Further Observations on the Use of "Aloe vera" Leaf in the Treatment of Third Degree X-Ray Reactions

By Tom D. Rushig, B. K. Lowell and Lloyd M. Park.

In 1910 one of us (T. D. R.) published a preliminary report on the use of fresh Aloe vera gel in the treatment of third degree x-ray reactions on white rats (1). Attention was called at that time to the modern use of this gel in the treatment of such reactions in humans. It should also be pointed out that various species of Aloe have been employed for centuries to promote the healing of wounds and fire burns. Thus, Theophrastus in 1613 referred to the use of "the inner juice Aloe to heal wounds," and Cosin in 1618 referred to the use of powdered aloe "to check hemorrhages in recent wounds." Various other references have from time to time mentioned aloe, either fresh or dry, as a healing agent. The present report deals with further observations on the use of the fresh gel, or ointment, of the leaf, in the treatment of experimentally produced third degree x-ray reactions on the skin of white rats.

The procedure followed in producing the x-ray reactions and the method of treatment in the present report are essentially the same as those described in the first report, with the following differences: rats were given a single dose of 1900 r instead of an divided dose since it was found that a single dose at this level was not toxic; ether was used for anesthesia in place of pentobarbital; control areas received no treatment at any

* Based on a section of a thesis submitted to the faculty of the University of Wisconsin prior to partial fulfillment of the requirements for the degree of Doctor of Philosophy by Tom D. Rushig.

Book Review


This is a collection of laboratory experiments in biochemistry as an individual picture for which can be included in a laboratory method. The collection is intended for medical students and for medical students for such experience in the biochemistry of carbohydrates, fats, proteins, milk, blood, urine, metabolism, food, etc. While intended primarily for medical students, it should also be of interest to pharmacy teachers and students. - A. G. D.
kind; the duration of treatment was from two to four weeks. The leaves used in the present report were obtained from the Jamaica gardens of S. B. Peck & Company. They were sent in separate shipments of 50 to 150 each at intervals during the year 1940-1941 and were, with the exception of the last two shipments, in excellent condition when received. The following table summarizes the information concerning the various shipments.

### Table I. Assay Leaves Used

<table>
<thead>
<tr>
<th>Ship No.</th>
<th>Number of Leaves</th>
<th>Date Received</th>
<th>Condition on Arrival</th>
<th>leaf in Testing Rat Garve No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>55</td>
<td>8/9/40</td>
<td>Good</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>9/10/40</td>
<td>Good</td>
<td>7 and 9</td>
</tr>
<tr>
<td>4</td>
<td>105</td>
<td>11/8/40</td>
<td>Good</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>80</td>
<td>12/1/41</td>
<td>Good</td>
<td>10 and 11</td>
</tr>
<tr>
<td>6</td>
<td>155</td>
<td>3/3/41</td>
<td>Poor*</td>
<td>12, 13, 14 and 15</td>
</tr>
<tr>
<td>7</td>
<td>55</td>
<td>4/18/41</td>
<td>Poor*</td>
<td>17, 18, 19 and 16</td>
</tr>
</tbody>
</table>

* Many of these leaves were completely decomposed and had to be discarded. The leaves in which they were clipped were unless a deep pink, indicating that most of the germ or latex from the rod had drained out entirely.

### EXPERIMENTAL

**Treatment with Fresh Pulp (Jell).**—Three groups of rats were treated with this material. Group 6 was treated twice daily for four weeks while Groups 7 and 8 were treated twice daily for three weeks. The shorter period of treatment was resorted to because it was found that spontaneous healing affected the results after three weeks. The results are summarized in Table II.

### Table II. Treatment with the Fresh Pulp

| Rat Group No. | No. of Rats | Treatment Days | Initial Slight | Improvement of Central Area | Duration Slight | Improvement of Central Area | Duration Slight | Total |
|---------------|-------------|----------------|---------------|-----------------------------|----------------|-----------------------------|----------------|-------|-------|
| No. 6         | 8           | 3              | 3             | 0                           | 0              | 0                           | 0              | 1     |
| No. 7         | 8           | 3              | 3             | 0                           | 0              | 0                           | 0              | 1     |
| No. 8         | 8           | 3              | 3             | 0                           | 0              | 0                           | 0              | 1     |
| No. 9         | 8           | 3              | 4             | 1                           | 2              | 1                           | 2              | 2     |

By combining the results in the first two columns it may be seen that 28 areas, or 62.8% of those treated, showed an increased rate of healing. This is 4½ times as many as showed improvement in the control areas, and is a definite indication that a healing agent is present in the fresh pulp of Aloe vera leaf.

