

Biolake BV has been established by ATO together with five entrepreneurs in the North of North-Holland. BioLake processes particularly dry organic material as residues from agricultural activities to biofuel by means of the torrefaction technology.

These residuals are available in large quantities and so far did not have a useful application. These materials have a relatively high calorific value, but are difficult to process in the form in which they become available. By processing it into so called pellets the heating value both by weight and particularly by volume increase substantially. The pellets will readily burn in state-of-the-art pellet burners.

Pellets are already widely produced from wood waste in countries where saw dust is produced as a side product in the timber industry. They are actually tiny fuel briquettes from about 6 to 8 millimeters thick and 2 to 3 centimeters long, but can also be pressed into larger briquettes, depending on the application. Opposite to raw biomass chips, or agricultural waste the pellets have high hydrophobicity and good flow properties.

A disadvantage of the pellets is that an extra step is required to produce them. This is done in industrial presses in which a heavy wheel presses the material through a screen with holes. Due to the increase in temperature the biomass will, to some extent, become sticky and give rise to the strength of the pellets.



The boilers in which these pellets are burned have also been improved. The pellets are stored in a hopper next to the boiler such that a mechanical mechanism regulates transfer to the firing location. The ashes are also removed automatically. In countries like Austria and Scandinavia already many households use this new system.

So far, wood is the main feedstock material, but also other feedstock materials are getting an increasing interest.

Fuels such as straw and hay can, if they are grinded into small particles, be processed into pellets. The grinding is, however, an expensive addition to the fuel production step, as the starting material has a fibrous structure. Another disadvantage of pellets of non torrefied wood is, that it is moisture sensitive. Moist pellets disintegrate almost to the original sawdust.

Torrefaction is already a well-known process to make wood and wood-based materials sufficiently brittle that they can be pulverized. This process involves a temperature treatment between 200 to 350°C for several minutes.

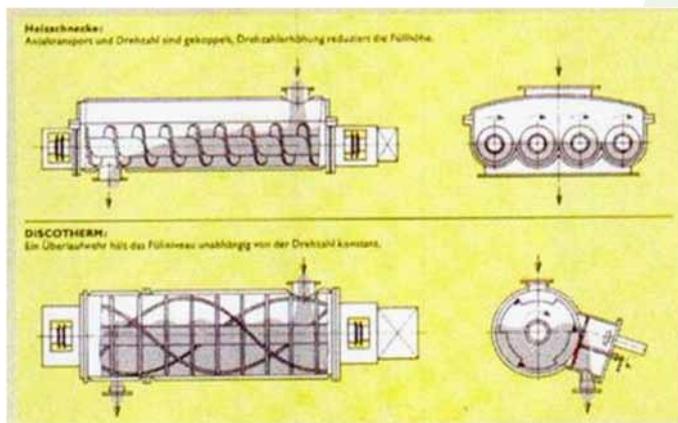
BioLake is currently focused on combining the torrefaction and pelletizing process with agricultural residues as input.

The envisaged production machine is based on existing technology in the feed and fodder industry, but has been developed for other products, same as the appropriate pellet production machines. For the

drying and torrefaction process we are relying on systems already extensively used in the ceramic or cement industry.

These heat treatment systems consist of a trough- type transfer systems through which the material is entrained by a screw conveyor. The troughs are heated from outside. Sometimes this is done electrically, but, as in our case, simply by burning the gas that is becoming available by the torrefaction process itself.

The two screw dryers operate at temperatures between 60 and 100°C in the low temperature section and between 110 and 160°C in the high temperature section. The torrefaction process operates between 260 and 350°C.



An important byproduct of torrefaction is a combustible gas which, inevitably, goes with some loss of material. This gas is burned in a boiler. The heat is supplied to the dryers and the torrefaction reactor. It has sufficient calorific value to combust it if the appropriate burners are applied. The total is enough to deliver heat to all the heat required components of the system.

Single unit



Two units including feeder

Market and technology studies have proven the feasibility of the concept, both economically and technically. A full production unit is being realized in the North of North-Holland and testing of the unit with several agricultural waste stream products is in progress.

The torrefied and pelletized material can be used for co firing in coal power plants, in wood stoves, by companies and individuals that need a lot of heat, but also in large heating systems including greenhouses, sporthalls, and swimming pools.