Efecto del contenido de lignina sobre la acetilación de aserrín de madera de pino radiata

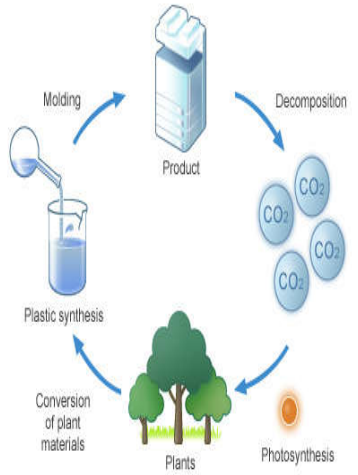
[1*]Miguel Pereira, [1]Karol Peredo, [1]Jorge Reyes, [1]Gustavo Solís y [2]Alex Berg.
[1]Departamento de Ingeniería Química, [2]Unidad de Desarrollo Tecnológico, Universidad de Concepción.

Contenido

- Introducción.
- Biopolímeros de madera.
- Metodología.
- Resultados.
- Conclusión.

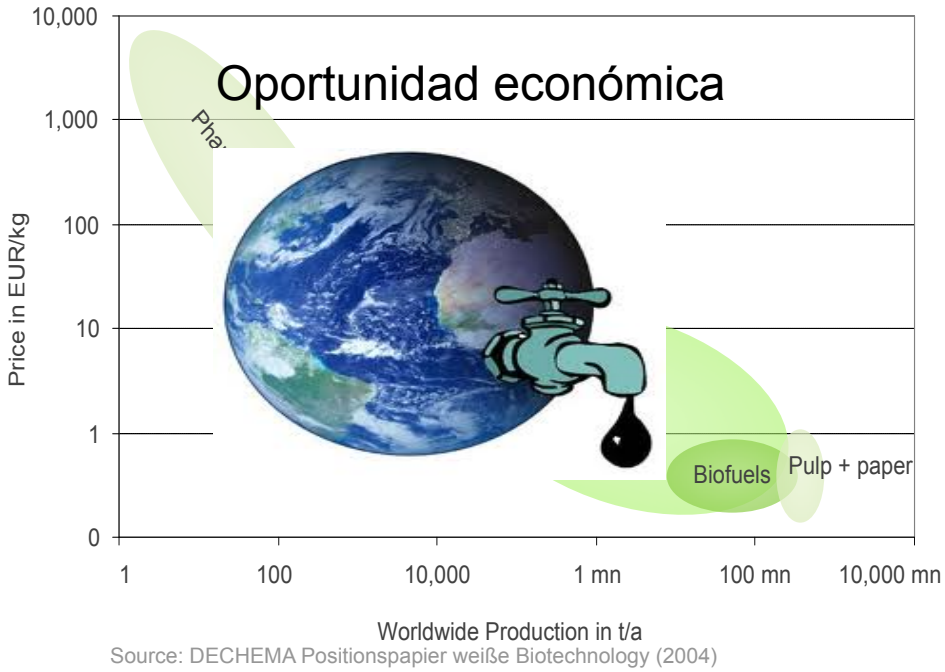
¿Por que producir plásticos desde biomasa?

