



## EXTRACTION AND QUANTIFICATION OF HIGH MOLECULAR WEIGHT POLYSACCHARIDES FROM *Aloe vera*'s GEL

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**Introduction.** Composition of *Aloe vera*'s gel contains polysaccharides of different molecular weights reported as immunostimulating agents, most of whom have been identified as glucomannans, mannans (acetylated) and pectin. The pharmacological activities of the acemnananos include antiviral effects, induction of nitric oxide production, T-cell stimulation and activation of macrophages (1). In the Yucatan Peninsula, Mexico, crops of *Aloe barbadensis* Miller have been planted and perfectly adapted to the soil and climatic conditions of the area. Total production of *Aloe* in the Yucatan in 2007 was 3944.06 tons (2).

The aim of this study was to characterize the polysaccharide fractions present in the gel of *A. barbadensis* Miller from the Yucatan, to promote virtues of this plant and to give more value added.

**Methods** Fresh leaves were harvested from crops of *Aloe vera* in the Yucatan in two different seasons: the first in the months of August to September (rainy) and the second in the onths of March-April (drought). In order to obtain a juice, the *Aloe vera*'s gel was extracted and homogeneized in a blender. The total carbohydrate composition was assessed by using the Dubois method. The reducing sugar analysis was performed by following the DNS method. *Aloe vera*'s gel was filtered to remove coarse solids through a membrane of 0.2  $\mu$ m, and then passed throughout an Amicon® ultrafiltration device in order to obtain two fractions: the first one, containing compounds below 100 kDa, and the second one, containing compounds larger to 100 kDa. The second fraction was utilized to extract polysaccharides by the method of size exclusion chromatography (SEC). 80 fractions were evaluated by thin layer chromatography (TLC) using as eluant n-butanol-pyridine-water (6:4:3), and H<sub>2</sub>SO<sub>4</sub> and H<sub>2</sub>O (2:1) as the developer. In order to determine the content of polysaccharides in the extract of *Aloe vera*, the acemnanan was quantified by using a colorimetric assay (3)

**Results.** From every 100 g of *Aloe*, 4.27 g of gel is obtained which, contains polysaccharides with molecular weight higher to 100 kDa. The rain

water shortages caused an increase in the concentration of total and reducing sugars in both fractions. Analysis by thin layer chromatography of the fractions obtained by SEC showed a compound in the fractions 28, 30 and 32. Since the type and molecular size of the polysaccharide isolated from the *Aloe* gel seems to be very different, the obtained fractions were pooled with compounds of molecular weight above to 200 kDa. (4) The quantification of acemnanan by the colorimetric method of the samples harvested during the rain shortage, showed an increases in almost twice of the acemnanan concentration when compared to samples of the rainy season. The fraction of high molecular weight showed concentrations of acemnanan of 106.03 ppm and 99.97 ppm for the dry and rainy seasons, respectively.

**Conclusions.** It was possible to develop and implement a methodology to extract and evaluate polysaccharides of higher molecular weight present in the gel of *A. barbadensis* Miller during the dry season. The analyzed fractions revealed the presence of a carbohydrate with high molecular weight (over 200 kDa) similar to acemnanan, and other compounds with lower molecular weight, between 17 and 47 kDa with two different compounds present. It was possible to quantify the concentration of acemnanan, which confirmed that the average molecular weight of acemnanan is high (up to two million of daltons).

### References

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