

## Pyrolysis Char Heating Values

Biomass	Condition for char	Char yield (%)	HHV (MJ/kg) of char
Cellulose	Packed bed pyrolyser At 773K (500 ° C)	11.1	32.4
Lignin		41.7	33.3
Xylan		20.7	32.3
Olive stone	Mobile bed furnace at 600 ° C for 2h	31.6	32.1
Wheat straw		33.0	24.4
Almonds shell		28.3	32.5
Pine sawdust		24.0	34.3
Hazelnut shell Including (%): Hemicellulose: 30.4 Cellulose: 26.8 Lignin: 42.8	22 to 227 ° C	43.2	28.6
	22 to 327 ° C	42.7	29.1
	22 to 427 ° C	41.3	29.8
	22 to 527 ° C	38.7	30.5
	22 to 727 ° C	31.9	31.3
	22 to 927 ° C	23.2	32.0
Pine bark ( <i>pinus brutia</i> Ten.)	450 ° C, 40 ° C/40 min	44.50	30.7
Cotton straw and stalk	550 ° C		21.4
Rapeseed cake	500 ° C, 7 ° C/min	27.4	25.3
Pine cone	500 ° C	36.6	27.4

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## Pyrolysis Oil Heating Values

<b>Biomass</b>	<b>Condition for Bio-Oil</b>	<b>Oil yield (%)</b>	<b>HHV (MJ/kg) of Oil</b>
Acacia	500 ° C		25.0
Maple oak (5.4%)	525 ° C		21
Rice straw	412 ° C		17.3
Sesame stalk	550 ° C	37.2	27.0
Rapeseed	500 ° C	46.0	38.4
Olive bagasse	500 ° C	34.4	31.8
Almond shell	400 ° C	53.1	14.1
Softwood bark	500 ° C	20	32.4
Softwood		75.0	20.0
Fir			22.2
Pine/spruce			16.6
Hardwood		70-75	17.5
Sunflower oil cake	550 ° C	48.69	32.2
Sugar cane bagasse	450 ° C		20.0
Switchgrass	480 ° C	43	23.6
Corn stover	503 ° C	70	24.3
Alfalfa stems	483 ° C	41	30.6
Corn Stalk	500 ° C		29.7
Pine bark ( <i>pinus brutia</i> Ten.)	450 ° C, 40 ° C/40 min	33.25	31.0

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