Recursos renovable



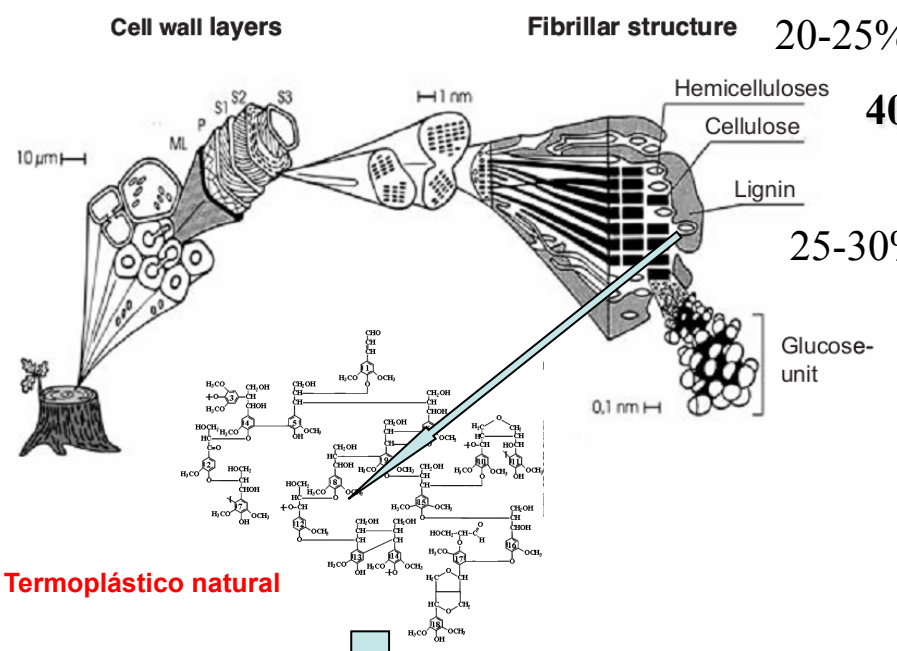
Bi ompostable

Desarrollo sustentable



Source: DECHEMA Positionspapier weiße Biotechnology (2004)

Madera



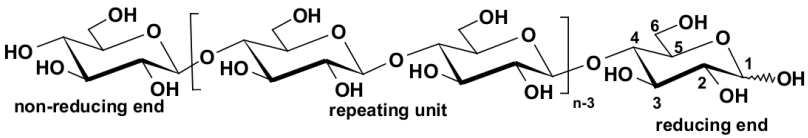
20-25%

40-45%

25-30%

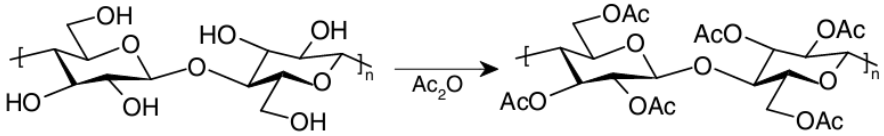
Termoplástico natural

Pulpa soluble
(celulosa ultra pura)



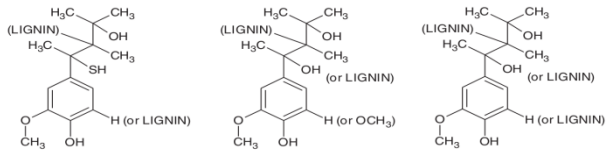
No termoplástico

Esterificación



termoplástico

Aislamiento



No termoplástico

Aplicaciones

Composites de acetato de celulosa y lignina

Lignin /lignina modificada

+

- Poliuretanos
- Polipropileno
- polietileno
- Acetato de celulosa

Acetatos de celulosa

+

- Fibras naturales: hemp, lana
- Polvo de madera
- Almidón

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Sci. Technol. Adv. Mater. **12** (2011) 045006 (16pp) — doi:10.1088/1468-6996/12/4/045006

Biopolymer-based nanocomposites: effect of lignin acetylation in cellulose triacetate films

Laura Alicia Manjarrez Nevárez[1], Lourdes Ballinas Casarrubias[2], Alain Celzard[3], Vanessa Fierro[3], Vinicio Torres Muñoz[2], Alejandro Camacho Davila[2], José Román Torres Lubian[4] and Guillermo González Sánchez[1]

A New Approach for the Production of Cellulose Acetate: Acetylation of Mechanical Pulp with Subsequent Isolation of Cellulose Acetate by Differential Solubility

D. G. BARKALOW, * R. M. ROWELL,† and R. A. YOUNG,
University of Wisconsin, Department of Forestry, 1630 Linden Drive, Madison, Wisconsin 53706, and USDA Forest Products Laboratory, 1 Gifford Pinchot Drive, Madison, Wisconsin, 53705

Producción de acetato de celulosa a partir de materias primas no convencionales

Composites: Part A 39 (2008) 1362–1369

Contents lists available

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Cellulose and cellulignin from sugarcane bag
composites: Effect of acetylation on mechan

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Carbohydrate Polymers 73 (2008) 74–82

Synthesis and characterization of cellulose acetate produced from recycled newspaper

Guimes Rodrigues Filho [a,*], Douglas Santos Monteiro [a], Carla da Silva Meireles [a], Rosana Maria Nascimento de Assunção [a], Daniel Alves Cerqueira [a], Hernane Silva Barud [b], Sidney J.L. Ribeiro [b], Younes Messadeq [b]

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[b] Instituto de Química da Universidade Estadual Paulista, Campus de Araraquara, SP, Brazil

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Carbohydrate Polymers 83 (2011) 339–345

