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## Biological Activity of Aloe Vera

An examination of the biological activity of steroids and synthetics revealed that they are both active yet toxic. In the search for natural substances, such as vitamins and amino acids, that have biological activity, we serendipitously discovered that Aloe Vera had many biologically active compounds that had anti-inflammatory, wound healing, analgesic and anti-arthritic activity.

### Ingredients in Aloe Vera Gel

Mannose and glucose are the most significant sugars found in the Aloe Vera gel, and they can be used to assay the activity of Aloe Vera. The gel contains important sterols which can have anti-inflammatory activity. Amino acids such as tryptophane and phenylalanine reduce inflammation. Studies have shown that vitamin C & B complex can maintain adrenalectomized animals, and that minerals such as zinc are very important in wound healing. Anthraquinones have good anti-inflammatory activity, but their activity is usually obtained by working through an inflammation pattern. Salicylic acid and aspirin are also highly biologically active.

### The Aloe Leaf

The rind is the manufacturing plant for carbohydrates, fats, proteins and vitamins. These Aloe Vera constituents are transported throughout the leaf by the phloem, and other materials are brought up from the roots by way of the xylem. These two mechanisms aid in transporting the Aloe Vera under the influence of the wind. Mucilage was

once thought to take part in this transport process, but researchers now feel that it acts as a container for the gel fillet or the storage of Aloe Vera.

If one takes the liquid mucilage and freeze dries it, one finds that the mucilage looks and acts like a bandage. It has occlusive »coverlike« properties as well as biological activity. The topical anti-inflammatory activity of mucilage at the 1% dosage is 3.8% in decreasing edema, whereas at the 5% dose level, it is 33.7%.

A consideration of the sol-gel transformation becomes very evident as an animal bites the Aloe leaf. The sol which is a colloidal system under the influence of many factors can be converted into a colloidal gel. If this system could be transported to the human wound, one would have an excellent topical wound healing treatment.

In the Aloe leaf synthesis, carbon dioxide and water are converted to an »active carbon« that is used to make carbohydrates, lipids, protein and vitamins. The Aloe Vera cell, visible at a magnification of about 40,000, is surrounded by a cell wall, has a large nucleus and two cell membranes the cytoplasm of which manufacturers mucopolysaccharide. The mucopolysaccharide is stored within the lumen of the cell.

### Biological Activity

Aloe Vera could prevent adjuvant arthritis 72%, and cause a regression of 22 to 26% at a dosage of 150 mg/kg per day. In another experiment, we proved that Aloe Vera was effective in reducing inflammation over a broad spectrum of irritants in experimental animals. The percent inhibition by Aloe Vera ranged from 76.9% against gelatin to 22.7% against dextran. In evaluating vitamin C's influence on localized adjuvant arthritis, we found that it could reduce

edema 80%, inhibit PMN infiltration, and decrease the pain induced by the adjuvant arthritis. However, there was no influence on the paw temperature. Anthranilic acid, a metabolite of tryptophane, could inhibit PMN infiltration as was evident in the peritoneal fluid of adjuvant arthritic rats.

The topical treatment of adjuvant arthritis with combined Aloe, RNA and vitamin C produced a 25.2% prevention inhibition and 45.1% regression inhibition at a dosage of 1.5% concentration of each.

Phenylalanine synergized with hydrocortisone acetate in reducing localized edema. We also obtained a good vehicle response on anti-inflammatory activity using Aloe Vera for hydrocortisone acetate. The combination of Aloe Vera and hydrocortisone was definitely additive in nature. We observed the vehicle effect of Aloe Vera for hydrocortisone acetate on inhibiting the infiltration of PMN's as well as the topical application of the steroid.

Aloe Vera is also a good vehicle for vitamin C and other important agents. Tryptophane and phenylalanine had good local anti-inflammatory activity in inhibiting PMN infiltration. In fact, the inhibition effect approaches that of the steroid. While phenylalanine was able to inhibit granuloma tissue weight in adrenalectomized animals synergistically with cortisone, tryptophane did not synergize with the steroid.

When we placed a cotton pellet under the skin of a rat we found that Aloe Vera was unable to inhibit the growth of granuloma tissue. Aloe Vera had no antifibrosis effect over a dosage range of 50 to 400 mg/kg administered for 12 days.

While Aloe Vera had no chronic anti-inflammatory influence, we wondered if it could inhibit the detrimental effects of the steroid on wound healing. Aloe Vera could inhibit edema in diabetic animals in a dose-response fashion up to 80% over a dosage range from 10 to 100 mg/kg.

A similar response was obtained in diabetic animals by Aloe Vera in inhibiting

