



# Management of stress trauma in *Aloe vera* (L.) Burm. transplant

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## General Note



Article is recommended to print as color version in recycled paper. *Save Trees, Save Nature.*

## ABSTRACT

This study investigated the stress trauma suffered by *Aloe vera* in transplant as a result of shock and management or protection of the plant from traumatic conditions by utilizing the causes of shock due to transplant as working tools. Most cherished *Aloe vera* often get weak, flaccid and changes colour either to yellow or brown and in extreme cases face threats of wilting or outright death as a result of shock from transplant. *Aloe vera* is a plant that belongs to Asphodelaceae family and thrives well in warm and arid regions. The leaves are long and triangular with two external membranes which are green and leathery, containing a compact,

gelatinous mass with a translucent pearly aspect. Overgrown potted *Aloe vera* plant with numerous babies (offshoots) was rooted up completely with great care not to rip off the root hairs. The mother plant root ball was loosened carefully. With a clean knife, the offshoots were severed with each of them carrying their little root balls without any damage to their main roots and root hairs. Each of them was buried at the centre of the bag of soil. The two sets were thoroughly watered and left for two weeks for the soil to drain out before watering again. Results showed that *Aloe vera* does not easily die off in as much as the gardener nurtures it. And if the right procedures of transplantation are followed, shock will not occur. It also showed that the plant can recover from the transplant shock if traumatic conditions are reversed.

**Keywords:** *Aloe vera*, trauma, shock, transplant, management or protection

## 1. INTRODUCTION

Generally, living organisms feel uncomfortable with a new change in their environment. Shrubs and other plants too get disturbed when transplanted to a new location or different landscape.<sup>1</sup> Transplant shock is one of the greatest problems faced by gardeners. Sometimes the shock or stress could be mild, while other times, it could be so prominent causing a threat to wilting or death of a particular cherished plant or vegetation; thus, it can be a costly and frustrating experience.<sup>2,3</sup> *Aloe vera* is an evergreen perennial succulent plant with thick mucilage.<sup>4</sup> It originated from Arabian Peninsula; but grows wild in tropical climate around the world. It is cultivated for agricultural and medicinal uses. *Aloe vera* is also used for decorative purposes and grows successfully indoors as a potted plant.<sup>5,6</sup> *Aloe vera* belongs to Liliaceae family and thrives well in warm and arid regions.<sup>7</sup> The plant can be eaten for its health benefits and made into tea.<sup>8,9</sup> The importance of the presence of mucilage tissue at the centre of its leaves is of great inexhaustible values. Various workers have reported that the plant has useful pharmaceutical effects in wound healing therapy. The plant works with the stimulating power of growth factors which act as signaling molecules between cells and bind specific receptors on the surface of their target cells for wound healing.<sup>10,11</sup> They also reported that it contains at least 140 substances and not less than 70 essential nutrients, wealth of vitamins, minerals, enzymes, proteins, phytosterols and amino acids.<sup>12</sup>

The plant is found as a constituent product in drugs, beverages, skin lotion, cosmetics, ointments for minor burns, sunburns; though little evidence of safety in its involvement is not known.<sup>9,13</sup> *Aloe vera* is grown as a low maintenance house plant. At times, it can grow very quickly and overgrow its pot with numerous babies. These babies are the offshoots with their own root system. Soon, overcrowdings results due to competition for space, water, air and nutrient in same pot. This also happens if *Aloe vera* is grown in the ground/soil; it can outgrow its immediate environments and competition ensues.<sup>14,15</sup> It is therefore necessary to transplant some of the offshoots or babies into different landscape for space and wellness. Transplanting from initial environment to another is commonly associated with several problems in which *Aloe vera* plant could shortly become flaccid; with older leaves degenerating; becoming yellowish or brownish in colour; and in extreme condition could wilt or die.<sup>16</sup> This study therefore anchors on the management of the plant to overcome transplant stress or trauma which comes as a result of shock from the transplantation. Some factors have been identified as the reasons for which *Aloe vera* could be traumatized after transplant

- Damage caused to the plant roots: Absorption of water and nutrients occur with the help of tiny root hairs which lie far away from the root ball; while transplanting; these root hairs could get damaged either by hitting the plant through uprooting from the mother base or by simply drying out. As a result of this, the plant lacks in major nutrients and eventually goes into shock.<sup>14,15,17</sup>
- Placing the plant into too small hole given it insufficient amount of space, water and nutrient.
- Placing shade – loving *Aloe vera* plant in direct sunlight
- Scorching of the leaves could make them roll, curl, turn yellow or brown or even shrivel.<sup>18,19</sup>

In order for *Aloe vera* to overcome shock after transplant, careful application of the procedure must need be complied with. Careful rooting of the entire mother plant with the offshoots is very necessary. Loosening of the root ball and severing of the offshoots from original base should employ great care. Pot mix and size of container, manner of watering are to follow prescribed procedures.<sup>20</sup> It is hopeful that if gardeners and owners of *Aloe vera* plant follow prescribed procedures for transplant, their *Aloe vera* will not suffer trauma because of transplant shock.

