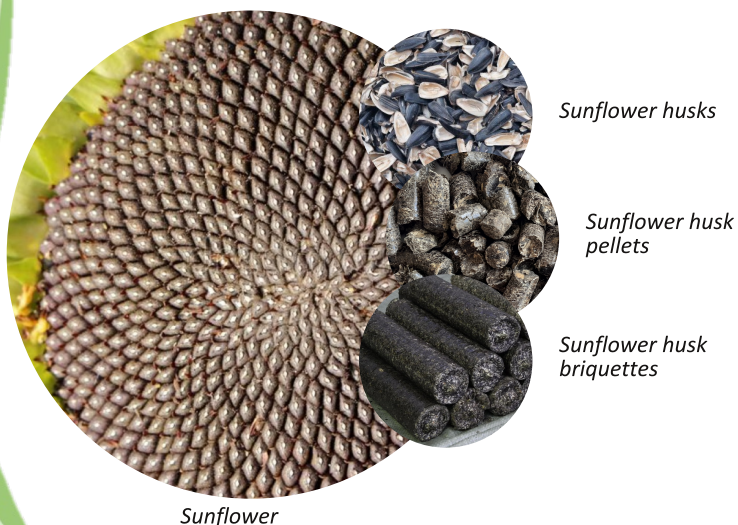


The sunflower is a herbaceous oilseed crop, that is cultivated in various countries for cooking oil, biodiesel, animal feed and confectionary. Among its advantages are its relatively short growth cycle, high resistance to drought and adaptation to different soil conditions. The top producer countries of sunflowers are the Russian Federation, Ukraine, the European Union (mostly Romania and Bulgaria) and Argentina, which produce roughly half of the world's sunflower seed production and over 60% of sunflower oil production.

Sunflower husks are a by-product of the sunflower oil extraction process and can be found in big quantities in sunflower oil factories.

The high energy content, low price and high energy density of sunflower husk pellets make them a very popular and widely marketed solid biofuel.



After separation from the seeds, the husks can be used as is (**granular form**) or be further upgraded to **pellets** or **briquettes**.

On the European continent, **18.07 million hectares** (70 % of the world surface) are cultivated with sunflowers, of which 16.31 million are in Eastern Countries like Russia, Ukraine, Moldova, Romania and Bulgaria.

Sunflower husks comprise approximately **20-30 %** of the total seed weight.

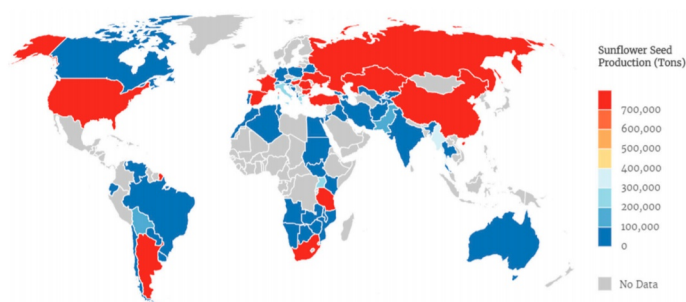
Sunflower husks are a popular industrial fuel for **heating** and/or **electricity production**.

Indicative fuel composition

Property	Units	Sunflower husk pellets*
Moisture content	w-% a.r.	10
Ash content	w-% d.b.	4.0
Net Calorific Value	MJ/kg a.r.	15.7
Bulk density	kg/m ³ a.r.	550
Energy density	MWh/m ³ a.r.	2.40
N	w-% d.b.	0.8
S	w-% d.b.	0.1
Cl	w-% d.b.	0.06
Ca	mg/kg d.b.	5000
K	mg/kg d.b.	11000
Na	mg/kg d.b.	50
Si	mg/kg d.b.	600

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

Image sources: sunflower - www.dreamstime.com, sunflower husks - www.plodogorod.com, sunflower husk pellets - CERTH, sunflower husk briquettes - www.prom.ua, map - Perea-Moreno, M. A., Manzano-Agugliaro, F., & Perea-Moreno, A. J. (2018). Sustainable energy based on sunflower seed husk boiler for residential buildings. Sustainability (Switzerland), 10(10).



Worldwide sunflower seed production (2016)

*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 sunflower husks can be found in Annex B of EN 17225-1.

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



SCAN ME



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 818369. This document reflects only the author's view. The Innovation and Networks Executive Agency (INEA) is not responsible for any use that may be made of the information it contains.