



PhD Funding-Programme of BMEL

CoffeeChar: Valorization of by-products from wet coffee processing: Waste to carbon-rich material using hydrothermal carbonization to improve the sustainability of the coffee value chain in Vietnam

Country/countries	Vietnam
Funding agency	Federal Ministry of Food and Agriculture – BMEL
Project management agency	Federal Office for Agriculture and Food – BLE
Project coordinator	Leibniz Institute for Agricultural Engineering and Bioeconomy (ATB)
Project partner(s)	VN: Van Lang University, GreenMessage-Water & Environment Limited Company (Ho Chi Minh City); Phuoc An Coffee Company (Dak Lak) DE: Netzwerk Bayerischer Bauernverband, Maschinen und Betriebshilfsring Rhön-Grabfeld, Agrokraft GmbH und Artec GmbH
Project budget	145,505.56 €
Project duration	01.09.2019 – 31.08.2022
Thematic area	Agricultural sciences, global food security
Background	The current Vietnamese national strategy to improve the competitiveness of Vietnam's coffee exports proposes to improve the product quality of coffee. One measure is to change the processing method of the coffee cherries from dry to wet. While wet-processing can make farmers and the whole value chain less dependent on weather conditions, produce higher quality coffee beans

	<p>and potentially increase profits at each stage in the value chain, new challenges arise from the centralized production of large amounts of by-products in these plants. Moreover, water and energy consumption increase, and effective treatment processes for wet solids and wastewater are required.</p>																					
<p>Short description of project</p>	<p>The purpose of the proposed project is to develop new innovative solutions to valorize by-products in the coffee processing sector. The project explores the use of hydrothermal carbonization (HTC), to convert wet solid by-products at temperatures of 180–250 °C to carbon-rich materials (hydrochars) within a relatively short time (minutes to hours). The hydrochars can be combusted to generate heat and power. Since little knowledge on the solid and liquid by-products from the HTC of coffee berries exists, a central outcome of the proposed research will be evidence for the technical feasibility of integrating HTC in the wet-processing plant and its waste treatment facilities. The project will develop and assess alternative designs for process combinations based on these results, evaluating their impact on resource use and environmental emissions in coffee processing. In addition, the project will strengthen scientific cooperation between Vietnam and Germany by developing a collaboration framework for further research with the goal to implement innovative solutions to improve the sustainability in the coffee value chain.</p>																					
<p>Pictures of project/map of research area</p>	<p>Distribution of coffee types and farmers in Vietnam. (Source: Catacutan et al., 2015)</p>  <table border="1"> <thead> <tr> <th>Province</th> <th>Farmers</th> <th>Production %</th> </tr> </thead> <tbody> <tr> <td>Gia Lai</td> <td>68,000</td> <td>12%</td> </tr> <tr> <td>Dak Lak</td> <td>170,000</td> <td>36%</td> </tr> <tr> <td>Dak Nong</td> <td>86,000</td> <td>14%</td> </tr> <tr> <td>Lam Dong</td> <td>123,000</td> <td>25%</td> </tr> <tr> <td>Other provinces</td> <td>70,000</td> <td>12%</td> </tr> </tbody> </table>	Province	Farmers	Production %	Gia Lai	68,000	12%	Dak Lak	170,000	36%	Dak Nong	86,000	14%	Lam Dong	123,000	25%	Other provinces	70,000	12%		<p>Dried skins from dried berries (Dry process method)</p>	
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