

Towards a sustainable biomass market

Hacia un mercado de la biomasa sostenible

Valladolid, October 21st, 2014
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Session I

"Advances in baling, storage, pelletization and torrefaction
to increase the competitiveness of bioenergy"

Sesion I

"Avances en el empacado, almacenado, peletizado y torrefacción
para aumentar la competitividad de la bioenergía"

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Session I

LogistEC storage experience

Experiencia de almacenamiento en LogistEC

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Renovables



- Content

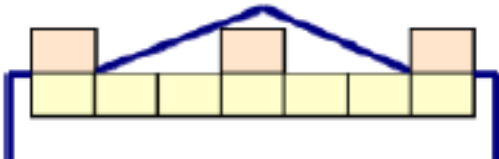
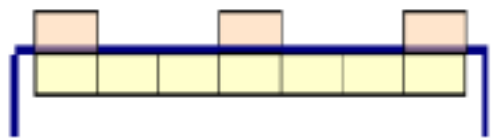

- Storage expertise in operation conditions of EC

- Triticale: Plastic cover vs indoor structures
 - Poplar: whole tree vs chips

- Tests with *new* biofuels

- New crops
 - Pre-treated feedstocks

- Different plastic cover alternatives

Configuración	Esquema	Pérdidas (%)
Referencia	n/a	12-14%
Plástico a dos aguas poniendo una fila de pacas en el centro de la pajera y pisando el plástico con pacas de paja en los orillos		2%
Plástico en cubierta plana pisándolo con pacas de paja en los extremos y en el centro de la pajera.		4%
Toldo en cubierta plana atado con cuerdas a las mismas pacas		2%

Plastic covers advantages and disadvantages

- Reduces raw material loses
- No very expensive
- Versatile: different solution according the storage configuration
- Difficult to built up the plastics cover
 - No wind
 - It is necessary a lorry with a crane
 - Risk of accidents
- Possibility of leak formation

- Indoor storage



- Weakness: cost, ...but if
 - Storage cost indoor: around 7 €/t
 - Save: 12% of the storage straw
 - Straw price: 55 €/t
- Then, *economically feasible*

- Grassy Biomass → Triticale. Start date: 7/05/2014
(Storage test currently in progress)

- Bales outdoor
- Bales outdoor cover by plastic
- Bales indoor
- Briquettes outdoor

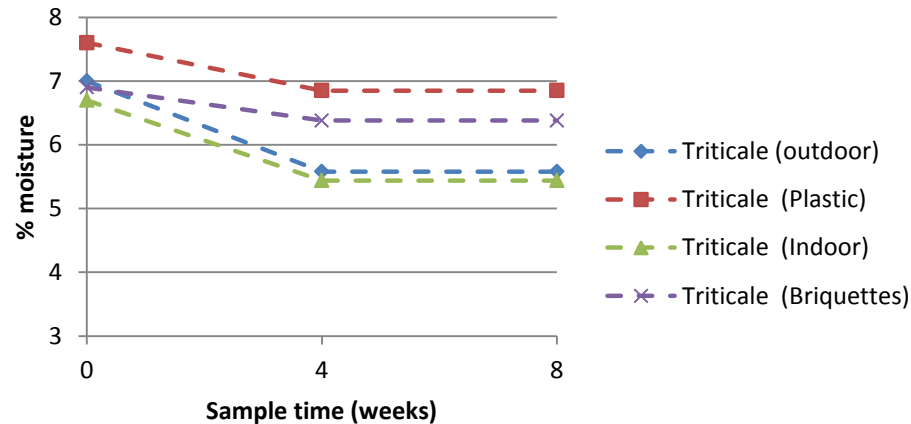


- Monthly Control : Weight NCV, Ash content, moisture content, elemental analysis.

