

HEALTHY AGEING IN WOMEN: ANTI-AGEING PROPERTIES OF COMMON HERBS FROM MODERN AND ISLAMIC PERSPECTIVE

Siti Nurshakirah Bt Zamzury
Faculty of Medicine and Health Sciences
Universiti Sains Islam Malaysia, Pandan Indah 55100 Kuala Lumpur
Email: shakirahzamzury@gmail.com

Dr Mohd Rahman Omar
Faculty of Medicine and Health Sciences
Universiti Sains Islam Malaysia, Pandan Indah 55100 Kuala Lumpur
Email: rahmanomar@usim.edu.my

ABSTRACT

Healthy ageing is defined as the process of developing and maintaining the functional ability that enables wellbeing in older age individual. Through ageing, older people are exposed to the higher risks of having health illnesses. Skin health is important as it is the largest and most visible organ of the body and greatly influenced by environmental factors, hence considered as the indicator of ageing. Its appearance influences the individual mental status, social interaction, overall quality of life and especially women self-esteem which contributed to overall well-being. Living in the equator, Malaysians are exposed to a very high index of ultraviolet rays which can predispose to photo aging. However, the Asia region is blessed with varieties of herbal plants that contribute to the health and medicine of mankind for centuries. Its potential in treating different diseases, make scientists developed an interest in exploring the science and evidence behind it. Particularly in treating skin diseases, some of the herbs capability to adorn and improve skin appearance are well-established. Herbs have high potentiality due to primarily its' antioxidants activity. Antioxidants such as vitamins, flavonoid, phenolic acid and other active compounds play the main role in fighting against free radical species caused by the environmental insult. In this concept paper, we look for the works of literature of common herbs that can be found in Asia region to elaborate the properties of the herbs as anti-ageing such as photo protection, moisturizing, antioxidant which offer its benefits to the human against numerous negative effects of skin changes.

Keywords: Healthy ageing; Skin ageing; Antioxidants; Herbs; Centella Asiatica; Curcuma longa

INTRODUCTION

Every person in this world deserves to live in a long and healthy life. The environment influences our health by exposure to health risks. Healthy ageing is to create a healthy environment that allows people to live healthily and value their life (World Health Organization, n.d.). As life expectancy has increased in this 21st centuries, therefore healthy ageing strategies are vital in order to prevent physical or mental diseases related to old age. As physical appearance become a major concern to most individuals, especially women, skin appearance and its health play an important role in overall wellbeing. In Malaysia, skincare industries are growing rapidly with a vast number of new products being marketed on shelves. Living in the equator, Malaysian are exposed to a very high index of ultraviolet (UV) rays which can predispose them to many harms such as skin cancers. Despite that, not many of the Malaysian are aware of the importance of using sunscreen to protect them from UV rays (Al-naggar & Bobryshev, 2016). A study conducted by Al-Naggar et al.(2012) on determination of practice in skin cancer prevention among 400 young Malaysians, it is proven that the prevention was poor and in the aspect of gender, marital status and income, significantly influenced the practice of sunscreen use amongst the study's participants (Al-naggar & Bobryshev, 2016). Another study conducted by Hughes et al. (2013) in a randomized controlled trial among 903 adults younger than 55-year-old on sunscreen use as preventive of skin ageing, and found that the daily sunscreen group showed no detectable increase in skin ageing after 4.5 years. It can be concluded that regular sunscreen use will retard skin ageing (Hughes, Williams, Baker, & Green, 2013). Realising this, many manufacturers of cosmetics are competing to produce the best sun protector, hence they formulate the product with added value ingredients which it can claim specific benefits such as wrinkle prevention and reduction, moisturizing and brightening effects. The aim to find effective photoprotective agents from natural sources, the plant-derived product has been researched for the above properties (Kora & Khambholja, 2011).

METHODOLOGY

This concept paper was written through an extensive search of literature reviews of the users of specific common herbal properties in healthy ageing, the issues possess by the people in the equator and the normal process of skin ageing. The literature reviews were carried out by using the following electronic databases which are included: Google Scholars, Medline, PUBMED and EBSCOhost. By using the electronic database, several articles, journal and research were retrieved, and the references list of the relevant articles were then be used to expand the search.

