

Dedicated energy crops are plants grown specifically for their energetic value. Lignocellulosic energy crops can be either herbaceous (e.g. miscanthus) or woody (eg. willow, poplar). Adaptable to a wide range of climate and soil conditions, they can be successfully grown on lands not ecologically suited for conventional farming practices, while delivering several ecosystem services. The genus *Miscanthus* comprises around 17 species of perennial non-wood rhizomatous tall grasses native to subtropical and tropical regions originating from Asia. The main characteristics of are its exceptional adaptability to different climates, the feasibility for cultivation on poor quality soils, the high dry matter yields and the extraordinary disease and pest resistance.



Miscanthus can either be mowed and **baled**, or it can be **chipped** during harvesting using forage harvesters (as used for maize). If desired, miscanthus biomass can also be further upgraded to **pellets** or **briquettes**. For heating applications, miscanthus is mostly used either in whole bales or chopped.

Typical yields are approximately **10 t dry matter per hectare per annum**. To obtain the best biomass quality for use as a combustion fuel, miscanthus is normally harvested in spring (March or early April) after it has had time to dry in the field.

In 2016, it was estimated that approximately **20,000 ha of miscanthus** was being grown in Europe. Most of them were located in the United Kingdom, Germany, France, Austria, Switzerland and Poland.

In Europe, a large proportion of miscanthus is utilized for combustion to produce **heat and/or electricity**. It is used for direct firing of thermal power stations, in farm-scale boilers and in small-scale biomass burners. A market is also being developed for miscanthus pellet-fired heating boilers. Alternative uses due to its high water absorption capacity include use as **animal bedding** and production of **building and packaging materials**.

## Indicative fuel composition

Property	Units	Miscanthus*
Moisture content	w-% a.r.	15
Ash content	w-% d.b.	4.0
Net Calorific Value	MJ/kg a.r.	14.7
Bulk density	kg/m <sup>3</sup> a.r.	130 (chopped)
Energy density	MWh/m <sup>3</sup> a.r.	0.53 (chopped)
N	w-% d.b.	0.7
S	w-% d.b.	0.2
Cl	w-% d.b.	0.2
Ca	mg/kg d.b.	2000
K	mg/kg d.b.	7000
Na	mg/kg d.b.	70
Si	mg/kg d.b.	8000

a.r.: as received  
d.b.: dry base

\*Agrobiomass composition can vary significantly. The given values are only indicative of typical values for this type of agrobiomass. More information on the typical variation of miscanthus can be found in Annex B of EN 17225-1.

Image sources: miscanthus crop/miscanthus chips - [www.terravesta.com](http://www.terravesta.com), miscanthus bale - [www.miscancell.nl](http://www.miscancell.nl), miscanthus pellets/miscanthus briquettes - [www.biofuelmachines.com](http://www.biofuelmachines.com), miscanthus baler - DORAN GROUP ([www.youtube.com/watch?v=cM4AduluVMQ](http://www.youtube.com/watch?v=cM4AduluVMQ)), miscanthus harvester/chipper - [www.lter.kbs.msu.edu](http://www.lter.kbs.msu.edu)



Miscanthus baler



Miscanthus harvester / chipper



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Find out more about miscanthus heating and use cases, fuel suppliers etc. in AgroBioHeat's Agrobiomass Heating Observatory



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