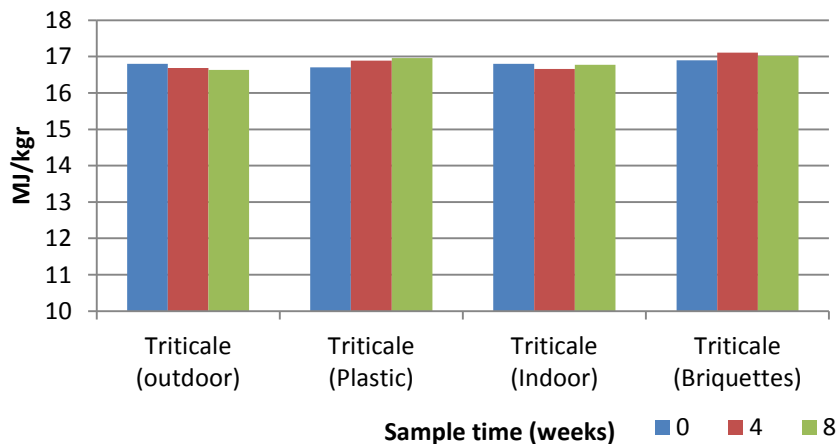
Sample description: 1 st control	% m/m-"aa"	d.m.	Heating Value d.m.	
	Moisture	% ash	PCS (MJ/kg)	PCI (MJ/kg)
Triticale (outdoor)	7,0	5,90	18,0	16,8
Triticale (Plastic)	7,6	5,30	18,0	16,7
Triticale (Indoor)	6,7	5,40	18,1	16,8
Triticale (Briquettes)	6,9	5,80	18,2	16,9

- Grassy Biomass → Triticale. Start date: 7/05/2014

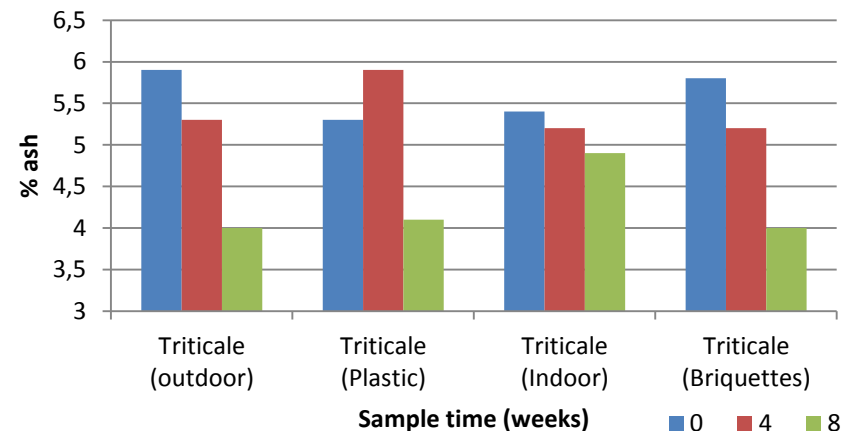
Moisture evolution



NCV (MJ/kg)



Ash



- Grassy Biomass → Triticale. Start date: 7/05/2014
(Storage test currently in progress)
 - October 2014: Clear degradation of the outdoor bale
 - 485 l/m²



- Grassy Biomass → Triticale. Start date: 7/05/2014
(Storage test currently in progress)
 - Triticale briquettes



