

## Aloe vera and Skin Care

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The majority of the abundant scientific information regarding Aloe vera and its multiple biological activities have been largely attributed to a complex carbohydrate or polysaccharide called Acemannan, which is the short name for poly  $\beta$ -1,4 mono-acetyl mannose<sup>1</sup>. It has been shown the activity of Aloe depends on the Acemannan content. Accordingly, the greater the Acemannan content, the greater bioactivity and beneficial effect on skin care and wound healing. In fact, Acemannan is so important that the International Aloe Science Council has determined that if a product does not contain Acemannan it is not Aloe vera.

This polysaccharide is found in the parenchyma of the aloe leaf, in a gelatinous structure that when separated from the aloe vera leaf rind, resembles the consistency of a fish fillet, hence the familiar name, "Aloe fillet", or "Aloe vera inner fillet gel".

The activities of Aloe were studied for decades now, and early studies determined that the two major fractions of Aloe were responsible for two major biological activities:

- 1) Anti-inflammatory Activity: found primarily on the lower molecular weight fraction.<sup>2</sup>
- 2) Immunomodulatory activity: Found in the high molecular weight fraction.<sup>3</sup>

Several studies followed in order to determine if the immunomodulatory fraction would also have wound-healing ability and if this effect could be attained if the product was consumed orally. Studies using a rat animal model confirmed both effects. It was observed that if the Aloe was used topically as well as used orally that the difference in response was a significant improvement compared with a control sample.<sup>4</sup>

Aloe based products showed remarkable performance when used in burned skin, ranging in application from sun burn to radiation induced dermatitis<sup>5,6</sup>. Aloe showed ability to stimulate fibroblast formation and increased collagen, thus contributing to skin repair<sup>7,8</sup>. In fact Aloe showed significant acceleration of skin repair following dermabrasion compared with no additional treatment<sup>9</sup>.

Aloe penetrates the skin and has been studied successfully to facilitate intra-dermal administration of certain products. When used together with other compounds it appears that Aloe vera components penetrate the skin in a fashion inversely proportional to the molecular weight of accompanying components. It has been postulated that the reason for this is due to the heavier molecules more effectively inhibiting permeation by displacing the Aloe components from the penetration pathways, but conversely, leave more of the Aloe components free to associate with the added compound enhancing its transport through the skin barrier<sup>10</sup>. The Aloe components for this transport and the Aloe components that permeate the skin have not been identified; however, in separate unrelated studies it has been shown Acemannan has the capacity to form adducts and

complexes with substances such as Congo Red<sup>11</sup> and FITC<sup>12</sup> making the potential use of the Aloe as a trans-dermal vehicle possible.

The Bioactivity of the Acemannan depends largely on the treatment that it has been subjected to during the processing of the Aloe vera. This includes handling during harvesting and the drying technique. Improperly processed the Aloe can undergo stereo-chemical conformation changes that irreversibly damage the Acemannan resulting in impaired bio-availability and biological activity.

Aloe vera processing should be focused on conserving biological activity while delivering the greatest amount of bio-available Acemannan. Certified organic freeze dried Aloe vera from a reputable source should be used for skin care and wounds to eliminate the possibility of pathogen contamination and to achieve the best skin care results.

## References:

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