HEALTHY AGEING IN WOMEN

According to the World Health Organization (WHO), healthy ageing is defined as the process of developing and maintaining the functional ability that enables wellbeing in older age (World Health Organization, n.d.). With advanced technologies and healthcare system nowadays, there will be older people living longer than the earlier generations. Hence there will be a big concern on how they will foster healthy ageing. A lot of intervention strategies have been developed to enhance the lives of older people in order for them to grow to age with grace and wisdom. With increased life expectancy, healthy ageing strategies are vital to prevent physical and mental diseases related to old age (Ory & Smith, 2017). As age is increasing in number, older people are exposed to many risks of having health illnesses. Previous ageing research typically focusing on health determinants such as the environment. The environment is a multi-dimensional concept which is comprised of home, family, finances, and environmental stress such as oxidative stress. These can influence the physical and mental health which are related to increase in mortality in laboratory studies signalling potential ageing mechanism in human (Ory & Smith, 2017).

At the biological level, ageing results from the impact of the accumulation of a wide variety of molecular and cellular damage over time. It is a process of progressive decreases in the maximal functioning of all organs in the body including the skin (World Health Organization, n.d.). The importance of skin health and its appearance influence the individual mental status, social interaction, overall quality of life and lastly self-esteem which is one of the biggest concern for women (Life et al., 2017).

Histological changes in aging skin

Normal skin architecture consists of 3 layers which are epidermis, dermis and hypodermis. The epidermal and dermal thickness is distributed in variations based on the area of the body.

The epidermis is lined by stratified squamous epithelial cells and it will continuously undergo cell renewal. Ninety-five per cent of epidermal cells is made up of keratinocytes. From the basement membrane, it will move progressively to the skin surface and form morphologically distinct epidermal layers which consist of stratum basale, spinosum, granulosum and corneum. From below, the basale consist of only one layer of cuboidal cell that rest on the basement membrane and then it will rise to the next layer which is stratum spinosum that usually organized in 3 to 4 layers of cells thick. The stratum spinosum then gives rise stratum granulosum that composed of 1 to 4 cells thick and lastly the outermost layer stratum corneum consists of flattened keratinocytes that have lost its nucleus and organelles. It then will be shed off in the process of epidermal turnover. Compared to younger skin, epidermal turnover time takes a much longer period of time in aged individuals (Farage, Miller, & Maibach, 2007). Apart from that, melanocytes are distributed between the basal layers of the epidermis. From tyrosine, melanin is produced by the action of tyrosine kinase and it then stored in melanosome. Melanosome can protect the skin from the detrimental effect of UV rays in which the melanosome is transported along with the dendritic processes of melanocyte to adjacent keratinocytes and forming an umbrella-like cap over the nucleus hence it shield the nucleus against deleterious harm. However, as age is increasing, cell numbers in the epidermis are reduced. Melanocyte density will decrease by 6% to 8% per decade thus resulting in the increase of uneven pigmentation and concurrently decrease in melanocyte density. Besides, Langerhans cells function as antigen-presenting cells for the activation of the immune response. About 3% to 6% of cells in the epidermis is made up of Langerhans cell. With long-standing sun exposure and ageing, the amount of the Langerhans cells decreases hence causing the impairment of cutaneous immunity and allowing the development of skin carcinoma in elderly (Khavkin & Ellis, 2011).

Meanwhile, the dermis is divided into two distinct regions which are upper papillary dermis and lower reticular dermis. The upper papillary dermis made up of loosely arranged dermis bundle of collagen, elastic fibres, fibrocytes, blood vessels and nerve ending. The lower reticular is formed by compact collagen fibres, deep part of epidermal appendages and vascular and nerve networks (Khavkin & Ellis, 2011). Wrinkle formed as a result of flattening of the dermal-epidermal junction which can lead to dermo-epidermal separation. Dermal thickness also decreases with age as the declination of cellularity and vascularity take place. Collagen, hyaluronic acid and glycosaminoglycan amount are declining as the cellular turnover is decreasing (Farage et al., 2007).

