TEST REPORT

Client: IN VITRO, S.L **REF:** 2012-58

Sample: Paulownia clone in vitro 112

Laboratory receipt date: November 2012

Lab Code: MS-434

Tests performed: Humidity, bulk density, immediate analysis, elemental analysis, calorific content of minor elements in ash, fusibility

Observations:

	Dry base	Wet Base		Units
Humidity EN 14774-1		20	30	mass %
Bulk density **EN** 15103		167.51		Kg/m^3
Immediate analysis				
Ash content EN 14775	1.29	1.03	0.90	mass %
Volatile contant EN 15148	82.79	66.23	57.96	mass %
Fixed carbon EN 15148	15.92	12.73	11.14	mass %
Elemental analysis				
Carbon EN 15104	50.80	40.64	35.56	mass %
Hydrogen EN 15104	5.61	6.72	7.28	mass %
Nitrogen EN 15104	0.26	0.20	0.18	mass %
Sulfur EN 15104	0.001	0.000	0.000	mass %
Chlorine **EN 15289**	0.01	0.01	0.01	mass %
Oxygen (Calculado por diferencia)	42.04	51.39	56.07	mass %
Gross calorific value (PCS_v) UNE 164001	19.47	15.58	13.63	MJ/kg
Net calorific value (PCI_v) UNE 164001	18.25	14.11	12.04	MJ/kg

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Major elements in ash 550ºC		
	Dry base	**Units**
Al_2O_3	1.95	**mass %**
MnO	0.04	**mass %**
CaO	11.80	**mass %**
Fe_2O_3	2.96	**mass %**
K_2O	22.74	**mass %**
MgO	3.10	**mass %**
Na_2O	0.25	**mass %**
P_2O_5	2.02	**mass %**
SiO_2	0.76	**mass %**
Fusion temperatures of the ashes (ANNEX I)		
	Temperature	**Units**
Sintering	960	ºC
Sphere	-	ºC
Hemisphere	1120	ºC
Fusion	1130	ºC

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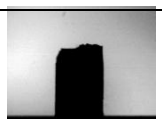
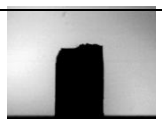
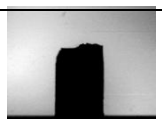
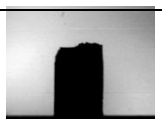
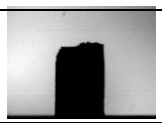
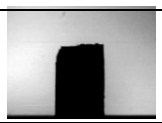
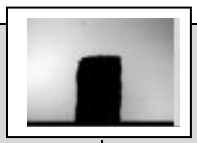
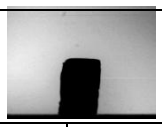
ANNEX I

Images ash fusibility test. Is noted that to highlight the temperature characteristics the temperature intervals between the images presented are not maintained always.

							
550 ºC	100.00 %	610 ºC	100.00 %	670 ºC	100.58 %	730 ºC	101.73 %
							
790 ºC	102.29 %	850 ºC	102.85 %	910 ºC	100.00 %	960 ºC	94.22 %
						SINTERIING	
							
1030 ºC	78.74 %	1120 ºC	46.56 %	1130 ºC	32.19 %	1210 ºC	0.00 %
		½ ESFERA		FUSIÓN			
Not reported (1)		Not reported (1)		Not reported (1)		Not reported (1)	
1270 ºC		1330 ºC		1390 ºC		1450 ºC	

NOTES:

(1) For the team security the test was terminated shortly after reaching the melting temperature, therefore not all the high temperature images were reported.

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Micropropagation of plantes

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ANALYSIS RESULTS INTERPRETATION PAULOWNIA IN VITRO 112 ® CLONE FOR BIOMASS

LOW ash content, good for fuel, classification ENPLUS-A1 (without bark), ENPLUS-A2 (with bark).

HIGH CALORIFIC VALUE, very good.

VERY LOW CHLORINE VALUE, important, because it is corrosive.

CARBON, NITROGEN AND SULPHUR EMISSIONS, low, very good.