PRELIMINARY CHARACTERIZATION OF THE POLYPHENOLOXIDASE PRESENT IN THE GEL OF ALOE (*Aloe vera barbadensis* MILL)

José Aaron Tamayo, Gerardo Rivera-Muñoz, Sara Solís-Pereira,
Jorge Tello-Cetina y Jorge Tamayo
Instituto Tecnológico de Mérida, Departamento de Ingeniería Química y Bioquímica, Mérida, Yucatán, México C.P. 97118
jtamayin@hotmail.com

palabras clave: Browning reactions, polyphenol oxidase, Aloe.

Introduction. Aloe Vera for its medicinal properties has acquired great importance over the years, the multiple benefits have become one of the most popular natural alternative. Changes to color by oxidation is the main problem that presents the gel of aloe vera, for their extraction and stabilization. This is the possible limitation that prevents the increase of the supply in the market of this crop. The polyphenol oxidase is capable of catalyzing oxidation reactions of phenolic compounds in the presence of molecular oxygen and the presence of compounds oxidized by enzymes are precursors of Browning reactions that occur in the process of post-harvesting and mannipulation of fruits and vegetables. The objective of this study was to characterize and analyze the enzymatic kinetics of the polyphenol oxidase of the gel of aloe vera (Barbadensis Miller) in post-harvest processes using different substrates.

Methods. Aloe Vera samples was obtained from a plantation located in the municipality of Uman, Yucatan. Raw material was used for recovery juice and this was used for a fractional precipitation using ammonium sulphate at 20, 40, 60, and 80% of salt saturation. Total protein was measured by Bradford method [1], polyphenol oxidase activity was determined using the modified technique of Oktay [2]

Results. The affinity of the enzyme was evaluated by employees substrates, by having a very low miles indicated that there is a greater affinity to substrates. When we used the pyrogallol as substrate, one lower value in relation to the catechin and pirocatecol km was found, comparing these results with the collected by [3] of the PPO in different fruits it was noted a big difference in the results of the Km and higher values with respect to the PPO of Aloe gel concentrate vera.(Table. 1)

Table. 1 Km and Vmax in Aloe Vera gel treated with 40% of ammonium sulfate

Sustrate	Km (µM)	Vmax (µM)
Pirocatecol	1.28	0.344
Catequina	1.28	83.33
Pyrogallol	0.60	1.17

Conclusions. The PPO studied showed activity in a wide pH range and in a temperature range from 40 to 80 ° C, which can be useful in industrial processes that require high temperatures. The PPO of Aloe Vera also showed high affinity for the three substrates evaluated especially to the pyrogallol since the value of Km was very small with respect to the other substrates tested

References

1) Bradford, M. M. (1967). A rapid and sensitive method for the quantification of microgram quantities of protein utilizing the principle of protein dye binding. Anal. Biochem., 72, 248-254.

2) Oktay I., Kufrevioglu, Kocacaliskan, Sakiroglu H., (1995). Polyphenoloxidase from Amasya Apple. Journal of Food Science Vol. 60 No. 3 pp. 494-496.

3) Christiane Queiroz, María Lucía Méndez López, Eliane Fialho, and Vera Lucía Valente-Mezquita. (2008) Polyphenol Oxidase: Characteristics and Mechanisms of Browning Control. Food Reviews International, 24:361–375,