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## To determine Aloin A & B content in *Aloe vera* (*Aloe barbadensis* Miller) leaf gels

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#### Abstract

The present investigation was conducted at Acharya Narendra Dev University of Agriculture and Technology, Kumarganj, Ayodhya during the year 2018-19 and 2019-20. Aloin, an anthraquinones molecule found in the bitter yellow sap of the middle leaf layer, has a strong laxative effect. The experiment revealed that Aloin A maximum in IC-112532 (0.87 ppm) and minimum in IC-112512 (0.80 ppm) and Aloin B maximum in IC- 112512 (1.27 ppm) and minimum in IC-283610 (1.17 ppm).

**Keywords:** Aloin, *Barbadensis*, anthraquinones

#### Introduction

*Aloe vera* is a cactus-like plant that grows in hot, arid climates and is currently grown in large quantities due to strong demand. It is regarded as an all-purpose herbal plant with a high rating throughout recorded history. The thick, tapering, spiky leaves of aloe grow from a short stem near the ground. It's not a cactus, but rather a Liliaceae tree called *Aloe Barbadensis* (Ghazanfar, 1994) [1]. Among the 75 potentially active constituents in *Aloe vera* are vitamins, enzymes, minerals, carbohydrates, lignin, saponins, salicylic acids, and amino acids (Richard, 2005) [8]. The vascular layer of *Aloe vera* plants contains two major liquid materials: first, a bitter yellow latex located beneath the strongly cutinized epidermis of the leaves and containing a high concentration of anthraquinone compounds; and second, a bitter yellow latex located beneath the strongly cutinized epidermis of the leaves within the vascular layer and containing a high concentration of anthraquinone compounds, which has been used throughout the centuries as a cathartic and for medicinal purges; and, second, the inner central zone's thin-walled tubular cells form a translucent mucilaginous gel (parenchyma) that has been used since past to treat burns and other wounds, where it's thought to extend the speed of healing and reduce the risk of infection (Joseph & Raj, 2010) [6]. Aloin, an anthraquinones molecule found in the bitter yellow sap of the middle leaf layer, has a strong laxative effect (IARC, 2016) [4]. Except within the pharmaceutical industries, the aloe plant was first used commercially in the manufacturing of "aloin", a latex substance (a yellow sap). In the food industry, it's the potential to be used as a food preservative (substitute of sulphur dioxide in preserving fruit and vegetables). Because of its anti-oxidant characteristics, it's becoming more popular as a natural covering. The leaf powder is employed during a number of ayurvedic medicines because it contains antioxidants, dietary fibre, iron, etc. Many researchers have tried to figure out what active ingredients are present in *Aloe vera* gel (Habeeb *et al.*, 2007) [2]. Proteins, lipids, amino acids, vitamins, enzymes, inorganic substances, and various carbohydrates are contained in polysaccharides located within the inner leaf parenchymatous tissue or pulp, (Hamman *et al.*, 2008) [3]. When the leaves are removed from the basal portion of the mother plant, the sap starts draining out immediately products made from *Aloe vera* plants such as gel, aloin, etc. (Pandey *et al.*, 2016) [7].

#### Materials and Methods

Aloin A & B content was estimated by the method of thin layer chromatography (TLC) is given by Izmailov and Shraiber (1938) [5].

#### Crystallization/drying

To carry out thin layer chromatography pre coated silica gel plates spectrophotometer is used for spectrophotometric assay.

Nitrogen is estimated by Kjeldahl method. The amount of sample taken is 0.1944 g, 0.3 g of CuSO<sub>4</sub>, 10 g of NaOH (to prepare 0.1 N solution) and 25 ml of H<sub>2</sub>SO<sub>4</sub> were used. Sodium hydroxide solution is standardized by titrating against potassium hydrogen phthalate. Sulphuric acid of 0.1 N concentration is prepared and standardized by titration with standard sodium carbonate.

#### Ash content

1 g of the ground drug is incinerated in a tarred platinum or silica dish at a temperature not exceeding 450 °C until free from carbon. Then it is cooled and weighed. The per cent age of ash is calculated with reference to the dried drug. The procedure carried out protected from light.

#### Solution (1)

In 20 ml methanol, 0.5 g of test substance is heated. Then the solution is shaken for few minutes and then decanted. The supernatant liquid is maintained at 4 °C and used within 24 h.

#### Solution (2)

50 mg of barbaloin (10-β-glucopyranosyl- 1-1, 8-dihydroxy-3-hydroxymethyl anthracen-9-one). Its molecular formula is C<sub>21</sub>H<sub>22</sub>O<sub>9</sub> and molecular weight is 418.4, it is an lemon yellow to dark yellow needles or crystalline powder. It darkens on exposure to Sunlight, is dissolved in 10 ml methanol. After removal of plate it is allowed to dry in air, then the plate is sprayed with 10% w/v solution of potassium hydroxide in methanol and examined ultraviolet light at 365 nm. Chromatograms obtained with solution (2) showed a yellow band with R<sub>f</sub> value of 0.4 to 0.5. The chromatogram obtained with solution (1) showed yellow band corresponding to that obtained with solution (2).

