acid. This molecule plays a crucial role in metabolic pathways in mammals, plants, and microbes. Urate oxidase (uricase) enzymatically converts uric acid, a breakdown product of nucleic acids, into this compound. Allantoin occurs naturally as a mineral and in diverse biological situations (Dinicaet al., 2021). Allantoin extract that is derived from animals usually made from mammal such as cow while the plant-based allantoin usually made from sugar beet, chamomile and wheat sprouts (Mat Nor et al., 2019).

Allantoin is extensively used in cosmetic and pharmaceutical products to treat burns, skin ulcers, and wounds due to its keratoplasty, healing, calming, and moisturising properties (R Dinica et al., 2021). Although the animal urine has undergone certain process such oxidation and hydrolysis to become allantoin, it is still categorized as najis because the process does not count as the process of *istihalah* (*Istihalah* can be defined as transformation or conversion of material which involves changes in its composition and properties), even though the physical of the products has changed (Mat Nor et al., 2019). So, manufacturers of halal cosmetics might need to verify the status of allantoin either it's from animal or plants before using it as one of their halal cosmetic ingredients.

2.2.2 Collagen

Approximately 2,500 new cosmetic products using collagen as a raw ingredient have been introduced in the last three years, according to a global search of the Mintel database:12, in shaving and depilatories, 1,472 in skin care, 582 in hair care, 310 in colour cosmetics, 87 in soap and bath goods (Walzel et al., 2022). This shows that collagen is one of the high demand ingredients used in cosmetic products.

Collagen is a structural protein found in animal beings that provides essential structural support. Mammalian and fish skin are the most prevalent sources of extraction (Sionkowska et al., 2020). Collagen's unique qualities as a natural humectant and moisturiser have piqued scholarly and cosmetic interest (Zaman et al., 2022). The major types of collagens include: type I collagen (found in skin, tendon, and bone tissue), type II (found in cartilage), and type III (found in skin and vasculature (Sionkowska et al., 2020). Collagen can be made from variety of animals, including porcine, although it was found that marine collagen has been the most desirable collagen source in the cosmetic field (Jadach et al., 2024). Manufacturer still need to have extra care on the type of collagen that will be used in manufacturing cosmetics.

Collagen is a key component of cosmetic formulations due to its moisturising, regenerating, and film-forming characteristics (Sionkowska et al., 2020). The skin's capacity to retain water helps it stay hydrated throughout the day. The skin is moisturised and softened. Collagen is one of the important proteins for the skin, as it is important for the structure and functioning of the extracellular matrix in the dermis. A study found that Collagen that is manufactured with pig skins approved safe for human consumption. Porcine collagen is one type of collagen that is widely used and has huge demand since it has a lot of health and beauty benefits (Zabidi et al., 2019). In addition, collagen made from animals are much cheaper than collagen made from plants, and it is also having higher availability (Jadach et al., 2024). For instance, Porcine collagen is commonly used in Japanese supplements due to its popularity in the cuisine (Rousselot, 2020). So, collagen can be

categorized of one of the halal critical cosmetic ingredients because of it is a common practice to have collagen derived from porcine.

2.2.3 Gelatin

Gelatin has been widely used in cosmetics as thickener (Rahmandari et al., 2021). It creates an occlusive barrier on skin upon application, preventing water loss from the skin. It can be found in moisturizers, topical treatments, and conditioners for hair that is curly or oily. Gelatin is also applied as gelling ingredients in cosmetics. Since gelatine has anti-aging, wrinkle-reducing, and stretch mark-reducing qualities as well as the ability to replace and rejuvenate the skin, it has become increasingly popular in cosmetics and healthcare goods. One example of this is the collagen found in tropical cosmetics creams.

Gelatin can be derived from animals such as pigs, bovine and fish. The partially hydrolyzed collagen and partially broken collagen crosslinked collagen molecules provide gelatin (Anuar et al., 2023). Because gelatin has so many uses, it comes from a variety of sources and is in greater demand. Porcine skin is the source of the greatest amount of gelatin produced worldwide, making up 46% of total output. After then, 29.4% of the production comes from cow hides, and 23.1% comes from cow bones. Swine gelatin is made from the connective tissues, skin, and bones of pigs. Pig gelatin's affordability, accessibility to supplies, and high breeding rates are its sole advantages. Gelatin is a protein derived from collagen found in pig skin, bones, and tendons. This protein is commonly used as a gelling agent, thickener, and emulsifier in solid and liquid oral dosage forms as well as in food products (Herdiana et al., 2023)

It is safe to categorize gelatin as one of the halal cosmetic critical ingredients since the possibility of gelatin sourcing from pig is high. Manufacturer of halal cosmetic must ensure the gelatin they use for cosmetic production is free from non-halal animals.

