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Valorisation of By-products from Coffee Processing to Improve the Sustainability of the Coffee Value Chain in Vietnam

HUYEN CHAU DANG¹, JUDY LIBRA¹, MARCUS FISCHER¹, CLAUDIA GLASER², CHRISTINA DORNACK³

¹*Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB), Post Harvest Technology, Germany*

²*Brandenburg University of Technology, Processing technology, Germany*

³*Dresden University of Technology, Inst. of Waste Management and Circular Economy, Germany*

Abstract

Fulfilling the demand for high-quality agricultural products on the world market, while providing adequate income for farmers, is a challenge for many developing countries. In order to meet increasing worldwide quality standards, farming and processing practices often must be adapted. If the changes lead to intensification and centralisation in the agro-food value chains, traditional recycling pathways for agricultural residues between the field and processing can be disrupted, negatively impacting soil fertility, environmental and human health. Sustainable solutions for these by-products are required that exploit their valuable properties and create environmentally-sound products.

In the current project, CoffeeChar, a collaboration between Germany and Vietnam, coffee processing methods (wet and dry), their by-products, and disposal in Vietnam are being studied. The objective of the project is to develop innovative solutions for recycling wet solid by-products from 1) the wet-processing method for coffee berries, which is growing in importance to produce higher quality coffee beans and from 2) secondary processing of the coffee beans. The thermal conversion process, hydrothermal carbonisation (HTC), is being investigated for its potential to convert wet coffee by-products into carbon-rich material that can replace fossil fuel in coffee processing or households. In addition, the use of HTC can reduce the amount of solid waste treated in the (often overloaded) wastewater treatment plant of the factory. In this contribution, the results of the initial assessment of the status of coffee processing and by-products in Vietnam will be presented along with experimental results on the production of fuel pellets from HTC-char. Agglomeration and pelletizing experiments have been conducting to find out the optimal process for producing high-quality fuel pellets. The outcome of this project will support farmers and producers to improve the sustainability of the coffee value chain in Vietnam, and also provide a basis for its adaptation to other coffee production regions.

Keywords: Agglomeration, carbon-rich material, coffee by-products, coffee processing, coffee value chain, hydrothermal carbonisation (HTC), pelletizing, sustainability