#### Identification of A

10 ml of 0.2% w/v solution is heated with 0.1 g of sodium tetraborate in water bath for 5 min. 2 ml of the resulting solution is poured into 20 ml water. A yellowish green fluorescence is produced which is particularly marked by ultraviolet light.

#### Identification of B

1 ml bromine water is added to 5 ml of 2% w/v solution. A copious yellow precipitate is formed.

#### Acidity

pH of 1% w/v suspension varied between 4 to 6.5%.

#### Light absorption

In a range of 250 to 370 nm, a freshly prepared 0.0025% w/v solution exhibited maximum at 266, 298 and 354 nm.

#### Water insoluble matter

Not more than 2% when determined by the following method: 1 g of the compound, 120 ml of water is added. The solution is shaken frequently for 2 h, maintaining the temperature at 25

°C. Then it is filtered through a sintered glass filter (used B.S. porosity No. 2). The residue is washed with 25 ml of water and dried to a constant weight at 70 °C and a pressure of 2 kPa (kilopascal) for 3 h.

#### Loss on drying

When dried at 70 °C at a pressure of 2kPa for 3 h, loses not more than 5% of its weight. The ash is not more than 0.5%.

#### Assay by UV Spectrophotometry

2 ml of NaOH, 0.2 g of aloin, 100 ml of boiled and cooled water, 10 ml CCl<sub>4</sub>, 0.6 g of FeCl<sub>3</sub>, 6 ml HCL are intimately mixed and cooled. Blank calibration was performed with 0.1 N NaOH. Wavelength ranges chosen were 195 to 600 nm.

#### Concentration of aloin

Devised formula = (Sample absorbance/standard absorbance × standard weight/sample weight) × 88 {88 is the standard aloin concentration.

#### Experiment Result

##### Aloin A

Aloin A content of various *Aloe vera* germplasm was found in year 2018-19 was 0.88-0.80 ppm and in year 2019-20 was also 0.88-0.80 ppm. In the year 2018-19 Aloin A content of the germplasm was highest which was 0.88 ppm in IC-112517 statistically significant at 5% level of significant followed by 0.87 ppm (IC-112532), 0.86 ppm (IC-112531), 0.85 ppm (IC-112527), 0.85 ppm (IC-112569), 0.84 ppm (IC-112512), 0.82 ppm (IC-112519), 0.82 ppm (IC-112518), 0.81 ppm (IC-283610) and 0.80 ppm (IC-112521). In the year 2019-20 Aloin A content of the germplasm was highest which was 0.88 ppm in IC-112517 statistically significant at 5% level of significant followed by 0.87 ppm (IC-112532), 0.86 ppm (IC-112531), 0.85 ppm (IC-112527), 0.85 ppm (IC-112569), 0.84 ppm (IC-112512), 0.82 ppm (IC-112519), 0.82 ppm (IC-112518), 0.81 ppm (IC-283610) and 0.80 ppm (IC-112521).

