

ANALYSIS OF PRODUCT DISTRIBUTION AND CHARACTERISTICS OF BIO-OIL AND BIOCHAR FROM FAST PYROLYSIS OF DATE PALM TREE WASTE

Yassir Makkawi, Paul Nancarrow, Ahmed El Sharkawy
Department of Chemical Engineering, American University of Sharjah, Sharjah, PO Box 26666, UAE

Tony Bridgwater, Scott Banks and Stuart Jones
European Bioenergy Research Institute (EBRI), Aston University, Birmingham, B4 7ET, UK

Key Words: Date palm tree waste; fast pyrolysis; fluidised bed reactor; bio-char; bio-oil

According to recent reports, there are more than 120 million date palm trees worldwide, with the estimated Middle East and North Africa combined share of more than 80%. Date palm trees produce huge amounts of waste amounting to 15-35 kg per tree per year. This represents a challenging environmental problem, since disposal is so far mainly based on landfill and uncontrolled combustion. This study presents experimental work on fast pyrolysis of a mixture of date palm tree waste (including stem, leaves and fruit bunch) in a 1 kg/h bubbling fluidised bed reactor. The results includes data on the feedstock analysis, composition of the produced bio-oil, biochar and gas, and detailed chemical and physical characteristics of the biochar and bio-oil. The results also include preliminary comparative analysis of the pyrolysis products from individual parts of the tree waste.

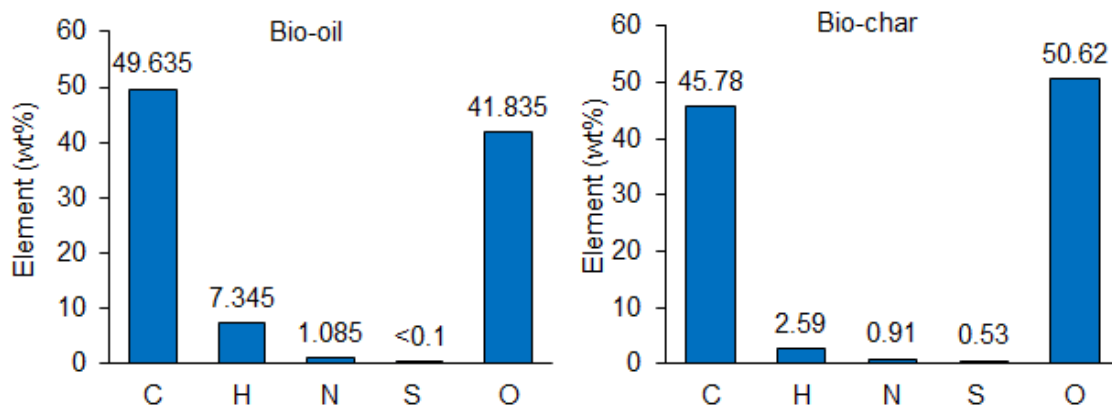


Figure 1 – Elemental composition of the bio-oil and biochar produced from a mixture of date palm tree waste