

## Main research questions

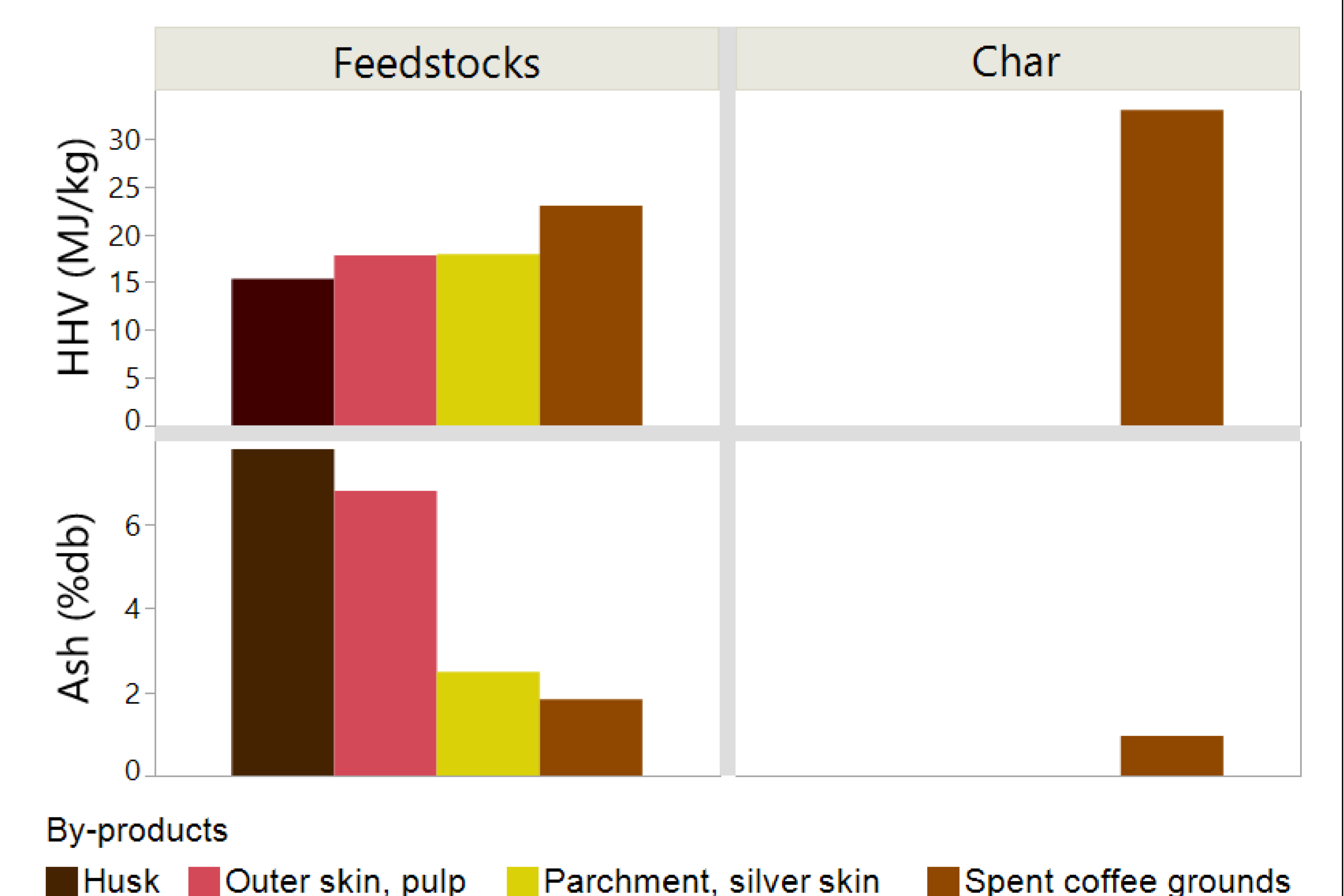
- Can hydrothermal carbonization (HTC) improve the combustion characteristics of coffee by-products?
- What post-processing methods are necessary to use the hydrochar as fuel?
- How can HTC be integrated into a wet-processing plant with its waste water treatment plant to reduce fossil fuel consumption, GHG emissions and improve effluent quality?
- Will the integration of HTC systems in coffee processing plants increase the sustainability in the coffee value chain?

## Research methods

- HTC: conduct at different temperatures (160°C – 240°C) and holding times (1h – 5h). *Char properties will be analyzed.*
- Char washing: remove unwanted substances that can lead to toxic emissions. *Substances in char will be investigated.*
- Pelletizing: press or agglomerate hydrochar with and without additives. *Properties of pellet quality will be optimized.*
- Combustion: test the performance of pellet combustion in industrial combustors and open stoves. *Combustion performance will be tested.*

## Preliminary results

HTC increases heating value (HHV) and decreases ash content



## Conclusions

- HTC can improve the quality of spent coffee grounds and turn them into energetic value-added products. Experiments with other coffee by-products are continuing.
- 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 adaption of HTC application to other coffee production regions.

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