

Assessment of carbon dioxide emission from coconut sugar production in community

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Abstract

This study aims to assess carbon dioxide emission from coconut sugar production at Amphawa Chaipattananurak Conservation Project. Raw materials, electricity & fuel consumption, water used and waste generation were collected for daily of sugar production. The results showed that the amount of carbon dioxide emission was 3,827.82 gCO₂/kg_{product}. The highest emission source was fuel consumption, followed by wastewater which the carbon dioxide emission of 3,200 and 590 gCO₂eq /kg_{product}, respectively. It was recommended to use sugar foam waste as an energy production to promote sustainable product.

Keywords: carbon dioxide emission, coconut sugar production, community product, sustainable management

1.Introduction

The Global warming is a huge problem in this time and many impact such as an ecology system, sea level rise, extreme weather and human life. Global warming is mostly being caused by human activities in terms of energy, industry, agriculture and households. Most countries are parties to the United Nations Framework Convention on Climate Change (UNFCCC) aims to reduce emissions of greenhouse gases. In terms of management of the country. A greenhouse gas inventory submitted to the Office of Natural Resources and Environmental Policy and Planning. Reporting in the energy sector. The industrial processes and product use. Agriculture, forestry and land use, and waste sector.

Thailand has plentiful of agricultural products. Coconut sugar is a famous product especially, from Amphawa district, Samut Songkhram province. Coconut sugar has more vitamin and minerals than granulated sugar and it has low glycemic index (Srikaeo and Thongta, 2015). Coconut sugar production mainly contains 4 steps namely boiling, cooling, stirring and packaging. Each process may concern energy consumption which can be evaluated as carbon dioxide emission. Collection of activity data from coconut sugar production in community can be developed as a green product or carbon label.

2.Method

2.1 location

This study specifies location for assessment of carbon dioxide emission from coconut sugar production at Amphawa Chaipattananurak Conservation Project, Amphawa district, Samut Songkhram province. This area has a landscape and weather suitable for agriculture especially coconut. It gets many yields and high quality so that Samut Songkhram province is the most famous source of coconut sugar production in Thailand

2.2 collected data

The activity data (raw materials, electricity and fuel consumption, water used, waste generation) from coconut sugar production was collected at Amphawa Chaipattananurak Conservation Project. The scope of carbon dioxide emission was from making sugary sap to coconut sugar which the functional unit of 1 kg product. Five daily productions were collected

2.3 Calculation

calculated for carbon dioxide emission according to revised 1996 The Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories (IPCC), IPCC 2006 and Thailand greenhouse gas management organization (TGO) guideline.

3.Results and Discussion

Fig.1 shows diagram of average daily input and output of each step for coconut sugar production. It was found that 18.4 kg product was derived from coconut sugary sap of 116.8 L which the fuel & electricity consumption of 85 kg and 0.125 kwh, respectively. The highest waste production was wastewater. It was 98.50% of total waste production. Wastewater from wok and container cleaning had BOD of 12,500 mg/L and 6,000 mg/L, respectively (Mahasaranon, 2014) and it wasn't treated. The fuel consumption was mainly coconut frond and firewood which the amount of 85 kg/day could emit the highest CO₂ of 3,200 gCO₂eq /kg_{product} as shown in Fig.2. Total CO₂ emission was 3,827.82 gCO₂/kg_{product}. However, it can be reduced by using sugar foam and wastewater as a feed for biogas reactor.

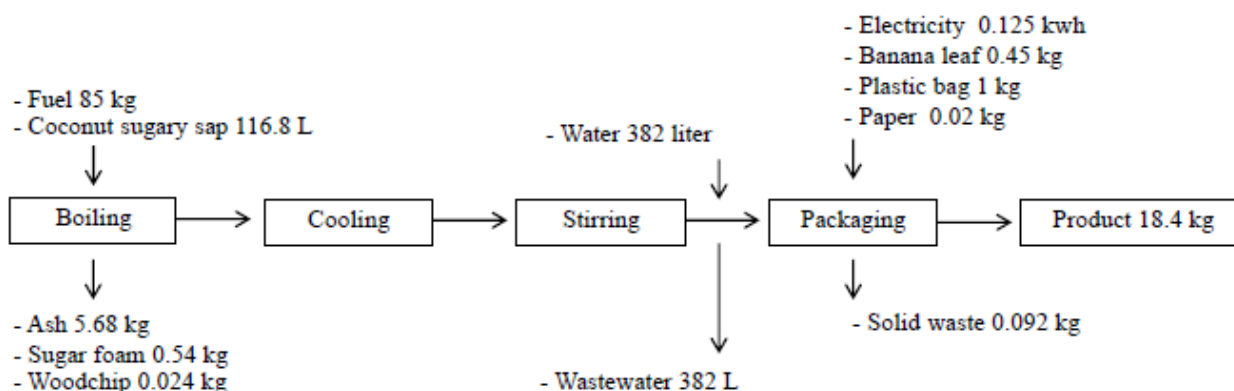


Fig.1 Coconut sugar production diagram.

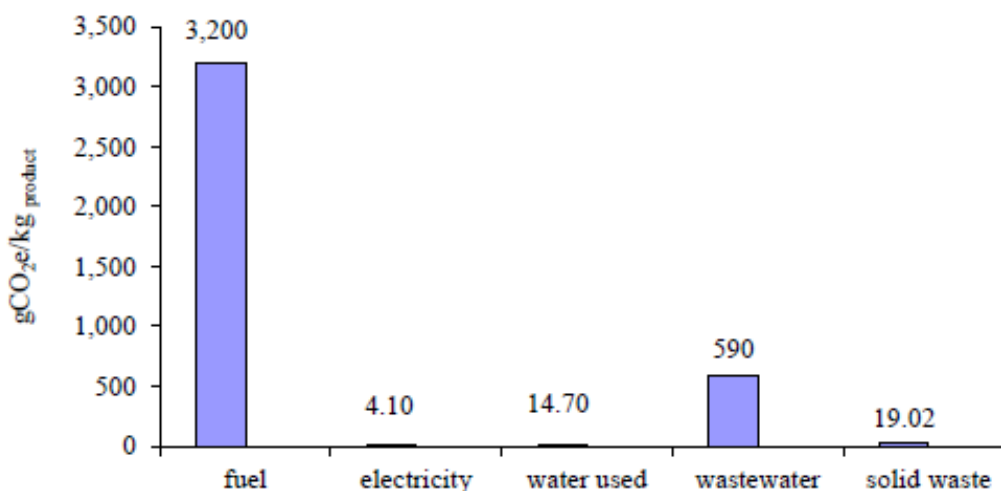


Fig.2 Carbon dioxide emission from coconut sugar production.

Conclusion

Carbon dioxide emission from coconut sugar production was 3,827.82 gCO₂/kg_{product}. Fuel consumption is the highest emission source. Data from this production can be used to further evaluation of carbon footprint by collecting the sugary sap acquisition.

Acknowledgements

Reference

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