51 days/ 198 l/m²



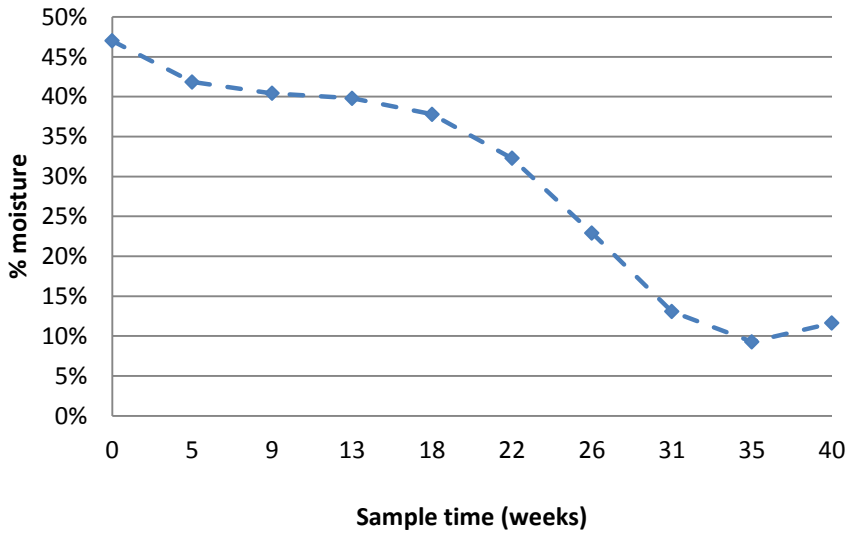
• Poplar storage

- Objective : compare different storage systems
 - Staked Logs
 - Pile of chips
- Storage during 2014
 - Storage demonstration: **whole poplar logs stacked**
 - Storage place: a plot near the plant, over a soil floor
 - Storage demonstration beginning on: 20/12/2013
 - Total biomass harvested: 239,8 t (47% moisture content)
 - The height of the poplars : 6 or 7 meters.
 - Diameter minimum of 8-9 cm up to a maximum of 12 to 13 cm.
 - Parameters controlled: Moisture, NCV and ash
 - *Pending task: Storage of poplar chips → 2015*



Length 70 m x width 10 m and Height 4m

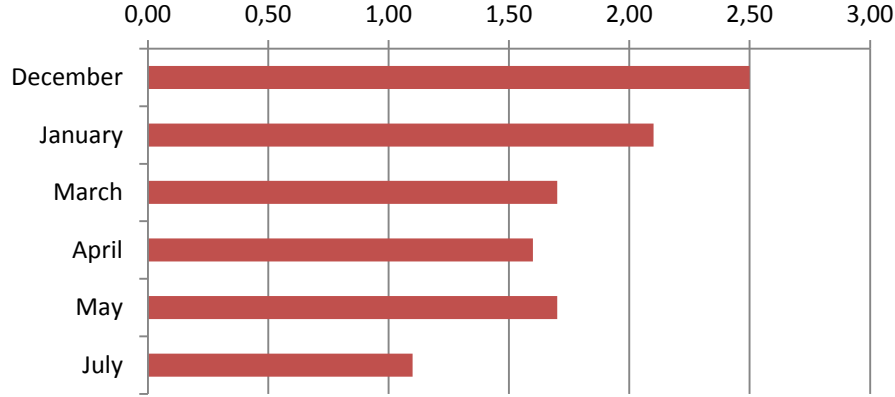
Poplar storage



NCV (MJ/kg d.m.)



% Ash



Small scale monitoring

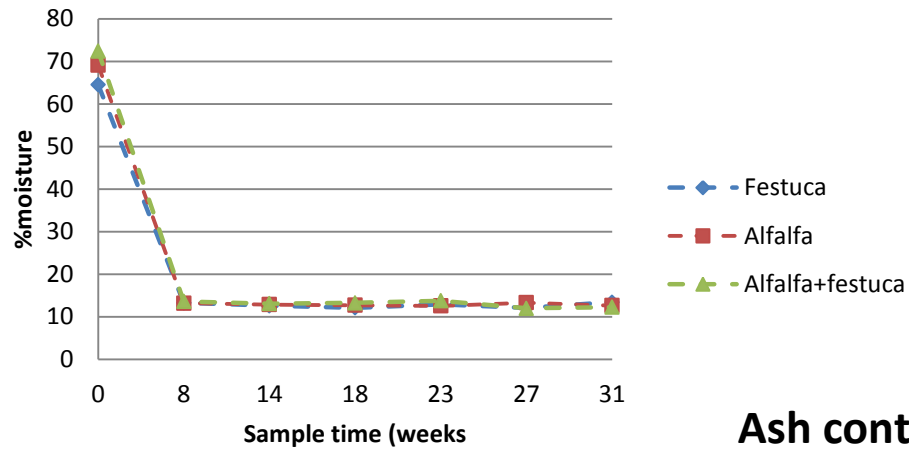
- Tests carried out in a climatic chamber:
 - Conditions: 12h → 22° C/ 55% H. 12 → 15°C/70% . During 6 months.
- 1st batch. Start date: 2/10/2013. End date: 29/04/2014
 - Festuca
 - Alfalfa
 - Alfalfa + festuca
- 2nd batch. Start date: 13/05/2014
 - Aroundo donax (Gigant Reed) torwash
 - Torrefied sorghum
 - Torrefied pellet from sorghum
 - Torrefied pellet from triticale
 - Sorghum briquettes



