

# THE BALTIC BEACH WRACK THERMOCHEMICAL RECOVERY AND VALORIZATION ROUTES

*Valdis Bisters  
Maris Klavins  
Juris Kalviss*

*University of Latvia, Faculty of Geography and Earth Sciences*

## **Abstract**

Thermal gasification tests have been carried out using beach wrack collected at Vikegārd, North-Eastern Öland, in Lapmežciems, Ragaciems, Jaunkemeri and Bigauņciems, Riga Bay Latvia. Beach wrack gasification tests were performed on an innovative gasification plant for thermochemical reforming of various biodegradable wastes. The pilot installation consists of an extruder-type pyrolyzer/gasifier, a pyrolysis product separation chamber, a thermal cracker for gaseous pyrolysis products and a gas burning torch. The gasification process does not use air or oxygen as a gasification agent. The plant has an allothermal gasification process using an external heat source. The operating temperature of the extruder was set and automatically adjusted to 300-600° C. The primary reforming of the fuel into pyrolysis gas and coal is carried out in the extruder. The pyrolysis gas is fed to a secondary high temperature reformer where the pyrolysis gas is heated to 800-1200° C. At elevated temperature, high turbulence thermal tar cracking takes place and the heavy organic gaseous substances are reformed into the synthesis gas components H<sub>2</sub>, CO, CO<sub>2</sub> and CH<sub>4</sub>. Studied samples shown suitability for the production of biochar and gasification application for regeneration of the beach wrack material. Based on the experience gained during the gas waste gasification tests, it can be concluded that beach wrack as thermal treatment feedstock is suitable for use in gasification. Additional beach wrack thermogravimetric and proximate/ultimate analysis done at the laboratory scale experiments. Thermal analytics on thermal capacities of beach wrack undertaken on different type of samples to be common for the Baltic Sea area and projections on application of gasification technology for upscale at municipality level is analyzed with a view to application for municipality level beach wrack thermochemical regeneration upscale and application for remediation of acid soils and as carbon sink.

**Keywords:** Beach wrack, thermochemical reforming, gasification, tar cracking, biochar