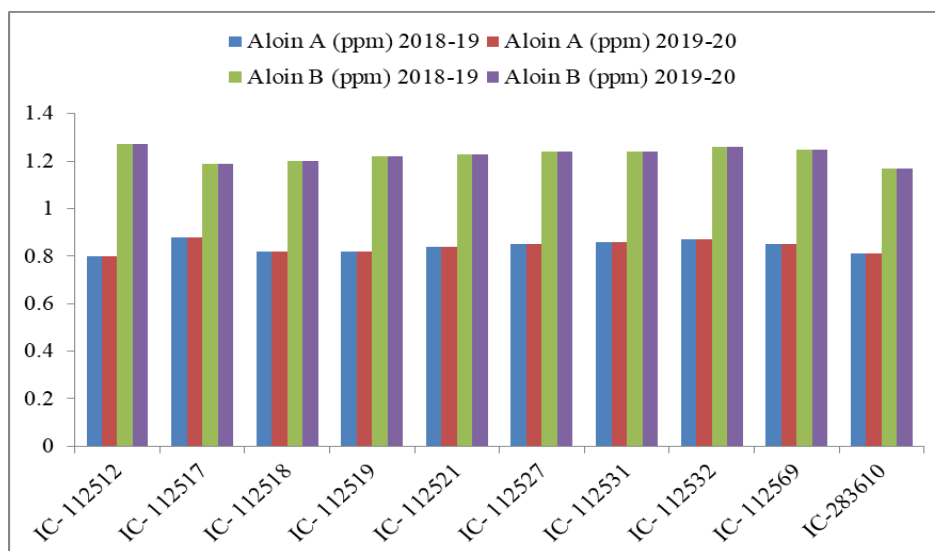
##### Aloin B

Aloin B content of various *Aloe vera* germplasm was found in year 2018-19 was 1.17 to 1.27 ppm and in year 2019-20 was also 1.19 to 1.27 ppm. In the year 2018-19 Aloin B content of the germplasm was highest which was 1.27 ppm in IC-112512 and statistically significant at 5% level of significant followed by 1.26 ppm (IC-112517), 1.25 ppm (IC-112569), 1.24 ppm (IC-112531), 1.24 ppm (IC-112527), 1.23 ppm (IC-112521), 1.22 ppm (IC-112519), 1.20 ppm (IC-112518), 1.19 ppm (IC-112532) and 1.17 ppm (IC-283610). In the year 2019-20 Aloin B content of the germplasm was highest which was 1.27 ppm in IC-112512 and statistically significant at 5% level of significant followed by 1.26 ppm (IC-112517), 1.25 ppm (IC-112569), 1.24 ppm (IC-112531), 1.24 ppm (IC-112527), 1.23 ppm (IC-112521), 1.22 ppm (IC-112519), 1.20 ppm (IC-112518), 1.19 ppm (IC-112532) and 1.17 ppm (IC-283610).

**Table 1:** indicating of Aloin A (ppm) and Aloin B (ppm) of *Aloe vera* germplasm

| Name of germplasms | Aloin A (ppm) |         | Aloin B (ppm) |         |
|--------------------|---------------|---------|---------------|---------|
|                    | 2018-19       | 2019-20 | 2018-19       | 2019-20 |
| IC-112512          | 0.80          | 0.80    | 1.27          | 1.27    |
| IC-112517          | 0.88          | 0.88    | 1.19          | 1.19    |
| IC-112518          | 0.82          | 0.82    | 1.20          | 1.20    |

|           |       |       |       |       |
|-----------|-------|-------|-------|-------|
| IC-112519 | 0.82  | 0.82  | 1.22  | 1.22  |
| IC-112521 | 0.84  | 0.84  | 1.23  | 1.23  |
| IC-112527 | 0.85  | 0.85  | 1.24  | 1.24  |
| IC-112531 | 0.86  | 0.86  | 1.24  | 1.24  |
| IC-112532 | 0.87  | 0.87  | 1.26  | 1.26  |
| IC-112569 | 0.85  | 0.85  | 1.25  | 1.25  |
| IC-283610 | 0.81  | 0.81  | 1.17  | 1.17  |
| CD at 5%  | 0.017 | 0.017 | 0.010 | 0.010 |
| S.Em±     | 0.006 | 0.006 | 0.003 | 0.003 |



**Fig 1:** Graph indicating of Aloin A (ppm) and Aloin B (ppm) of *Aloe vera* germplasm

## Conclusion

### Aloin A

Aloin A content of *Aloe vera* germplasm was recorded in the range of 0.80 to 0.88 ppm in year 2018-19 and 0.80 to 0.88 ppm in year 2019-20. In the year 2018-19 maximum Aloin A content in IC-112517 (0.88 ppm) and minimum was IC-112512(0.80 ppm). In the year 2019-20 maximum Aloin A content in IC-112517 (0.88 ppm) and minimum was IC-112512 (0.80 ppm).

### Aloin B

Aloin B content of *Aloe vera* germplasm was recorded in the range of 1.17 to 1.27 ppm in year 2018-19 and 1.17 to 1.27 ppm in year 2019-20. In the year 2018-19 maximum Aloin B content in IC-112512 (1.27 ppm) and minimum was IC-283610 (1.17 ppm). In the year 2019-20 maximum Aloin B content in IC-112512 (1.27 ppm) and minimum was IC-283610 (1.17 ppm).

## References

1. Ghazanfar SA. Hand book of Arabian medicinal plants. Boca Rato; CRC Press. 1994.
2. Habeeb F, Shakir E, Bradbury F. Screening methods used to determine the anti-microbial properties of *Aloe vera* inner gel. *Methods*. 2007;42:315-320.
3. Hamman JH. Composition and applications of *Aloe vera* leaf gl *Molecules*. 2008, 1599-1616.
4. IARC. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, No.108. *Aloe vera*. 2016.
5. Izmailov NA and Shraiber HS. A drop-chromatographic method of analysis and its application to pharmacy. *Farmatsiya*. 1938;3:1.
6. Joseph B & Raj SJ. Pharmacognostic and phytochemical

properties of *Aloe vera* Linn-an overview. *International Journal of Pharmaceutical Sciences Review and Research*. 2010;4:106-110.

7. Pandey A and Singh S. *Aloe Vera: A systematic review of its industrial and ethno-medicinal efficacy*. *Int. J Pharm. Res. Allied Sci*. 2016;5:21-33.
8. Richard LW. *Aloe vera gel: Update for dentistry*. *Pharmacology Today*. 2005, 6-9.