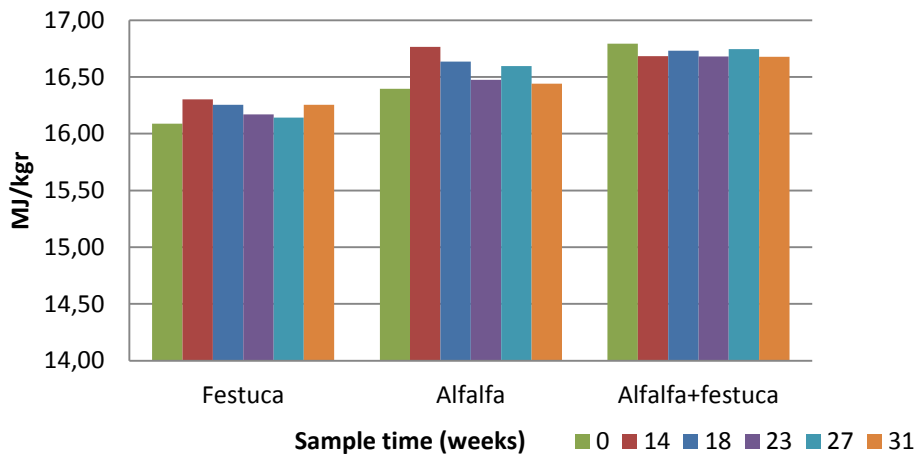
Small scale monitoring

- Results 1st batch

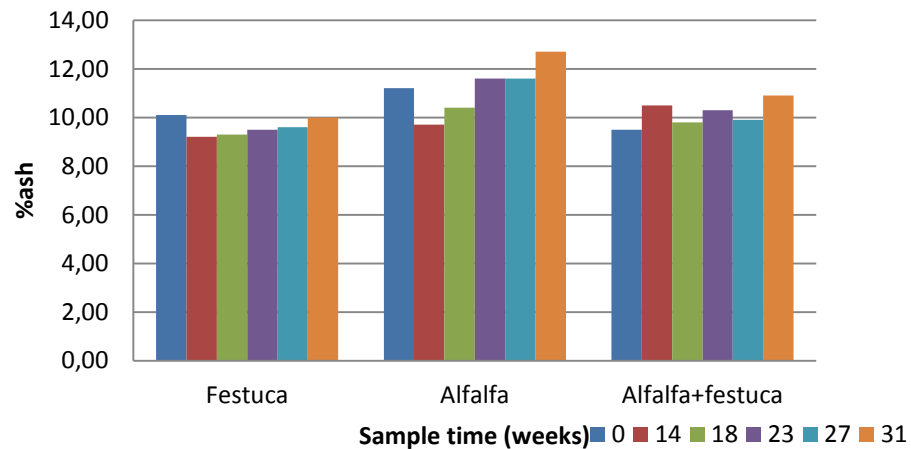
Moisture evolution



NCV



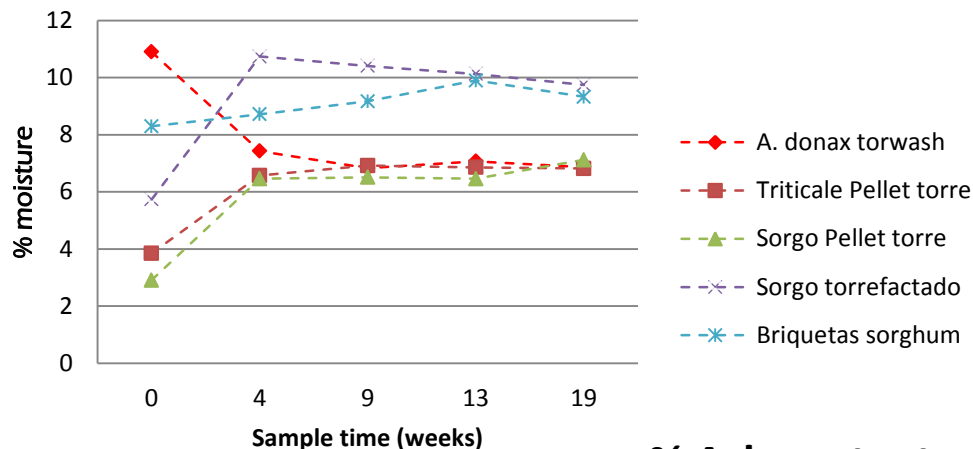
Ash content



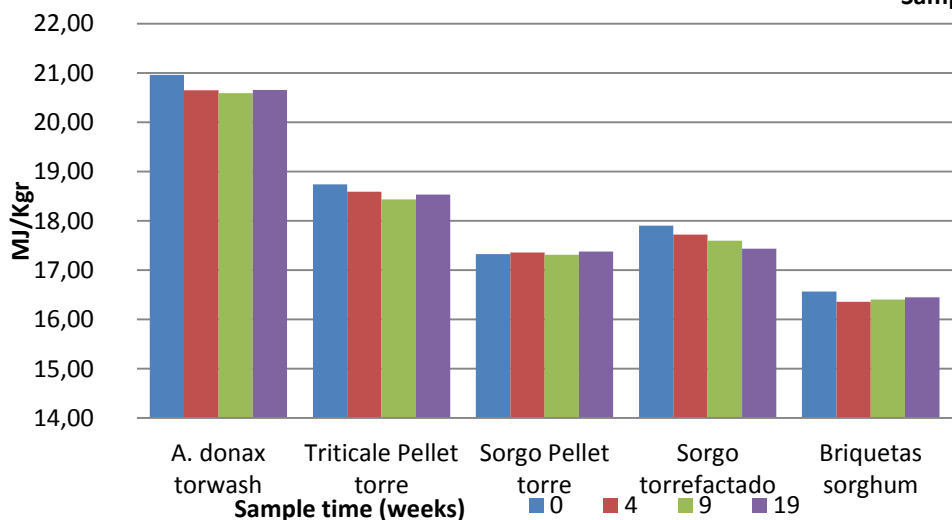