**Treatment with the Partially Decomposed Pulp.**—Some of the leaves from Shipment 4, after standing at room temperature for one month, were partially decomposed, while parts of them were completely spoiled. The latter areas were cut out and the remainder of the partially decomposed leaves stored at 5°C. After two months the pulp from these leaves had acquired a pink color and a characteristic fermented odor, and had lost most of its virid, gummy consistency. Treatment of a group of 8 rats (Group 9) with this partially decomposed pulp resulted in 7 areas, or 87.5% of those treated, showing an increased rate of healing, while only one area, or 12.5%, showed no benefit. Moreover, all of the treated areas which responded did so within 12 days after treatment was started. These 3 areas were healed in 6 days, 1 area in 8 to 9 days, 2 areas in 11 days, and 1 area in 12 days. These results were better than those obtained with the fresh pulp and pointed to the conclusion, contrary to the statement of MacKee (42), that the pulp does not have to be fresh in order to be effective.

**Treatment with the Jell.**—The promising results obtained with both the fresh pulp and the partially decomposed pulp led us to suspect that the healing agent might be present originally in the jell and upon standing pass from the jell into the pulp. Accordingly, a group of 8 rats (Group 10) was treated with fresh pulp prepared from Shipment 4 to study its effectiveness. The jell was prepared by removing the pulp from the medulla of the leaves by scraping, running the pulp-free jell through a meat grinder, and...
thoroughly triturating the millet rind in a mortar, adding one ounce of distilled water to each four ounces of millet rind. This mixture was then applied in the form of a paste on the areas which had been 2 to 8 days of the normal

were completely healed in 6 days, barons having healed in 5 days. In order to obtain further data on the fresh rind, 8 of the corneal, or puncture, granules in this group were treated with the solution, using the 8 granules along the same scale of classification as reviewed in the preceding paragraph. The results obtained show that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely more effective than the fresh granule, and that the fresh rind was definitely 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3 Contradictory results were obtained with the fresh rind of the leaf, the rind from one shipment of leaves being more effective than the pulp in promoting healing, while the rind from the other shipments of leaves gave negative results. The different season of the year in which the latter shipments were collected, or, perhaps more likely, the poor condition of these leaves when received, is offered as a possible explanation for these negative results. It is believed, from our observations, that the healing agent of the leaf is concentrated in the rind. Further work is needed to clear up this question.

4 Results obtained with aloe ointment, scarlet red ointment and urea ointment show that none of these are effective in promoting healing of acute third degree X-ray reactions in the skin of white rats.

REFERENCES

(1) Rowe, T. D., Journ. A. Ph. A., 29 (1940), 348.
(5) Private communication from the Baldwin Packers, Ltd., Hawaii.
(7) Crowe, J. E., Ibid., 27 (1933), 528.
These observations. Average change after Aloe vera administration +1.88 pH units. are consistent with the previously acknowledged bacteriostatic properties of Aloe vera juice. This would indicate that the Aloe vera supplementation had a tonic effect on the intestinal tract, thereby promoting a reduced transit time with decreased residence of fecal material in the colon. This mild tonic effect was not accompanied by any diarrhea and, therefore, would not be considered operating as a true laxative. Aloe vera is a type of succulent plant with gel-filled leaves. It plays a role in traditional medicines of many cultures; people have used aloe vera gel for thousands of years to treat a range of skin conditions, including psoriasis. Research suggests that compounds in aloe vera may reduce inflammation and help modulate the immune system. These elements may allow aloe vera to. A person can also use natural aloe vera gel directly from the plant by snapping off a leaf and gently squeezing out the gel. First, apply the gel or cream to a small area of skin to check for any unwanted reactions. In the meantime, aloe vera is generally safe to use as a moisturizer and on skin affected by psoriasis. Q: What type of aloe vera should I try for moderate plaque psoriasis?