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Volume 2

Edited by

**MUHAMMAD TAHER
QAMAR UDDIN AHMED**



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Press**

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Muhammad Taher
Qamar Uddin Ahmed



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Chapter 7

Microsponge: A Potential Delivery System for Salicylic Acid in Treating Acne

Hazrina Hadi, Nurul Namira Azillah and Qamar Uddin Ahmed

7.1 Introduction

7.1.1 Acne

7.1.1.1 Definition

Acne is a common dermatological disorder that can affect people of all ages especially during early adulthood. A study that was conducted by Perkins et al. (2002) to investigate the prevalence of the disease in women showed that clinical acne is predominantly seen in younger ages. Nevertheless, women of older age have also been affected with acne but at a much lower percentage of occurrence (Perkins et al., 2002). Other than that, the prevalence of the disease does not reflect any preference for male or female (Fabbrocini et al., 2013). Acne is believed to be severe during adolescence probably because of hormonal changes prior to puberty.

There are many types of clinical acne which are acne neonatorum, infantile acne, acne vulgaris, adult acne, acne conglobate, acne inversa, acne fulminans, acne cosmetic, iatrogenic acne and acne excoriee (Montagna, 1974). However, the commonest form of acne that affects most people is acne vulgaris (Hon and Leung, 2010). Acne vulgaris is a disease related to pilosebaceous units of the skin which are mostly associated with sebaceous gland follicles (Fabbrocini et al., 2013; Hon and Leung, 2010; Layton et al., 2004). Acne can typically be seen on the face, chest and back (Robert et al., 2006). Acne vulgaris can be

classified into non-inflammatory lesions and inflammatory lesions. The non-inflammatory lesions of acne have two different forms namely open comedone and close comedone which are also known as blackheads and whiteheads respectively. There are also microcomedones which are the precursor lesion of acne.

Meanwhile, inflammatory lesions are characterized by the formation of papules, pustules or nodule on the skin (Strauss et al., 2007; Jeremy et al., 2003). Inflammatory lesions usually progress from the comedone in the presence of *Propionibacterium acnes* (*P. acnes*). In this case, the inflammation process can be considered as the secondary event in the formation of acne lesion (Layton et al., 2004). Inflammatory events present around the pilosebaceous follicles initiate the inflammation of acne lesions (Layton et al., 2004; Jeremy et al., 2003). Inflammation that occurs at the acne lesion will appear red in colour and gives some painful sensation to the patients at the affected area.

Furthermore, the diagnosis of acne can be classified according to the degree of its severity (Strauss et al., 2007). Mild acne is generally the minor form of acne. Non-inflamed whiteheads and blackheads are ordinarily categorized as mild acne. Herein, acne lesions are typically limited to the face. Some forms of mild acne may have inflammatory lesion like papules or pustules, yet these are less in number when compared to moderate and severe acne (Sharma and Lall, 2013). Mild acne is not widespread acne and it does not extensively inflame.

The next classification, moderate acne, is relatively similar to mild acne. However, moderate acne is characterized by numerous comedones, papules and pustules compared to mild acne. Patients with moderate acne may be affected by few small nodules, too. The lesions of moderate acne are often painful more than mild acne (Sharma and Lall, 2013; Ray, 2013).

Most importantly, severe acne is considered a critical type of acne. Severe acne is often distinguished by the presence of several nodules. The skin's surface might become inflamed and causes extensive damage to the skin. Other than that, severe acne can result in serious and permanent scarring on the patient's skin (Sharma and Lall, 2013).

Additionally, acne has a psychosocial aspect to it which may lead to social changes to the patient. Acne may possibly lead to embarrassment,

self-consciousness, and it is of great interest to society (Sharma et al., 2004; Sharma et al., 2004). Severe acne can lead to suicide or even death. Moderate acne can lead to Acne not only affects the patient's self-esteem but can improve the quality of life.

7.1.1.2 Acne

There are many types of acne, but it is widely accepted that hyperkeratinization of the pilosebaceous follicle is a key event in the pathogenesis of *P. acnes* and is a key event in initiating the inflammatory response (Leung, 2010; Leung, 2002; Korec, 2002).

Hyperkeratinization of the follicle which leads to the formation of follicular cysts.

Several studies have shown that hyperkeratinization of the follicle can be because of the accumulation of lipid, and due to the presence of *P. acnes* (2004). A local inflammatory response in patients. However, after treatment with antibiotics, the level of cytokines in the skin was found to be lower (Korec, 2002). It gets trapped in the follicle, hyperkeratinization continues, it leads to the formation of cysts.

Increased awareness of the importance of the

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CURRENT ISSUES in PHARMACY

Volume 2

The field of pharmacy consists of many disciplines of pharmaceutical sciences particularly pharmacy practice, pharmaceutics, pharmacology, molecular biology, pharmacognosy and medicinal chemistry. Pharmacy is involved in a wide array of pharmaceutical research and education, too. Pharmacy practice research focuses on the areas of pharmacogenetics, pharmacokinetics and pharmacodynamics. It also covers the inter-relationship between these areas in different ethnic groups, as well as methodological issues on pharmacoconomics. Clinical and applied research is conducted on studies that are supposed to improve patient outcomes and could have a favourable impact on pharmacy practice and service. Pharmaceutics research is concerned with drug formulation, stability, and delivery science, and also works on medical devices. Medicinal chemistry research is mainly focused on pharmaceutical chemistry, drug discovery and compound library, and receptor biology. Pharmacology research works on molecular and cellular mechanisms of disease states and associated pharmacology, as well as a range of toxicology research.

MUHAMMAD TAHER, is currently working as an associate professor at the Department of Pharmaceutical Technology, Kulliyah of Pharmacy, International Islamic University Malaysia. He is actively involved in Natural Products research. His research interest is to isolate and characterize phytochemicals from plant, animal and marine sources. He uses different cell lines in drug discovery to evaluate several bioactivities such as antidiabetic, antiobesity, anti-inflammatory, cytotoxic and wound healing. He has published a number of articles in several journals related to his area.

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