2.2.4 Hyaluronic Acid

Hyaluronic acid, which is also known as hyaluronan or hyaluronate (Zile et al., 2023). is a naturally occurring, thick, and transparent component found in all living creatures, including humans. Hyaluronic acid and its sodium and potassium salts are commonly used in skincare products for moisturizing, protection, and anti-aging benefits. HA is used in cosmetics for facial, neck, and eye skin care, including masks, lotions, and tonics, as well as anticellulite and antistrip treatments (Olejnik et al., 2012).

Hyaluronic acid used in cosmetics is usually derived from animals, and it can be from either bovine or porcine. Since HA's discovery in 1930, methods for extracting it from animal tissues have been developed to identify, characterize, and understand its biological potential. It is present in practically all tissues of vertebrates, including the vitreous body of the eye, synovial fluid, pig skin, the rabbit's pericardial fluid, shark cartilage, and other marine creatures (Graciela et al., 2023). Pig umbilical cord was shown to be a rich source of hyaluronic acid, almost as rich as human cord. Hyaluronic acid can be isolated and refined from pig cord using the same processes as human umbilical cord (Follett, 1948).

Using Hyaluronic acid-containing cosmetics, such as creams or lotions, can improve skin hydration, suppleness, and reduce wrinkle depth. When applied to the skin's surface, HA solutions form an occlusive barrier, absorb moisture, moisturise the skin, and fill in wrinkles (Zile et al, 2023). According to Vogue, hyaluronic acid is one of the most popular cosmetic ingredients because of its function that helps to replenish lost moisture. It attracts water molecules, hydrating and plumping skin, making it a go-to for maintaining skin health or addressing indications of ageing (Noble, 2024). So, hyaluronic acid can be categorized as

one of the halal cosmetic critical ingredients due to its common practice which it can be derived from pig.

2.2.5 Fatty Acid

Fatty acid derivatives have been one of animal-based cosmetics ingredients that has been widely used due to its function and properties (Johnson, 1977). Hydrolysis of typical animal and vegetable fats and oils produces fatty acids, which are then fractionated. Fatty acids used in foods, pharmaceuticals, and cosmetics are typically a combination of many fatty acids, with composition varying depending on the source and manufacturing procedure (Burnett, et al., 2019). A study by Garcia and Viera-Aller (2023) shows that fatty acid can be derived from pig.

Lipids found in cosmetics designed to be applied to human skin to protect and improve the appearance of the body, establish a protective barrier on the skin, guard it from exterior hazardous chemicals, and aid to keep it hydrated and soft (Ahmad & Ahsan, 2020). Cosmetic formulations of fatty acid typically contain a combination of saturated and unsaturated fatty acid triglycerides (Bonnet, 2018). Cosmetic-grade Oleic, Lauric, Palmitic, Myristic, and Stearic Acids are fatty acid combinations derived from various sources and manufacturing methods.

Common fatty acid used in cosmetic products are from unsaturated fatty acid families, which are oleic acid, linoleic acid, stearic and palmitic. These fatty acids can be produced by the hydrolysis of common animal and vegetable fat and oils. Oleic acid has the potential of being derived from animal source since it commonly found in animal fat. Palmitic acids can be found in all animal and plants, and have been reported as major component of lard and tallow with 25-30%, palm oil (30-50%) and other vegetables (Okamoto, 1987).

2.2.6 Glycerin/ Glycerol

K. W. Scheele, a Swedish chemist, unintentionally discovered GLYCEROL in 1779. A chemical reaction between olive oil and lead monoxide resulted in the discovery of glycerol, a water-soluble sweet molecule. Scheele coined the term "sweet principle of fat" to describe the first chemical isolation of glycerol (SDA, 1990). Glycerol, often known as glycerin, is a colourless, odourless, and sticky liquid. In the cosmetics sector, glycerol acts as a demulcent and anti-inflammatory. (Azelee et al., 2019). Glycerin occurs naturally in all animals and plants in the form of glycerides in fats and oils, as well as lipids within cells. Natural glycerin can be obtained as a byproduct in the hydrolysis of fats and oils (Becker et al., 2018).