Carbohydrate Polymers

www.elsevier.com/locate/carbpol

n of wood by reaction with vinyl acetate

Sèbe*

Wood Modification 2005

**Cellulose Triacetate Prepared fro
Dissolving Pulp and Its Insoluble
Mediums**

SHIRO SAKA, KEIKO TAKANASHI

Department of Socio-Environmental Energy Science, Graduate School of Energy Science, Kyoto University, Kyoto 606–01, Japan

Received 20 February 1997; accepted 16 June 1997

Cellulose **10:** 397–404, 2003.
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New process for producing cellulose acetate from wood in concentrated acetic acid

Hironori Sato, Yasumitsu Uraki*, Takao Kishimoto and Yoshihiro Sano

*Laboratory of Wood Science, Graduate School of Agriculture, Hokkaido University, North-9, West-9, Kita-ku, Sapporo 060–8589, Japan; *Author for correspondence (e-mail: uraki@for.agr.hokudai.ac.jp Phone: +81-11-706-2817; Fax: +81-11-716-0879)*

Received 4 June 2002; accepted in revised form 17 April 2003

osite made from acetylated cellulose acetate

Javad Torkaman

y of Guilan, P.O. Box 1144, Somehsara, Rasht, Iran
orkaman@yahoo.com

Carbohydrate Polymers

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Synthesis of cellulose acetate from cotton l

H.N. Cheng [a,*], Michael K. Dowd [a], G.W. Selling [b], Atanu

[a] Southern Regional Research Center, USDA/Agricultural Research Service, 1100 Robert E. Lee Blvd., New Orleans, LA 70124, USA
[b] Plant Polymer Research Unit, National Center for Agricultural Utilization Research, USDA/Agricultural Research Services, 1815 N. University Street, Peoria, IL 61604, USA

ydrate Polymers 76 (2009) 23–29

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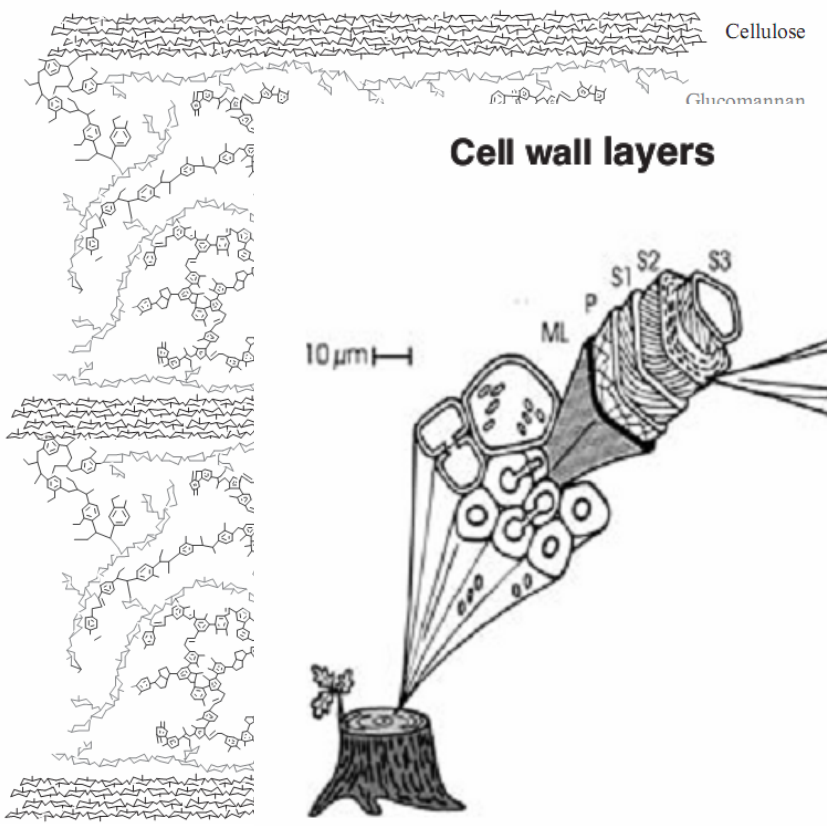
llulose for producing cellulose acetates:

Novel use of residual hemicellulose as plasticizer

Hamid M. Shaikh, Kiran V. Pandare, Greeshma Nair, Anjani J. Varma*

Polymer Science and Engineering Division, National Chemical Laboratory, Pune 411008, India