Lastly, hypodermis functions as the insulator and protect the body from mechanical injuries. Adipocytes are the main cell in the hypodermis and its thickness is varied in individual and nutritional status of the individual (Khavkin & Ellis, 2011). Aged skin has diminished subcutaneous fat volume in the face, hands and feet in contrary to the volume of subcutaneous fat in thighs, waist and abdomen (Farage et al., 2007).

Extrinsic Aging by Ultraviolet Radiation

Cutaneous ageing is a progressive process that involves intrinsic and extrinsic changes of the skin. Intrinsic process or chronologic ageing is genetically determined and it is an inevitable process in the skin. Meanwhile, extrinsic ageing is largely preventable as it is process caused by external factors especially sun exposure (Khavkin & Ellis, 2011).

Functional decline in the skin is often accelerated by chronic environmental insults such as ultraviolet (UV) and infrared (IR) irradiation as well as environmental carcinogens present in noxious gases of air pollution of major urban centres with simultaneous exposure to UV. Apart from that, a recent study also mentioned that penetration trans-epidermally and through hair follicles of particulate matter (PM) pollutant can induce skin ageing (Burke, 2017). Hence, it is a complex process which occurs with time, as a consequence of both extrinsic and intrinsic factors.

A cross-sectional study conducted by Green et al(2010) among 1400 residents aged between 20 to 54-year-old which were randomly selected for study in the determination of the risk factors for photoaging. It is concluded that skin ageing is a combination of overlying chronological ageing due to the increase in age. Apart from that, it is also due to prolonged sun exposure that hastens the condition (Trial, Hughes, Williams, Baker, & Green, 2013).

Sunray protection is necessary as it can protect against the harms of UV radiation. Ultraviolet radiation is composed of three bands in order of increasing wavelength and decreasing energy. The difference in wavelength and energy in UV subdivision is associated with the different of its effect on living tissues (Kora & Khambholja, 2011). About 90-95% of ambient sunlight is composed of UVA primarily, while UVB up to 5-10% and UVC mostly is being absorbed by the ozone layer (Amaro-Ortiz, Yan, & D'Orazio, 2014).

UVA has the longest wavelength of 315-400nm, whereas in the mid-range is UVB with 290-320nm and the shortest wavelength which is UVC with 100-280nm. As the wavelength of UVC is the shortest, hence it is absorbed and filtered by the ozone layer, although it possesses the highest energy (Amaro-Ortiz et al., 2014). On the contrary to that, UVB can cause direct injury to DNA and extend to the epidermis which is the upper layer of the skin. Meanwhile, UVA can reach the dermis and increase the levels of reactive oxygen species (ROS) which is indirect can induce DNA mutagenesis (Akhalya, Maksimov, Rubin, Lademann, & Darvin, 2014). In recent studies have shown that UVA also acts as carcinogen probably through its pro-oxidative effects (Akhalya et al., 2014) and likely through other mechanisms such as telomere shortening (Yin & Jiang, 2013). The appearance of ageing caused by direct UVA exposure is by upregulation of collagen and elastin-degrading matrix metalloproteinases (MMPs) in dermal fibroblast. The role of matrix metalloproteinase (MMP) is to degrade components of the extracellular matrix such as collagen and elastin. Eventually, it will directly cause the wrinkles, sagging, laxity of extrinsically aged skin (Burke, 2017).

In a study conducted by Hughes et al. (2013) a randomized controlled trial among 903 adults younger than 55-year-old on sunscreen use as preventive of skin ageing, it was revealed that the daily sunscreen group showed no detectable increase in skin ageing after 4.5 years. It can be concluded that regular sunscreen use will retard the skin ageing as sunscreen can shield the skin against UV irradiation (Hughes et al., 2013).

However, human skin has the capability to defend from the action of the ROS as the ability of antioxidants along with antioxidant enzymes can stimulate the skin to repair and build itself naturally to prevent degenerative disorders deriving from persistent oxidative stress and limits the free radical injury(Amaro-Ortiz et al., 2014)(Kora & Khambholja, 2011). In the cell, glutathione is the most widely expressed antioxidant. Depletion of glutathione is due to an increase in free radicals, hence antioxidant enzymes are being recruited to expel the ROS. If the free radicals are not being removed by the antioxidant enzymes, it may disrupt the DNA and other cell signals proteins hence impairing their functions and eventually, it potentiates photoaging process (Amaro-Ortiz et al., 2014).

