STUDY OF THE RESIDUE OBTAINED FROM THE PINEAPPLE INDUSTRIALIZATION PROCESS

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Introduction

Resources depletion and global warning have driven every industry to move toward a greener and more sustainable industry, one of these is to use more naturally abundant material, such as lignocellulose. Kengkhetkit et al., (2012) The use of lignocellulosic wastes in Mexico could make a great usage of pineapple (*Ananas,comusus*) because the canning industry generates waste from this fruit in an approximate amount of 701,746 metric tons (MT)[2] Ramos-Cassellis et al., 2014.

The international average yield is between 35 and 50% of the original weight, however, some companies have exceeded this level of utilization, reaching 60%. Pineapple products results from processing around 480 tons/m3 per week, this generates a total of 169 tons/m3 , which leads to a biological oxygen demand of 187 kg per year and 64 tons/m^3 of suspended solids per year .Larrauri et al ., 1997

Aim

The aim of this work was to reduce the lignin content in the residues generated by the pineapple processing industry (crown, peel and core) and to evaluate the modification in their structural properties and lignocellulosic content.

Methodology

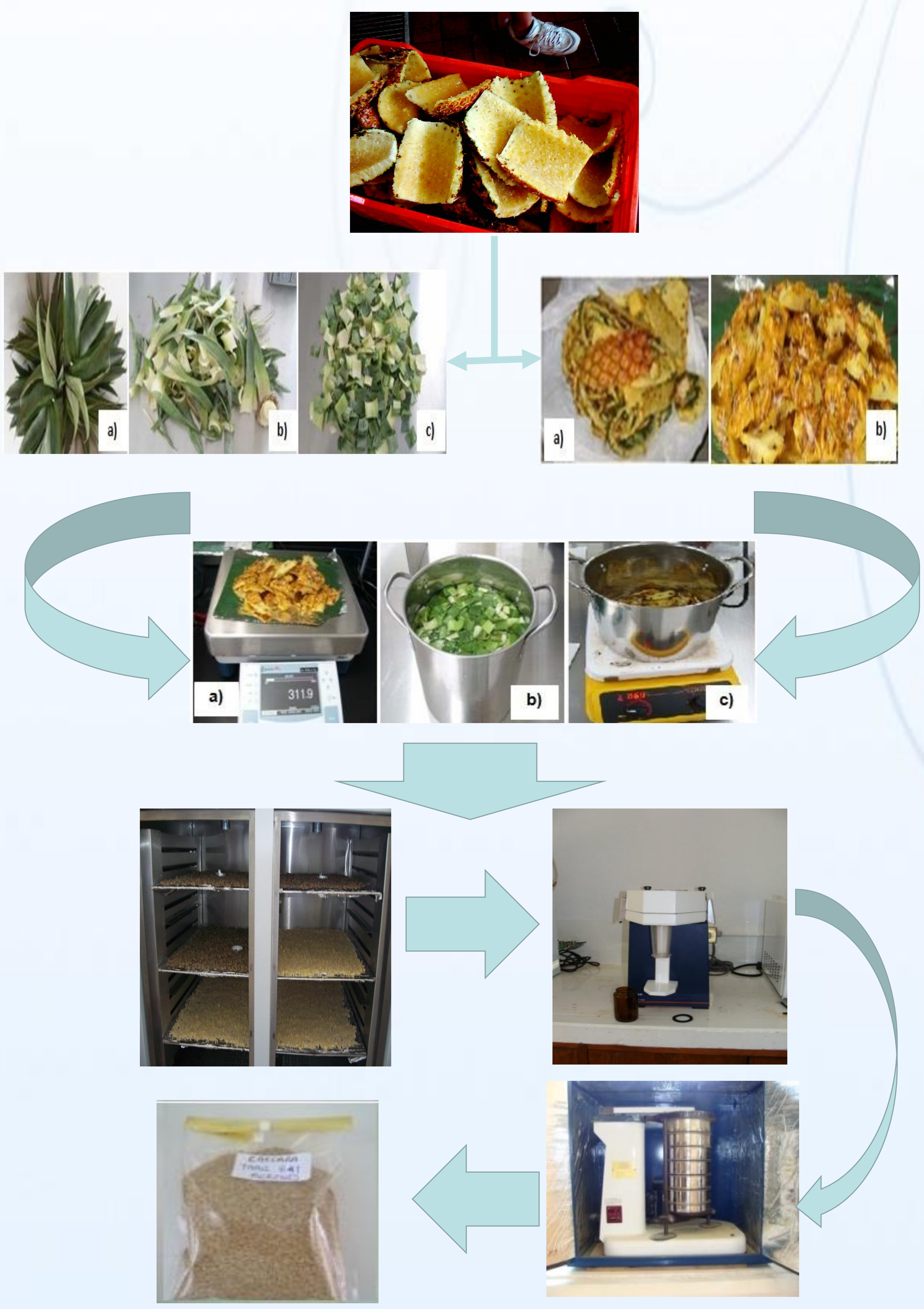


Figure 1. Waste treatment process

Results

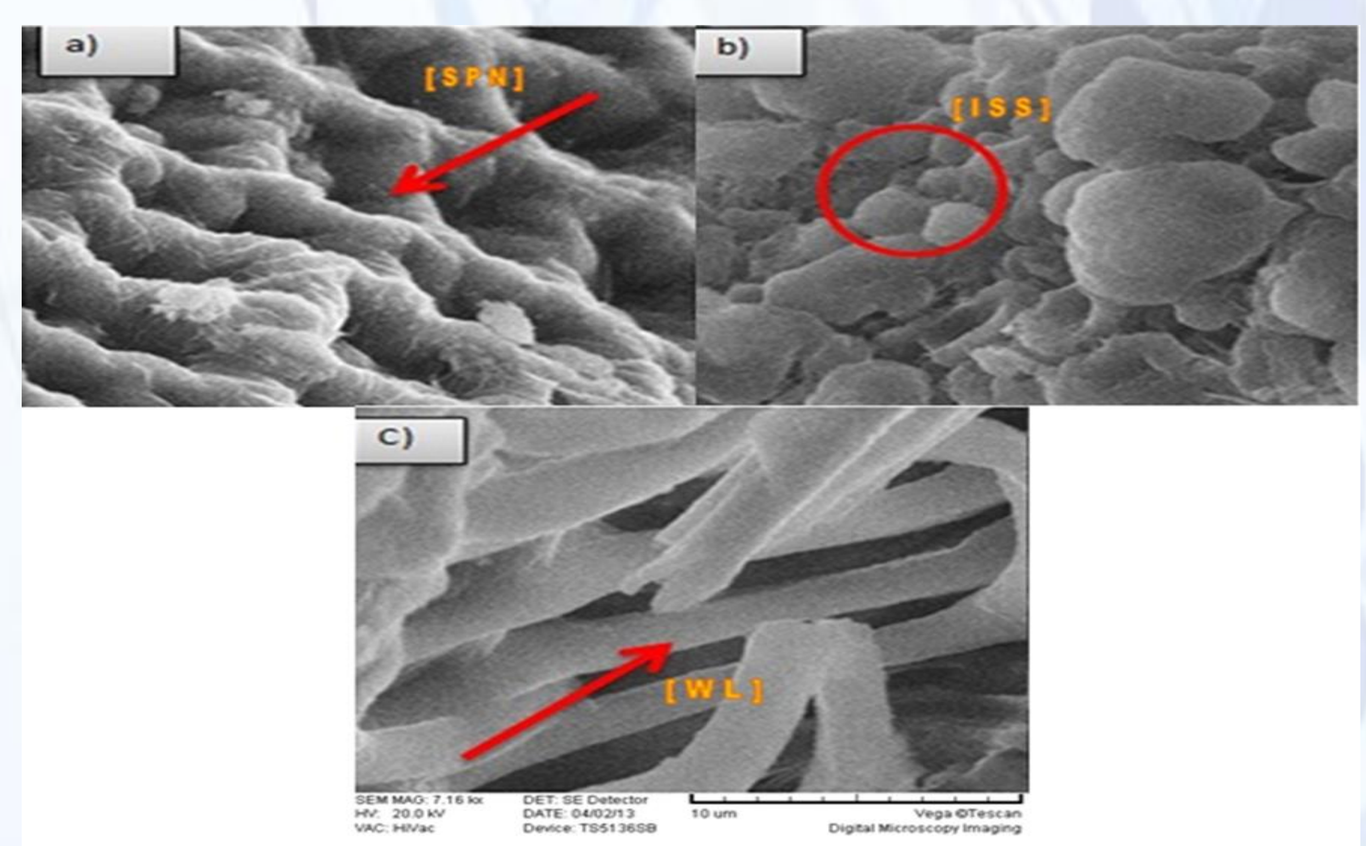
Figures 2a, 2b and 2c, show the leaf bract, shell, and core chemical hydrolysate morphology that were studied. It is shown that the fibers have xilica forms associated with gelatinous fibers constituting another tracheid fiber modification in the images. Partial delignification bonds between lignin and cellulose by alkaline treatment gives rise to cellulose products with high-holding water capacity, and thus an increased swelling or volume (Saxena et al. 2011).