Composite Acetato de celulosa- Lignia



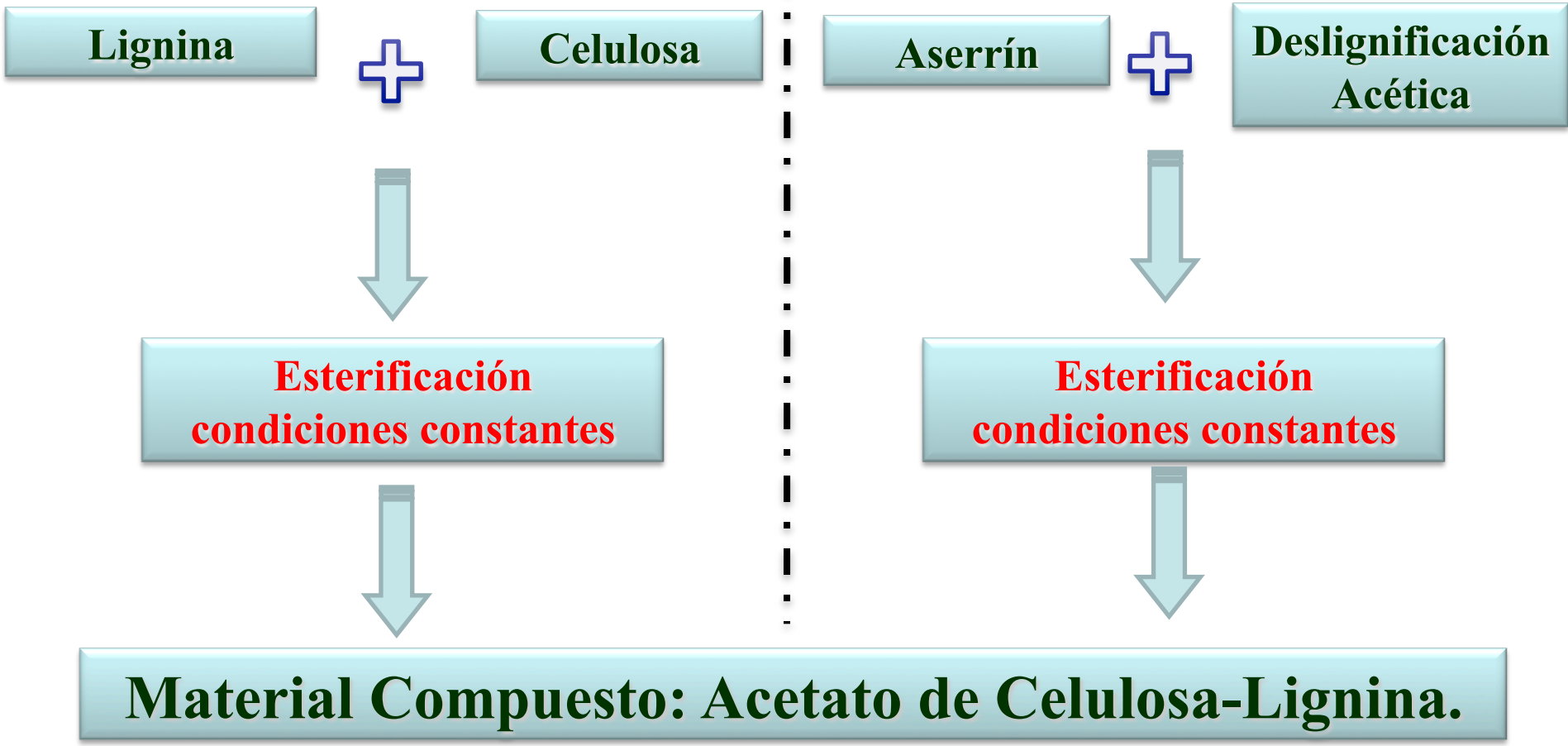
¿Accesibilidad de reactivos?

celulosa

lignina y

material

Aproximación a la comprensión del proceso de acetilación de biomasa.



Experimental

Lignina

0 %
5 %
10 %
15 %
20%
25%

Celulosa

Aserrín

Deslignificación

Esterificación
Condiciones constantes

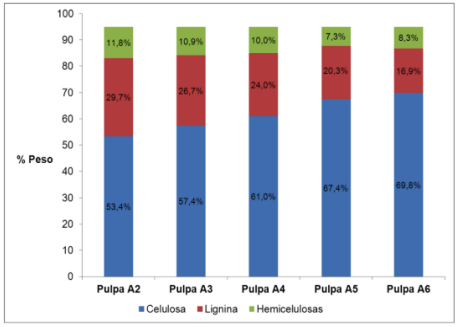
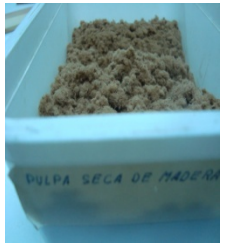