## 2. MATERIALS AND METHODS

This work was carried out in the Department of Plant Science and Biotechnology, River State University, Nkpolu- Oroworukwo, Port Harcourt, in Rivers State, Nigeria. In the Department was an unkempt traumatized *Aloe vera* plant which was transplanted a couple of weeks (2 weeks) before this study, as shown in Fig 1. It was the condition of that plant that brought about this investigation which

anchored on managing *Aloe vera* in transplant to avoid same condition. Overgrown potted *Aloe vera* plant with numerous babies (offshoots) was rooted up completely with great care not to rip off the root hairs. The mother plant root ball was loosened carefully. With a clean knife, the offshoots were severed with each of them carrying their little root balls without any damage to their main roots and root hairs. Ten offshoots were planted each to a large, perforated polyethylene bag filled with good draining soil. Each of them was buried at the centre of the bag of soil. Another set of five were also planted directly into the ground soil with good draining capacity. The two sets were thoroughly watered and left for two weeks for the soil to drain out before watering again. The watering was not by flooding the soil; but after two weeks, watering was upon the leaves for the water to drip down to the soil. The traumatized pot of *Aloe vera* was rehabilitated by enhancing the soil with a good draining soil instead of the loamy soil where it was seated and watering to it was no longer by flooding. The nurture continued until it regained its vigor and developed off shoots.

### 3. RESULTS AND DISCUSSIONS

The traumatized *Aloe vera* which concern informed this work regained its vigor and the brown colour returned to evergreen fig. 2. The reason for this may be that the plant was uncared for as it was left in the direct heat of the sun and was always watered by flooding. This may have led to the rotting of the roots in excess water in spite the fact that the plant is a succulent one. The reverse of all the adverse conditions and care may have helped in restoring the traumatic condition to vigor as shown in Fig 2.



**Figure 1** Showing traumatized *Aloe vera* plant due to transplant shock



**Figure 2** Showing potted *Aloe vera* plant; a- Traumatized *Aloe vera* about to recover from stress trauma due to transplant shock; b – Fully recovered *Aloe vera* plant from stress trauma, showing offshoots/babies



**Figure 3 (a)** Showing *Aloe vera* transplanted to the soil according to prescribed procedure (two weeks old); (b) – Established *Aloe vera* with no sign of transplant shock (arrow showing offshoots/babies)



**Figure 4** Showing *Aloe vera* transplanted to polyethylenebag according to prescribed procedure (two weeks old)

The set of *Aloe vera* transplants into nylon and direct ground soil did not enter into traumatic or stress condition. This may suggest that the pattern of transplant and nurture helped the stands not to go into shock. The plant vigor and spread of growth showed that all the stands adapted to the new landscape of transplant with constant nurture (Figs. 3 & 4); as such they were established and developed off shoots.

#### 4. CONCLUSION

The restoration of the traumatized *Aloe vera* is an indication that the plant cannot easily die off as much as the gardener care for it. The plant stands on the nylon bags and ground soil also indicated that transplant shock is relative and not a rule that a transplanted stock must be traumatized. This study therefore shows that if a gardener nurtures his *Aloe vera* and follow the prescribed pattern for transplant, his *Aloe vera* plant will not be traumatized due to transplant shock. As a follow up, gardeners and *Aloe vera* owners can transplant their stock without any more fear of losing the plant to wilt or trauma. Finally trauma, stress, or shock can be managed using the prescribed pattern for transplant.

#### RECOMMENDATIONS

The following recommendations are prescribed as procedures for gardeners and owners of *Aloe vera* plant to follow for sustainability of the plant especially in transplant; and if so followed, there is a relative assurance their plant will not be traumatized due to transplant shock.

- Remove or root up by pulling carefully the entire mother Aloe plant completely from the existing pot or soil.
- Loosen up the root ball without damage to the roots and their hairs.
- Remove the offshoots with caution, so that the roots will not rip off.
- With a clean knife, sever the offshoots along with their individual root balls without damage to the roots
- Plant the offshoots at the centre of the bag, pot or ground soil; 2 inches deep into the soil.
- Use large containers that will accommodate the root ball + 2 inches all round.
- Use good draining soil
- Replant the mother plant from where it was removed.
- Water thoroughly at first and stop until after 2 weeks so that the water will dry out from the soil.
- Subsequently after 2 weeks water from the leaves so that it will drip down to the soil. Do not water close to the root base.

#### COMPETING INTERESTS

There were no competing interests whatsoever concerning this work.

#### AUTHOR CONTRIBUTIONS

Author 1 designed the study, carried out the practicals and wrote the first draft of the manuscript; Author 2 managed the analysis and literature searches. All authors read and approved the final manuscript.

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