BIOMASS PYROLYSIS IN A BUBBLING FLUIDIZED BED: EFFECT OF BIOMASS COMPOSITION AND REACTOR TEMPERATURE

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Flash pyrolysis of two types of woody biomass (Pine Wood, PW, and Green Wastes, GW) was carried out in a Bubbling Fluidized Bed of olivine particles between 700°C and 850°C. Experiments were conducted in a laboratory scale reactor (height of 2.5 m and internal diameter of 0.214 m) with continuous fuel feeding. Products distribution was determined through a global approach: incondensable gases yield were measured with an online microGC, condensable products yield, obtained by tar protocol, were quantified using GC-MS and Karl-Fischer titration and char yield was determined through high temperature combustion of the accumulated char at the end of each experiment. The results (*Figure 1 a)*) showed that the pyrolysis of green waste leads to higher amounts of condensable species (tars and water) and char compared to those obtained by the pyrolysis of pine wood. These results can be attributed to the high values of ash content as well as H/C and O/C molar ratios for green waste compared to pine (*Table 1*). In addition, GC-MS analysis of pyrolysis tars (*Figure 1 b)*) showed that BTEX compounds account for more than 70% in mass of the produced tars for both types of biomass. Furthermore, a drastic increase in incondensable gas yield (from 626 g/kg,daf to 726 g/kg,daf) as well as an important reduction in tar yield (from 129 g/kg,daf to 67 g/kg,daf) were observed when the pyrolysis temperature was increased from 700°C to 850°C.

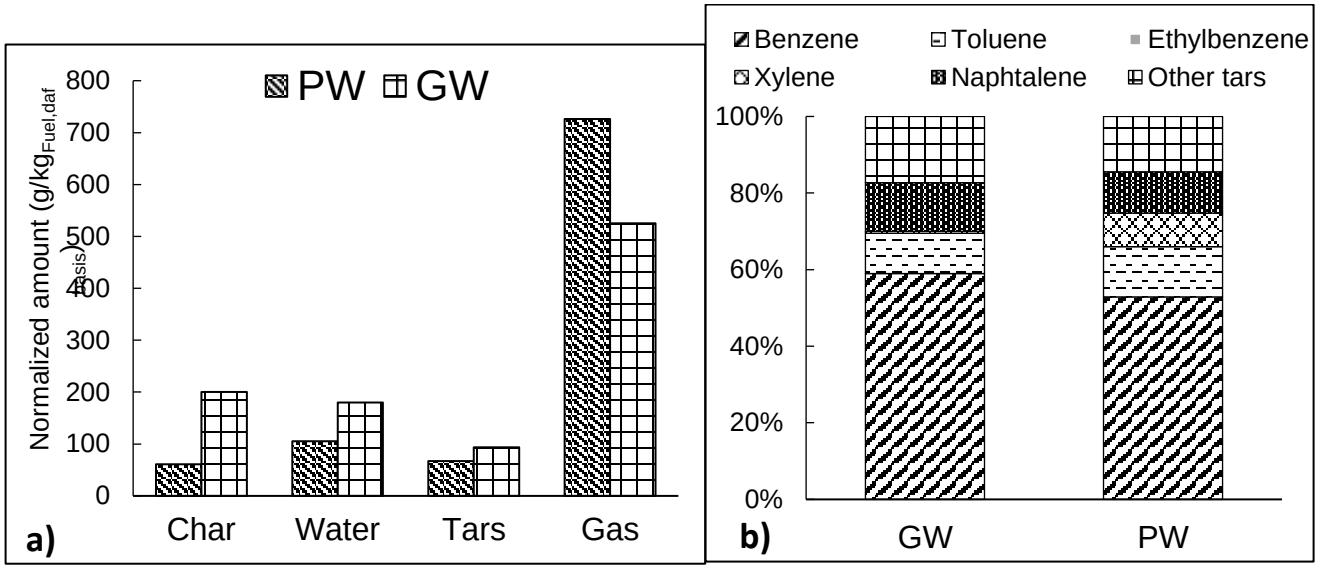

Figure 1 - Products distribution for pyrolysis at 850°C : a) Global products distribution b) Tars distribution

Table 1 - Woody biomass compositions

Fuel	Chemical composition (%m, daf basis)					Molar ratios		Moisture (%m)	Ash (%m)
	C	H	O	N	S	H/C	O/C		
PW	50.50	5.86	43.40	0.24	0.00	1.39	0.64	5.00	<1.00
GW	45.20	5.80	48.55	0.44	0.00	1.54	0.80	9.50	2.01