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PROBIOTIC HOLD PROMISES FOR GLOWING AND HEALTHY SKIN

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ABSTRACT

Probiotic bacteria are used to treat or prevent broad range of skin disease, condition and syndrome. In addition, there are area of medical use that have been proposed for future probiotic application in skin diseases this review have provide evidence of probiotic effectiveness for the treatment and prevention of skin aging, acne, skin allergy and atopic dermatitis that cure with the help of regular intake of probiotic and dietary food products or the probiotic bacteria that are active against many skin diseases.

KEY WORDS

Atopic dermatitis, probiotics, dietary supplements, S. epidermidis.

INTRODUCTION

Probiotics are "live microorganisms, which, when administered in adequate amounts, confer a health benefit to the host" (Anon, 2006). It has been speculated that the skin status could benifit from reinforced gut homeostasis (Salminenetal, 2005). Diet variations determine individual characteristics of intestinal microflora, according to age, feeding, lifestyle, interactions among numerous constituents of the same flora and pathologic conditions. Probiotic formulations are becoming increasingly available for healthy skin care, prevention and treatment of skin diseases, and anti-aging benefits thus representing an emerging area for skin health (Cinque *et al*., 2011). The advantages of probiotic treatment (probiotic-prevention or probiotic therapy) are that this method is efficient to the patients and also it has no side effect on them. Therefore, probiotic-therapy for the skin is potentialy comparable to the ordinary methods of treatments.

In modern lifestyle negatively influences the intestinal ecosystem, and there may be cumulative degradation of the intestinal microflora. Linear changes in environmental conditions and lifestyle may lead to nonlinear changes in the gut flora possibly to an increasing susceptibility to skin diseases (Schmidt, 2004). A number of clinical studies suggest that probiotic strategies induce systemic effects that extend beyond the gut and may even affect selected functions of the skin (Ouwehand *et al*., 2002). Many experimental studies have shown that probiotics exert specific influences in the intestinal on epithelial cells and immune cells with antiallergic potential (Caramia *et al*., 2008). Also, an emerging approach in dermatology to help preventing and treating skin conditions, including the external signs of aging, acne, rosacea, yeast and bacterial infections, psoriasis, and dermatitis, is represented by topical probiotics, as shown by the growing market place for topical probiotic formulations available for skin care and antiaging benefits (Cinque *et al*., 2011). Totally, probiotics exert their health effects to the skin directly through cutaneous formulations or indirectly through dietary supplementary formulations.

This review is related to the beneficial effect of probiotic bacteria on skin aging, atopic dermatitis, acne and skin allergy.

1. SKIN AGING

Figure1: wrinkles on skin (Source: https://www.yahoo.co.in)

Aging skin involve a complex interplay between intrinsic aging including genetic and hormonal influence and extrinsic aging influence enviormental factor such as uv light, pollution and cigarette smoking. UV radiation is considered the strongest precipitator of extrinsic aging. As public knowledge has increase dregarding the link between sun exposure and photoaging, interest in preventing and treating the adverse effects of UV radiation has escalated. Early studies suggest that probiotics and their metabolites might alter several aspects of skin aging and also help to maintain skin homeostasis by protecting against UV-induced skin damage (J. h. jeong *et al*., 2016). Healthy, normal skin exhibits a slightly acidic pH in the range of 4.2- 5.6, which aids in the prevention of pathogenic bacteria colonization, regulation of enzyme activity, and maintenance of a moisture-rich environment (Mauro, 2006). However, after the age of 70, the pH of skin raises significantly, stimulating protease activity (Hachem *et al*., 2003). Probiotic metabolism frequently produces acidic molecules, lowering the pH of the surrounding environment (Cinque *et al*., 2010) as seen with *Lactobacilli* producing free fatty acids (FFAs) and conjugated linoleic acid (CLA) during the fermentation process. Therefore, the use of probiotics may work to restore the normal skin pH and consequently return protease activity levels closer to those seen in young and healthy skin.

2. ATOPIC DERMATITIS

Figure 2: Atopic dermatitis (Source: https://www.yahoo.co.in)

Atopic dermatitis is the most common chronic skin condition in infants and children, with a prevalence of 10–20% (Kliegman *et al*., 2015). The term atopy refers to a genetic predisposition to become sensitized and to mount an IgE response to allergens. Atopic dermititis has been linked to food hypersensitivity, especially milk and egg protein. It is also defined as “a skin condition characterized by intense dryness of the skin, pruritus, and chronic erythematous lesions with a relapsing course” (Del Giudice jr *et al*., 2002). Atopic dermatitis is a chronic relapsing inflammatory skin disease that usually starts during the first years of life. In patients with the disease, the quality of skin is severely affected, and this is closely linked to a reduced quality of life. AD has three stages, non-atopic dermatitis, “True” atopic dermatitis and autoallergic atopic dermatitis (Bieber, 2008). Non-atopic dermatitis is a non-IgE associated form of AD. However, it can transform into “true” atopic dermatitis due to the development of sensitization of the skin to IgE. “True” atopic dermatitis can develop into autoallergic atopic dermatitis by scratching. Scratching damages the skin cells which releases autoantigens. These autoantigens induce IgE auto antibodies which make the inflammatory response worse (Altrichter *et al*., 2008). A probiotic bacteria *S. epidermidis* can be used to improve atopic dermatitis by combatting *S. aureus* infection. *S. aureus* is found in 90% of atopic dermatitis lesions and worsens the symptoms of atopic dermatitis. Esp secreted by *S. epidermidis* can inhibit *S. aureus* and potentiate the effects of skin antimicrobial peptide produced by the host.

