



“Gheorghe Asachi” Technical University of Iasi, Romania



PRELIMINARY ANALYSES ON AN ALGAE-BASED WATER SCRUBBER FOR SYNGAS CLEANSING

**Giulio Allesina¹, Simone Pedrazzi^{1*}, Meltem Altunoz^{2,3}, Nicolò Morselli¹, Marco Puglia¹,
Francesco Allegretti¹, Chiara Leonardi⁴, Loris Giorgini⁴, Laura Arru^{2,3}, Paolo Tartarini¹**

¹Department of Engineering, DIEF “Enzo Ferrari”, BEELab (Bio-Energy Efficiency Laboratory),
University of Modena and Reggio Emilia, Italy

²Department of Life Science, DSV, University of Modena and Reggio Emilia, Italy

³Interdepartment. Research Centre Biogest-Siteia, University of Modena and Reggio Emilia, Italy

⁴Department of Industrial Chemistry, DCI “Montanari”, University of Bologna, Italy

Abstract

Common issues of the gasification systems relate to filtering apparatus. Dry filtering processes are simple and reliable. However, the filtering material defines the maximum and minimum temperature at which the filter can operate properly. In addition, dry filtration is not effective on light tar compounds (i.e. benzene and toluene) or ammonia compounds. On the other hand, despite being very efficient, wet filters drop the gas temperature below the line of condensation of tar, ammonia and steam. The resulting condensate is normally disposed at a high cost on account of the high amount of hydrocarbons it contains. This work investigates the effects of a specific micro-algae growth on the waste-water from a syngas water scrubber. The results demonstrated the capability of the algal growth in the tar-contaminated water in which a certain amount of contaminants have been dissolved. Quantitative analyses of the compounds outlined the effect of algal growth on the reduction of several chemical species derived from the syngas filtration.

Key words: gasification, microalgae, Neochloris oleoabundans, syngas purification, water scrubber

Received: February, 2017; *Revised final:* July, 2017; *Accepted:* August, 2017

* Author to whom all correspondence should be addressed: e-mail: simone.pedrazzi@unimore.it