HERBAL COSMETICS

Kora et al. (2011) mentioned that in aim to produce effective topical photoprotective agents, plant-derived products have been researched for their antioxidant activity hence the uses of natural antioxidants in commercial skin care products is increasing. Tocopherols, flavonoids and phenolic acids, lipoic acid are the example of effective botanical antioxidants that are widely used to alleviate UV-mediated damage. The main damaging factors are oxygenated molecules which are free radicals. They are normally being produced by the cells during metabolic activities but it can be varied with the exposure of UV irradiation and levels of antioxidant enzymes. UVA is a well-known inducer of free radicals and many studies were done in linked to age-related loss of skin elasticity and photoaging as it initiates cellular damage pathways and directly causing cellular senescence or photoaging(Amaro-Ortiz et al., 2014).

Centella Asiatica

Centella Asiatica or commonly known as "pegaga" among Malaysian is a brown and green leafily plant of the parsley family. It is widely being used in modern medicine and Hamidpour et al.(2015) in their paper explained that there were various clinical and preclinical studies on Centella Asiatica and it stated that topical solution of Centella Asiatica showed positive influence in skin condition, wound healing, venous insufficiency and varicose vein and anti-inflammation(Hamidpour, 2015).

The chemical composition of its extract consists of pentacyclic triterpenes that mainly composed of asiaticoside, madecassoside, asiatic acid and madecassic acid(Bylka, Znajdek-Awizeń, Studzińska-Sroka, Dańczak-Pazdrowska, & Brzezińska, 2014). C.asiatica is rich in antioxidants activities due to its high phenolic contents. In contrast to that, it was found that these compounds have low amounts via in-vitro culture but have a huge content of caffeoyl derivatives, primarily 3,5-O-dicaffeoyl-4-omalonilquinic acid. This acid is beneficial in slowing the progression of skin ageing, shields skin against UV harm and prevent collagen breakdown as the acid able to absorb UV light from a range of 300 and 330 nm(Hamidpour, 2015).

C.asiatica works as an anti-ageing in such a way that it can promote the fibroblast to proliferate and increase the collagen synthesis. Apart from that, it also enhances fibronectin content and improves the tensile strength of newly formed skin. As collagen content decrease with age, madecassoside and asiaticoside able to trigger collagen expression by stimulating the SMAD signalling pathway(Bylka, Wiesława, Znajdek-awizen, Paulina Studzinska-sroka, Elzbieta Brzezinski, 2013). SMAD pathway is the growth factor signalling pathway that function to control gene expression. The phosphorylation of SMAD complex induced

by asiaticoside will be translocated to the nucleus. It then will act as regulators of the target genes expressions such as type I collagen (Bylka et al., 2014). In one randomized, double-blind clinical trial was performed to examine the effect of topical application of 0.1% madecassoside with 5% vitamin C on 20 female participants at age 45 to 60 years old and the result showed that after 6 months of treatment, there was a significant improvement in skin's firmness, elasticity and hydration (Bylka, Wieslawa, Znajdek-awizen, Paulina Studzinska-sroka, Elzbieta Brzezinski, 2013).

Based on systematic review done by Mukherjee et al. (2011), they concluded that the active compounds of Centella Asiatica such as medecassoside, asiaticoside, centelloside and asiatic acid able to increase collagen production which the mechanism behind this has been believed that it is the activator of SMAD pathway. To justify this statement, a randomized double-blind control trial has been performed and it was found there was a significant improvement of the clinical score for wrinkles, suppleness, firmness, roughness and skin hydration (Mukherjee, Maity, Nema, & Sarkar, 2011).