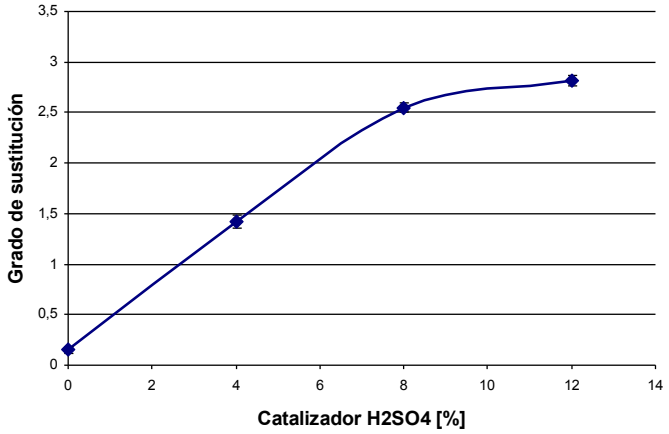
Figura 5.12: Composición Química de las pulpas A2, A3, A4, A5 y A6.

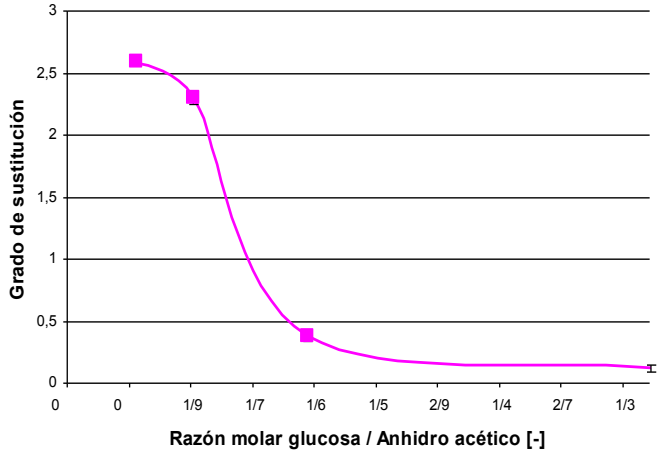


Pulpa

Resultados

Definición de condiciones acetilación

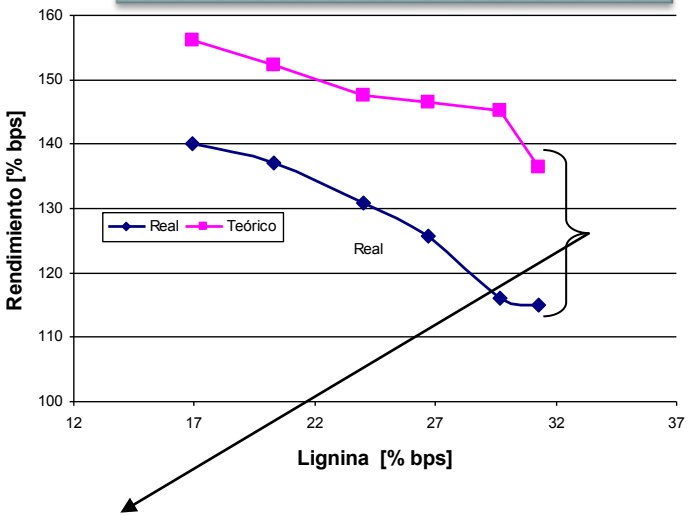




Razón Molar glucosa/Anhídrido acético	: 1/9
Catalizador	:10% bps
Temperatura	: 40ºC
Razón sólido/solvente	:1/5 p/v
Tiempo de reacción	: 1,5 Hr.