Table 1

Part of the pinneapple	Lignin %	Hemicellulose %
Leaf bracts	8.9^{A} ± .3189	19.2^{A} ± .8320
shell	6.8^{B} ± .3189	17.5^{A} ± .8320
Mix	5.9^{C} ± .3189	15.2^{B} ± .8320
Core	3.3^{D} ± .3189	10.6^{C} ± .8320

Table 2

NaOH (%)	Lignin %	Hemicelullulose %
4.5	7.8^{A} ± .2762	22.0^{A} ± .7206
7.5	6.8^{B} ± .2762	14.3^{B} ± .7206
10	4.0^{C} ± .2762	10.5^{C} ± .7206



Conclusions

Alkaline pre-treatment performed at low temperature proved to be an effective approach to break ester linkages among cellulose, hemicellulose, and lignin polymers, avoiding hemicellulose fragmentation.

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Bibliography

[1] Atlas, R. Bartha. (2002). Ecología microbiana y microbiología ambiental. Cuarta Edición. Editorial Adisson Wesley. Madrid, España.
[2] Eun, Beauchemin, K.A, Hong, S.H., Bauer, M.W., (2006). Exogenous enzymesadded to untreated or ammoniated rice straw: effects on *in vitro* fermentationcharacteristics and degradability. Anim. Feed Sci. Technol. 131, 87–102.
[3] Ramírez, P. y Coha, J.(2003) "Degradación de celulosa por actinomicetos termófilos: aislamiento, caracterización y determinación de la actividad celulolítica". Rev. Peru.
[4] Ángel, Interián y Esparza, (2013). Manual de análisis de alimentos, fundamentos y técnicas. UNAM, México
[5] Sakata M., Ooshima H., Harano Y. Effects of Agitation on Enzymatic Saccharification of Cellulose. Biotechnology Letter. 7689-694, 1985.