Pork fat is used to produce glycerin, which is used in many modern household items. Glycerin can originate from a variety of animals. The most frequent source is tallow, which is a type of cattle or lamb fat. Pork is also utilised to create more than forty goods, including toothpaste (Ilaje, 2020). Glycerin derived from the fat extracted from animal bones such as pork is less expensive, hence it has been utilised in various toothpaste products to give tooth paste its texture. Today, swine fat is utilised to produce glycerin, which is used in a variety of modern household items.

2.2.7 Non-Critical Animal-Based Ingredients

Apart from critical animal-based ingredients, there are other cosmetic animal-based ingredients that are not critical for halal cosmetic since, it is commonly not derived from pig or other haram animals, such as alpha hydroxy acids, that is derived from milk or plants (Bergfeld, 1997). In addition, there are a lot of cosmetic ingredients nowadays has been replaced with plant-based ingredients, since Consumer awareness of the concept of natural-

based components drives the natural cosmetics business to flourish. A recent study by Mujib (2023) also shows that there are always alternative ingredients for animals-based ingredients for cosmetic products.

For example, fatty alcohols are commonly utilised in items including detergents, cosmetics, and cleaning agents, and it can be made from plants and animals (Munkajohnponget al, 2020) Fatty alcohols have been used in cosmetics such as oil-in-water creams and milky lotion, to improve the appearance and the condition of the skin (Okamoto, et al., 2016). Common fatty alcohol that has been used in cosmetics are cetyl alcohol, stearyl alcohol, cetyl alcohol and behenyl alcohol. Plus, it is also found that, animal-based ingredients might have common side effects to its user.

Table 1. Cosmetic ingredients derived from animal

Ingredients	Remark	Category	Reference
Allantoin	Can be derived from animal urine	Critical	Rathod & Mujariya, 2023
Alpha Hydroxy Acid	Commonly derived from milk (lactic acid)	Non-critical	Bergfeld, 1997
Azelaic Acid	Commonly not derived from pig	Non-critical	Lusianti, et al., 2017
Collagen	Can be derived from pig	Critical	Jadach, et al., 2024
Hyaluronic Acid	Can be derived from pig	Critical	Graciela, et al., 2023
Gelatin	Can be derived from pig	Critical	Sarmiento-Garcia & Viera-Aller, 2023
Fatty Acid	Can be derived from pig	Critical	Okamoto, 1987
Fatty Alcohol	Commonly from plant	Non-critical	Munkajohnpong et al, 2020
Glycerin/ Glycerol	Can be derived from pig	Critical	Ilaje, 2020

Source: Author

3.0 CONCLUSION

The cosmetics industry thrives on science and innovation, making it one of the most profitable and rapidly expanding industries. However, there are few studies analysing scholarly literature on cosmetic items. Academic interest in halal cosmetics is growing, making it an emerging field for future research. Halal cosmetics are categorised into six primary topics: characteristics, customer purchase, buying intention, certification rules, organisation control, and testing methods. A recent study by Bahrinet al. (2023) shows that there are lack of study related to halal cosmetic from the natural science perspective. Halal cosmetic from natural science field involves the study related to ingredients of halal cosmetic and testing or verification method for halal cosmetic.

Halal cosmetics require careful adherence to criteria that ensure products are lawful under Islamic law. One important aspect in this context is the origin and processing of ingredients, particularly those sourced from animals. Animal-based cosmetic compounds, such as fatty alcohols, steryl alcohols, and different types of collagens or gelatin, might make halal certification difficult. To be considered permissible, these items must be derived from halal-certified animals that have been slaughtered according to Islamic traditions. Furthermore, the usage of any byproducts from pigs or non-halal killed animals is absolutely prohibited. In light of these constraints, the cosmetic industry is increasingly turning to plant-based and synthetic alternatives that can provide similar functional benefits while maintaining halal standards. Ingredients such as plant-derived fatty alcohols and synthetic

replacements offer feasible alternatives that meet the stringent requirements of halal compliance while also meeting the growing consumer demand for ethical and religiously acceptable products.

As the market for halal cosmetics grows, manufacturers must be diligent in obtaining and validating their materials. Transparency in supply chains and adherence to halal certification standards are critical for preserving consumer trust and ensuring that products fit religious requirements. In conclusion, while animal-based ingredients can be difficult to incorporate into halal cosmetics due to strict religious regulations, the availability of plant-based and synthetic alternatives presents a viable option. By focusing on these alternatives and adhering strictly to halal standards, the cosmetic sector may effectively meet the needs of Muslim consumers seeking goods that are consistent with their ethical and religious values.

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