In summary, Centella Asiatica has huge potential in skin ageing prevention and reduction as it has the anti-ageing properties of pentacyclic triterpenes mainly due to activation of SMAD pathways and enhancement of type I collagen production as its amount in the skin decrease with age (Bylka et al., 2014). It is also able to improve the clinical score for deep and superficial wrinkles, suppleness, firmness and skin hydration (Mukherjee et al., 2011).

Curcuma longa

Curcuma longa or turmeric is a spice that possesses a yellow pigment colour which is widely used in food preparation and cooking. Curcumin (diferuloylmethane) which is the active components that isolated from its rhizome. It is a compound that capable to trigger cellular stress responses, as well in repairing and detoxifying in anti-oxidant pathways (Lima, Pereira-wilson, & Rattan, 2011). Apart from that, it also has an anti-inflammatory, anti-tumoral, anti-oxidant activity which give great benefits in delaying photoaging and skin carcinogenesis process. The evidence is supported by the findings of systematic review by Vaughn et al. (2016) on the use of topical and ingested turmeric in improving skin health and function, it is stated that a study on the use of topical herbal combination gel of turmeric, rosemary and Centella for four weeks has shown to have improvement in skin firmness among 28 women at age between 34 to 36-year-old (Vaughn, Branum, & Sivamani, 2016).

In another systematic review by Mukherjee et al. (2011), it is concluded that the effect of Curcuma longa extract can minimize the skin wrinkling as it has the potential in increasing skin elasticity, decrease pigmentation and wrinkling that caused by long-standing UVB irradiation. It also can prevent wrinkle formation and melanin as well as decreasing expression of matrix metalloproteinase-2 (MMP-2) intracellularly (Mukherjee et al., 2011). The role of matrix metalloproteinase (MMP) is to degrade components of the extracellular matrix which it is believed that gelatinase is one of the members of MMP and it can degrade the gelatin, collagen and elastin. Gelatin is produced at the lowest part of the epidermal layer and it is suggested that its breakdown can cause wrinkle formation and other photoaging effects as it is easily stimulated by the exposure of low dose of UV irradiation. Hence, it is believed that gelatinase-inhibitory effect of curcumin can be used as anti-photoaging substance (Muta et al., 2018).

According to Hossen et al. (2017), 100g of *C. longa* contains high concentrations of antioxidants such as polyphenols (8.97 ± 0.15 g GAEs), flavonoids (5.46 ± 0.29 g CE) and ascorbic acid (0.06 ± 0.00 mg AEs) thus able to protect cells against UV-mediated damage. The total polyphenol concentration is expressed as gallic acid equivalent (GAE), while total flavonoid content is expressed as catechin equivalent (CE) and lastly ascorbic acid concentration is expressed as ascorbic equivalent (AE) (Hossen et al., 2017). This finding further supported by Kora et al. (2011) that topical application of curcumin in epidermis could inhibit UVA-induced ornithine decarboxylase (ODC) activity. Ornithine decarboxylase which is a rate-limiting enzyme is considered a marker for tumour promotion and it is being induced due to UV irradiation. As UV trigger ROS production, curcumin able to scavenge the free radicals and prevent UV-induced apoptotic changes as being experimented on human epidermoid carcinoma A431 cell (Kora & Khambholja, 2011).

Apart from that, in a study conducted by Lima et al. (2010), curcumin is able to act as an inducer of cellular stress response in hormetic anti-ageing effect. The hormetic effect is a beneficial response to a low dose of chemical agent meanwhile larger dose caused a detrimental response. In this study, low doses of curcumin was used on human skin fibroblast as an inducer of mild stress hence the induction of heme oxygenase-1 (HO-1) then preceded by elevation of glutathione-S-transferase, reduced glutathione (GSH) level and reduced glutathione to oxidized glutathione (GSH/GSSG) ratio level as compensation to increase oxidative stress. Glutathione usually presents in a reduced form which is GSH, yet in the stimulation of oxidative stress, it will be converted into an oxidized form which is GSSG. The induction of stress response triggered by curcumin in human cells led to protective hormetic effects to further oxidant challenge as the increase in glutathione-S-transferase, GSH level and GSH/GSSG ratio level will remove the free radicals from the cell. Hence curcumin-induced cellular stress responses supporting the view that induction of hormetic effect by curcumin stimulates cellular antioxidant defences can be a beneficial option toward anti-ageing intervention (Lima et al., 2011).