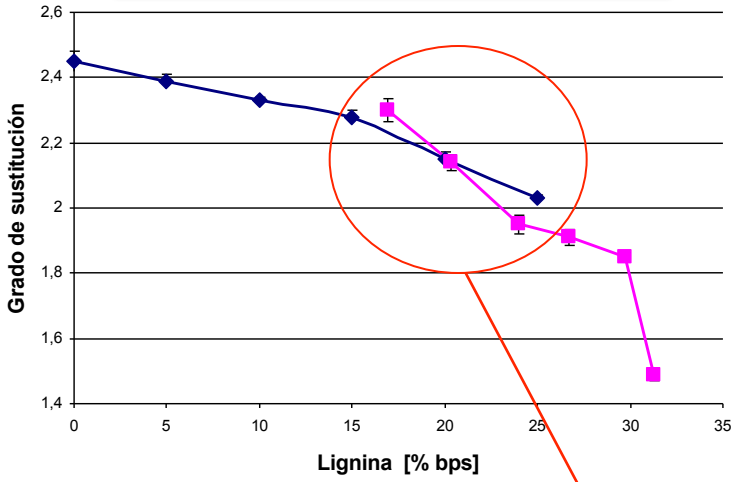
Resultados

Rendimiento



Material soluble o degradado durante la acetilación.

Grado de sustitución



La distribución de la lignina en la pared celular parece no tener gran influencia para concentración < a 20%.

Solubilidad

Aserrín deslignificado

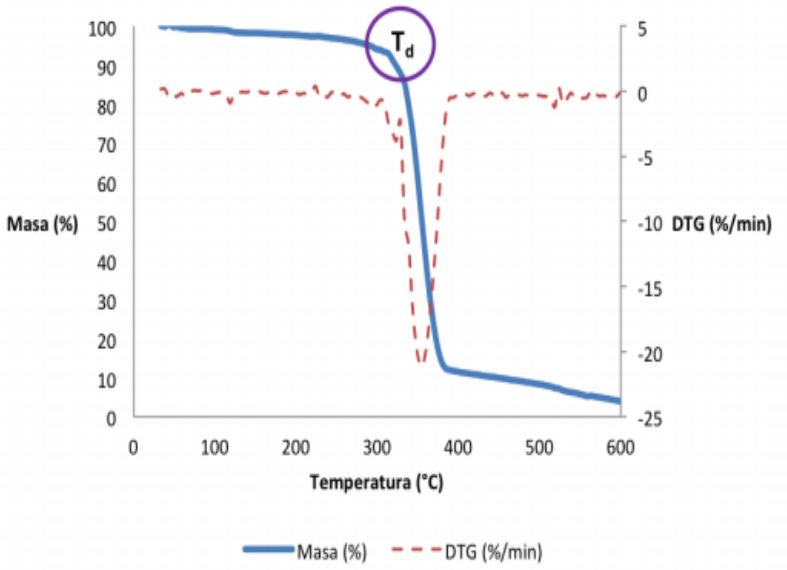
Lignina [%]	D.S.	Solubilidda en acetona	Solubilidad en cloroformo
16,9	2,3	88,6	Insoluble
20,3	2,1	73,8	Insoluble
24,0	2,0	51,3	Insoluble
26,7	1,9	40,2	Insoluble
29,7	1,9	Insoluble	Insoluble
31,3	1,6	Insoluble	Insoluble

Celulosa más lignina

Lignina [%]	D.S.	Solubilidda en acetona	Solubilidad en cloroformo
0,0	2,45	100	Insoluble
5,0	2,39	89	Insoluble
10,0	2,33	74	Insoluble
15,0	2,28	69	Insoluble
20,0	2,15	30	Insoluble
25,0	2,03	Insoluble	Insoluble

