



A TMCP TECHNOLOGY (MIRACOIL SL 2017)

Over the recent years Municipal Solid Waste (MSW) management has been fast evolving from the conventional methods of landfilling, open-air burning, dumping in oceans, to more sophisticated methods. In recent years the enormous environmental and economical downsides of landfilling have reached the top of waste policy agenda and alternatives are being sought to minimise landfilling, where policies tend towards zero-landfill and circular economy development. Similarly treating MSW through incinerators which generate energy have proven to be seriously damaging to human health as carcinogenic dioxins are not eliminated even when sophisticated and very expensive filters are deployed. **The challenge remains to develop techniques that are economical, easily replicable, avoid environmental pollution and risks to human health, and reduce carbon emissions, while promoting the circular economy in recovering the value from the waste.**

MIRACOIL commercialize a **patented new technology that is capable of converting several types of waste as feedstock into high-quality second-generation advanced biodiesel**. This technology is known as **Thermo-Mechanical Cracking Process (TMCP)**. TMCP technology pursues converting waste into a resource and thus, meeting the main environmental and social objectives of European Commission's Circular Economy package. The company's vision is aligned with environmental objectives to minimise waste generation, by avoiding landfilling and incineration, and secondly to convert waste into a resource, in this case a synthetic secondary fuel to substitute fossil fuels.

The TMCP is a clean, efficient and flexible technology that converts waste into a high quality synthetic biofuel; an alternative to the current linear production-consumption system, reintroducing waste in the economic cycle, treating it locally and extending its life-cycle. Thus, it contributes significantly to reduction of landfilling and encourages energy independence.

The key innovation of the TMCP system lies in **obtaining liquid hydrocarbons by cleavage of carbon and hydrogen molecules using various organic biomass waste feedstock materials**. This methodology efficiently addresses waste management, producing a high-quality biofuel, assimilable in its operational characteristics to fossil diesel. The main economical profit is the cost-effectiveness of the TMCP plant, together with the potential of becoming an eco-diesel fuel provider.





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When compared with competing solutions, TMCP is more profitable than competitive technologies that often have higher operational costs compared with the income they generate. TMCP's disruptive technology presents numerous advantages over other existing waste treatment and disposal systems. A TMCP's technology removes a broad range of waste (up to 85%) without the need to separate the input materials (except for glass, metal and recycled materials).

- The TMCP's investment cost is lower than most of competitors.
- Zero landfill. The sub-end products are not contaminated (inert solids with a possible destination for road fill, among others).
- Energy self-sufficient. TMCP's technology generates its own energy using between 20% and 30% of the generated final product for self-consumption (this percentage depends on the raw material used).
- The TMCP system is closed and pressurized, it requires minimal environmental controls, and does not require an air pollution permit. The combustion of gas through the steam and the flammable hydrocarbons is used to generate energy.
- It produces a high-quality synthetic diesel fuel that reduces pollutant emissions since it does not contain benzene or cycle-thin (e.g. automotive diesel).

Miracoil's TMCP plant, besides eliminating a high percentage of waste in a given area, can operate as a small local refinery to meet the consumption needs of their environment. In line with the EU circular economy package, Miracoil seeks to reintroduce waste in the economic cycle, as well as it results key in order to meet the renewable energy targets of 20% biofuels by 2020.

MIRACOIL has recently been granted a Project Climate award through the Spanish Ministry of Agriculture and Environment, which stands January 2016, and it is focused on the CO2 emission reduction rights (up to 3M € over 4 years), that will be accessible from 2018.

TMCP technology is fully patented and valid in 38 countries. Filing date of the patent: February 2, 2007; date of publication of the application: May 1, 2009. Publication number: 021. 2319 Spanish Patent and Trademark Office. International Classification: C10G1/00; C10G15/08; C10G3/00; C10G1/00; C10G15/00; C10G3/00.