Based on the study conducted by Kaur et al. (2011) on the determination of the photoprotective effect of Curcuma longa, it is proven that turmeric helps in improving skin hydration and sebum content as it contained vital photoprotective compounds which are curcumin, demethoxycurcumin and bis-demethoxycurcumin. The study found that topical application stimulates glutathione content and glutathione-S-transferase activity as per gram of dry extract of Curcuma longa contained high antioxidant with total phenolic content of 18.23 ± 1.50 mg GAE/g expressed as gallic acid equivalents (GAE). Apart from that, it also interrupts the induction of epidermal ornithine decarboxylase and protein kinase C, and hence scavenge ROS which is the main factor of photoaging (Chanchal Deep Kaur Shri, 2011).

In a nutshell, Curcuma longa has the properties to prevent and reduce the ageing appearance and protect against skin illnesses. This is due to the high content of antioxidants which include polyphenols, flavonoids and ascorbic acid as well as active compound curcumin which offer benefits of slowing down the photoaging process and preventing skin carcinogenesis.

ISLAMIC PERSPECTIVES ON DISEASE PREVENTION AND APPRECIATING ALLAH CREATURES

The Prophet (PBUH) said: “there are two blessings which many people do not appreciate: Health and leisure.”

As a servant of Allah, human always takes things for granted. We will come into realisation once the blessing was taken. Good health is the best gift from Allah and everyone should obtain the goal of preserving it for now and the future as preserving health and maintaining longevity as possible is responsibility of Muslim (Life et al., 2017) as narrated by Usamah bin Shareek (may Allah be pleased with him): ‘ I was with the Prophet (PBUH), and some Arabs came to him asking, "O Messenger of Allah, should we take medicines for any disease?" He said, "Yes, O You servants of Allah take medicine as Allah has not created a disease without creating a cure except for one." They asked which one. He replied “old age.”

As we all know, ageing is inevitable as it is a natural process and everyone shall taste death. The Quran and Sunnah serve as a guidance that teaches how one is to protect his/her health and live life in a state of purity. It shows that Islam urges the Muslim to promote a healthy lifestyle in the aspect of physical, mental and spiritual.

According to Islam, everything in the universe is created by Allah Subhana Wa Ta’ala. He adorns the skies with the clouds, glittering stars, shining moon and sun and the face of the earth with green trees and plants as well as a variety of animals. Hence, the creation of the environment is created for the people to make use out of it for the benefit of mankind and at the same time without damaging it and ultimately creating the peace itself as the symbol of blessing from Allah.

“He causes to grow for you thereby the crops, olives, palm trees, grapevines, and from all the fruits. Indeed in that is a sign for a people who give thought”. (Quran 16:11)

CONCLUSION

In a nutshell, healthy ageing in the elderly is a process that enables the elderly to maintain their functional ability for their wellbeing. This will allow them to appreciate their life in a healthier way and age with grace and wisdom. Skin as the largest organ of the human body portrays self-confidence and overall quality of life as it reflects general health status. As a result, it gives a strong social and psychological impact on one's life (Life et al., 2017). Hence, the preventive measure of skin illnesses must be taken in order to lead a healthy life.

In this context, plant-derived products have been widely being used as it contained a high amount of anti-oxidants to fight against free radicals and also its photoprotective properties that can shield the skin against the harms of UV irradiation. Although previous studies proved a positive effect of Centella Asiatica as an anti-ageing, more studies are needed to be carried. With the current knowledge, it is inadequate to prove its effectiveness as an anti-ageing as the works of literature available do not elaborate further about the best route and dosage of administration in order to evaluate its effectiveness (Mukherjee et al., 2011). Meanwhile for Curcuma longa, although there are many studies that provide evidence on curcumin benefits in treating skin diseases and overall skin health, it is still not yet proven that it can act as an alternative or adjunct to traditional treatment. Hence, more clinical studies should be conducted on a large scale to assess its efficacy in treating skin conditions (Vaughn et al., 2016).

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