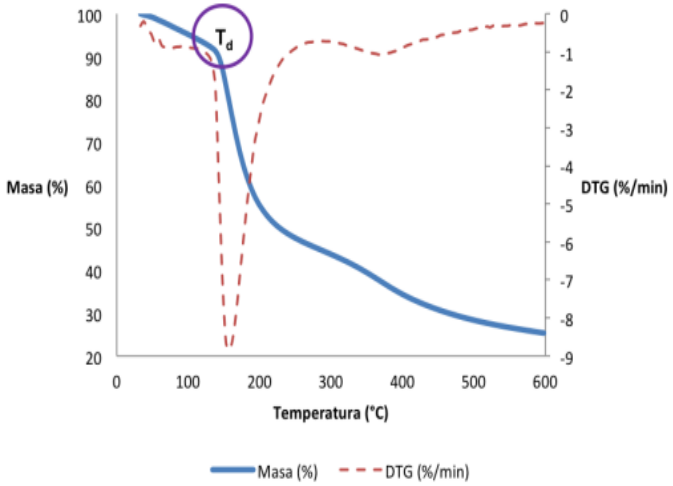
Resultados TGA

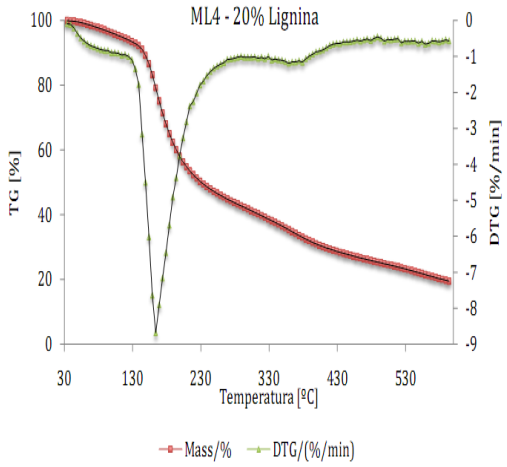
Algodón acetilado



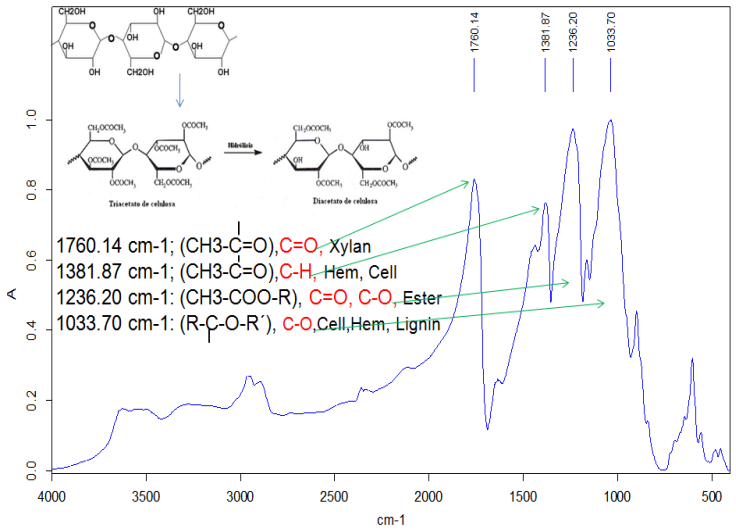
Muestra	GS	$T_d(°C)$	$T_{dm}(°C)$
A1	1.49	157.8	201.2
A2	1.85	134.6	164.9
A3	1.91	124.1	162.2
A5	1.95	118.6	158.6
A6	2.14	113.1	156.1
A7	2.30	169.3	349.4