3. ACNE

Figure 3: Acne (Source: https://www.yahoo.co.in)

Acne (vulgaris) is a common disease that mainly affects teenagers. About 80% of the people acquire acne in their adolescence (Cunliffe and Gollnick, 2001). People can experience acne symptoms for decades, nearly 50% of these people suffer from acne in their 20s (Al Robaee, 2005 and Galobardes *et al*., 2005). Acne vulgaris is multifactorial condition and is characterized by hyper colonization with *P. acnes* inflammation and immune responses. Propioni bacteria have been shown to have adjuvant and antitumor activities (Ingham *et al*., 1992) and also same species are of pathogenic relevance in acne and folliculitis (Leydenetal., 1998). The symbiotic ability of probiotic bacteria and Konjac glucomannan hydrolysates to inhibit the growth of *P. acnes* in an in vivo study has been recently reported suggesting that the development of a new alternative involving probiotic therapy for reducing acne episodes in vivo could been couraging (Al-ghazzewi and Tester., 2009). The local burden of lipid peroxidation in acne is high, such that it appears to place a great demand upon blood-derived antioxidants (Bowe and Logan, 2010). Some recent studies have shown that orally consumed prebiotic and probiotics can reduce systemic markers of inflammation and oxidative stress (Mikelsaar and Zilmer., 2009). Then the ability of oral probiotics to limit systemic oxidative stress may be an important therapeutic pathway (Fu *et al*.,2010). Oral administration of probiotics regulates the release of inflammatory cytokines within the skin (Hacini-Rachinel *et al*., 2009), and a specific- reduction in interleukin-1α (Cazzola *et al*., 2010) would be of potential benefit in acne (Bowe and Logan, 2011). Probiotics have been shown to directly inhibit *P. acnes* through the production of antibacterial proteins.

4. SKIN ALLERGEY

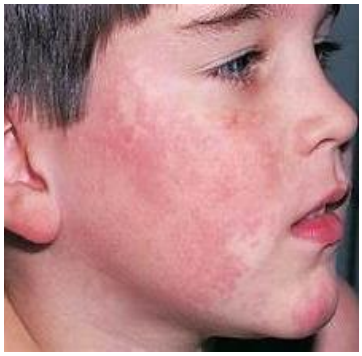

Figure 4: Allergic diseases (Source: https://www.yahoo.co.in)

The role of probiotics in prevention of allergic disease is still not clearly established. It has been shown that probiotics exert specific anti-allergic effects on epithelial cells and immune cells. The allergen penetration through the skin can lead to a systemic sensitization involving the intestinal mucosa. Also, it has been reported that inflammation plays an important role in photo ageing of human skin in vivo (Pillai *et al*., 2005). Intervention strategies have been elaborated to balance the intestinal microecology with oral administration of probiotics (Ogden and Bielory., 2005). The composition of the intestinal microflora is the main element in allergic diseases, and species of probiotics could play a role in the development of healthy immunity response, participating in enteric microecology, preventing, and potentially treating allergic diseases (Zutavern *et al*., 2006). Dietary supplementation using particular probiotic strains has been found to increase interferon activity in the blood of human, and children born to families who consume traditional *Lactobacillus* rich fermented foods experience fewer allergies than those from families who consume more sterile foods (Caramia *et al*., 2008).

It has been confirmed that children who develop allergies present low levels of *bifidobacteria,* gram-positive aerobic organisms and enterococci, but more elevated levels of clostridia and *S. aureus* in their enteric microflora. Increased fecal levels of i-caproic acid that are indicators of high level of *Clostridium difficile*, suggest that the enteric microflora could be changed in allergic children. Many factors exert the alteration of gastrointestinal flora equilibrium such as genetic factors, diet, and infection frequency, antibiotic therapies, passive smoke, pollution, vaccinations, psychologic stresses, reduction of immunologic activity,

and development of allergic diseases (Halken, 2004). For example, antibiotic therapy leads to changes in intestinal, bacterial, and fungal components and also to over growth of *Candida albicans* which can secrete potent prostaglandin-like immune response modulators and subsequently promote the development of allergic events in distal mucosal sites such as the skin (Noverr *et al*., 2005). It should be noted that not all probiotic microorganisms have the same immunologic properties and specific probiotic microorganisms of the developing intestinal microflora that most influence skin health need to be defined because specific deviations inintestinal microflora may exert predisposition to allergic disease (Caramia *et al*., 2008). Totally, allergic responses may also be affected by dose and viability of the probiotic and these factors in turn potentially modified by the host environment (Wickens *et al*., 2008).

CONCLUSION

The role of probiotic bacteria in the prevention and treatment of skin diseases such as atopic dermatitis, acne, skin aging and allergic reactions. However, probiotic bacteria are unanimous but more evidences are needed to prove the impact of probiotic in the treatment of skin disease especially for allergic disorders. Probiotic bacteria *Lactobacillus, S. epidemis, Bifidiobacteria* provide protective shield against skin diseases. Oral administration of probiotic also plays significant role against bacteria which cause skin disease like acne and skin infection. Regular intake of probiotic and dietary food products can reduce minimum risk of skin related diseases last but not least further investigations are also required, in vitro and in clinical trials, with different species and strains of probiotic microorganisms in relevance to their effects on the skin.

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