Small scale monitoring

- Results 2nd batch

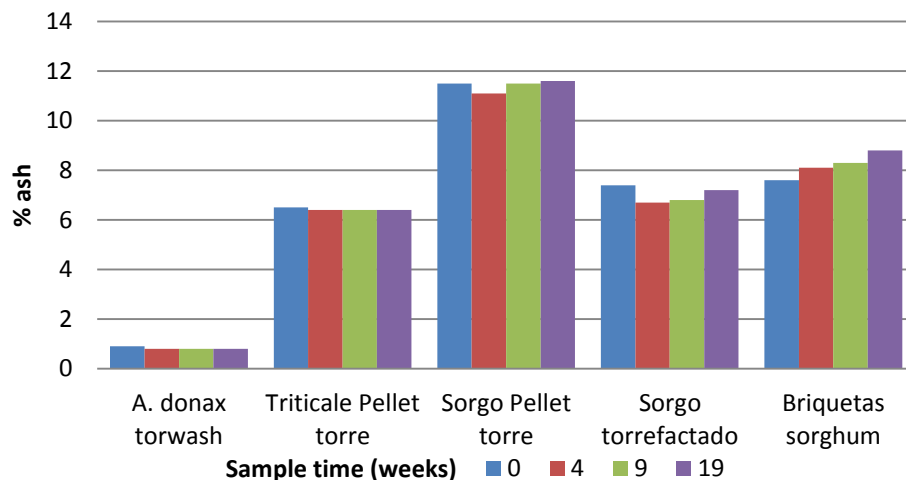
Moisture evolution



NHV (MJ/kg)



% Ash content



Thank you! : Gracias

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