20 % de lignina



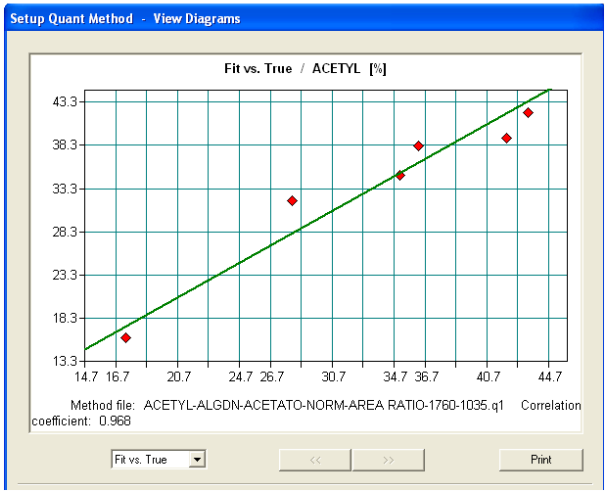


Resultados FTIR



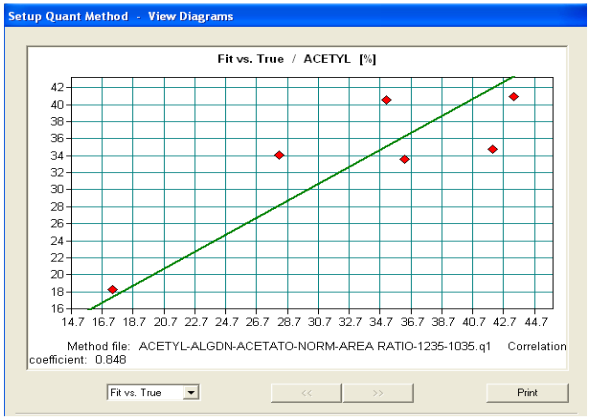
Algodón puro

CALIBRACION PEAK : Ratio Area : 1760 /1035 cm-1

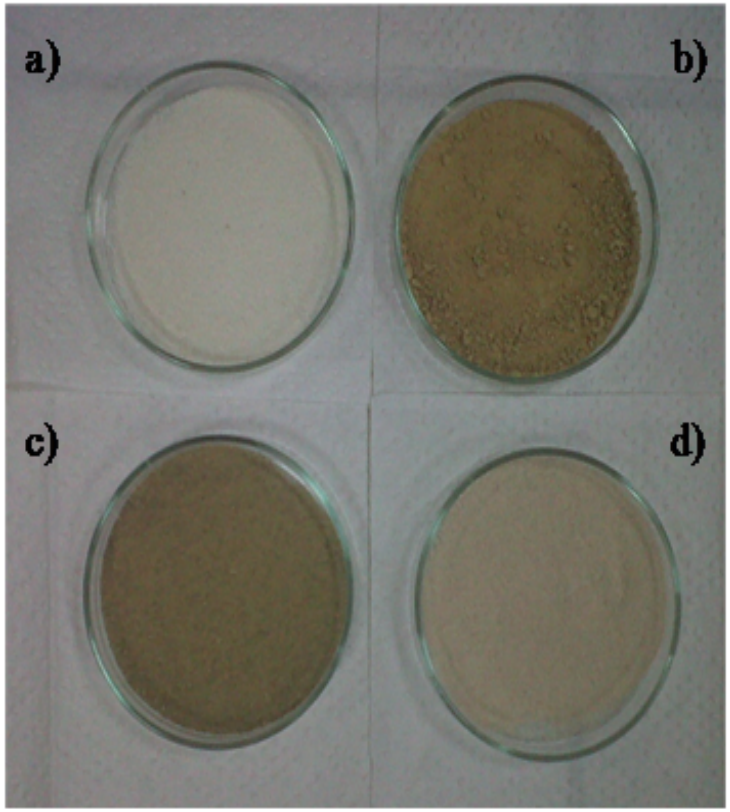


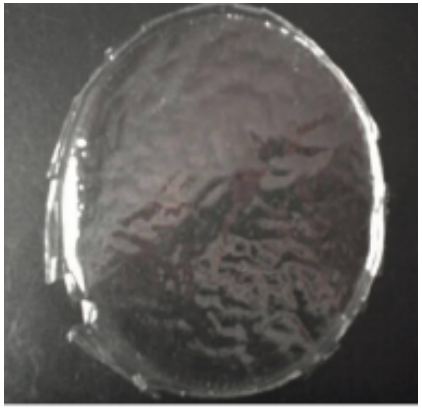
Celulosa-Lignina

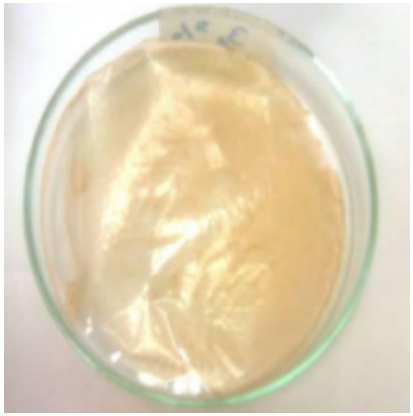
CALIBRACION PEAK : Ratio Area : 1760 /1035 cm-1

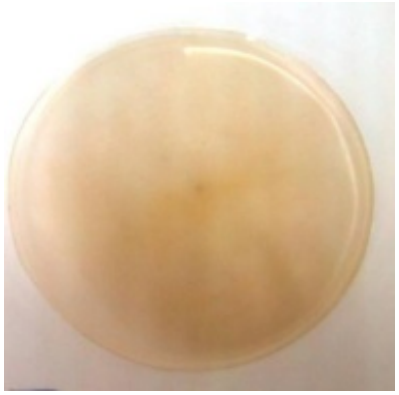


Resultados Casting









a) Acetato Comercial
b) Algodón + 15% Lignina

c) Aserrín tratado 16% lignina
d) Algodón acetilado

Conclusiones

- La acetilación de celulosa de aserrín de pino radiata en presencia de lignina favorería la obtención de un material compuesto con características termoplásticas.
- La presencia de lignina en el aserrín parece no limitar el proceso de acetilación por impedimentos del tipo estéricos.
- Se proyecta posible la obtención de un material termoplástico compuesto a base de acetato de celulosa desde pulpa de biomasa de baja pureza como el aserrín de pino radaita.

Efecto del contenido de lignina sobre la acetilación de aserrín de madera de pino radiata

[1*]Miguel Pereira, [1]Karol Peredo, [1]Jorge Reyes, [1]Gustavo Solís y [2]Alex Berg.
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