



1 of 1

Export Download Print E-mail Save to PDF Add to List More... >

EnvironmentAsia • Volume 14, Issue 3, Pages 124 - 135 • September 2021

Document type

Article

Source type

Journal

ISSN

19061714

DOI

10.14456/ea.2021.29

View more ▾

Life cycle assessment of high pressure-cooked smoked milkfish production: A case study in semarang, indonesia

Susanto N.^a, Prastawa H.^a, Sembiring N.V.^a, Ulkhaq M.M.^a ✉

Save all to author list

^a Department of Industrial Engineering, Diponegoro University, Semarang, Indonesia

Full text options ▾

Abstract

Author keywords

Indexed keywords

Abstract

This research aims to assess and measure the environmental impacts of high pressurecooked smoked milkfish (HPCSM) production. Although the literature about measuring the environmental impact is abundant, research about this topic implemented in a HPCSM production remains limited. The assessment was performed using the life cycle assessment (LCA), which is considered as a holistic assessment since it regards the entire life cycle of products from cradle to grave. To make a contribution, the LCA was supplemented with the eco-efficiency index to assess the affordability and sustainability status of the business. To exhibit the methods, a case study has been carried out in Semarang, Indonesia, where the centre of HPCSM production is located. Forty enterprises (thirty-one small-, eight medium-, and one large-scale) were assessed. Results showed that the production process has several environmental impacts, such as climate change, photochemical oxidant formation, acidification, fine dust, eutrophication, ecotoxicity (fresh water), human toxicity, metals depletion, waste, and water stress indicator. In addition, the analysis of eco-efficiency index revealed that all type

Cited by 0 documents

Inform me when this document is cited in Scopus:

Set citation alert >

Related documents

Combining LCA and LCC in the early-design stage: A preliminary study for residential buildings technologies

Dejaco, M.C. , Mazzucchelli, E.S. , Pittau, F.
(2020) *IOP Conference Series: Earth and Environmental Science*

Achieving consensus on the assessment of toxicity in LCA

Hauschild, M.Z. , Huijbregts, M. , Jolliet, O.
(2009) *EM: Air and Waste Management Association's Magazine for Environmental Managers*

Life-cycle assessment of ammunition demilitarization in a static kiln

Ferreira, C. , Ribeiro, J. , Mendes, R.
(2013) *Propellants, Explosives, Pyrotechnics*

View all related documents based on references

Find more related documents in Scopus based on:

Authors > Keywords >



Source details

EnvironmentAsia

Scopus coverage years: from 2009 to Present

Publisher: Thai Society of Higher Education Institutes on Environment

ISSN: 1906-1714

Subject area: [Environmental Science: General Environmental Science](#) [Pharmacology, Toxicology and Pharmaceutics: Toxicology](#)

Source type: Journal

[View all documents >](#)

[Set document alert](#)

[Save to source list](#)

CiteScore 2021

1.1

SJR 2021

0.195

SNIP 2021

0.334

[CiteScore](#) [CiteScore rank & trend](#) [Scopus content coverage](#)

Improved CiteScore methodology

CiteScore 2021 counts the citations received in 2018-2021 to articles, reviews, conference papers, book chapters and data papers published in 2018-2021, and divides this by the number of publications published in 2018-2021. [Learn more >](#)

CiteScore 2021

$$1.1 = \frac{208 \text{ Citations 2018 - 2021}}{194 \text{ Documents 2018 - 2021}}$$

Calculated on 05 May, 2022

CiteScoreTracker 2022

$$1.1 = \frac{207 \text{ Citations to date}}{182 \text{ Documents to date}}$$

Last updated on 05 October, 2022 • Updated monthly

CiteScore rank 2021

| Category | Rank | Percentile |
|--|----------|------------|
| Environmental Science | #167/228 | 26th |
| General Environmental Science | | |
| Pharmacology, Toxicology and Pharmaceutics | #106/123 | 14th |
| Toxicology | | |

[View CiteScore methodology >](#) [CiteScore FAQ >](#) [Add CiteScore to your site](#)



EnvironmentAsia

The international journal published by the Thai Society of Higher Education Institutes on Environment

Volume 14, Number 3, September, 2021; ISSN: 1906-1714; ONLINE ISSN: 2586-8861

EnvironmentAsia

Volume 14, Number 3, September, 2021; ISSN: 1906-1714; ONLINE ISSN: 2586-8861



This journal is covered by:

DOAJ
DIRECTORY OF
OPEN ACCESS
JOURNALS

EBSCO
HOST



THOMSON REUTERS



Scopus®

Academic Journals Database
Disseminating quality controlled scientific knowledge

Available online at <http://www.tshe.org/ea/index.html>



Printed and Published by TSHE c/o

Department of Environmental Science, Faculty of Science,

Chulalongkorn University Phayatai Rd Bangkok 10330 Thailand



EDITOR-IN-CHIEF

Professor Dr. Wanida Jinsart
*Department of Environmental Science
Faculty of Science, Chulalongkorn University
Phayatai Rd. Bangkok, Thailand
environmentasiaj@gmail.com*

HONORABLE CONSULTING EDITORS

Professor Dr. Rob Mars, *University of Liverpool, UK*
Professor Dr. Chongrak Polprasert, *Thammasart University, Thailand*

ASSOCIATE EDITORS

Associate Professor Dr. Jaroon Jakmunee, *Chiang Mai University, Thailand*
Associate Professor Dr. Racha Chaichana, *Kasetsart University, Thailand*
Assistant Professor Dr. Panwadee Suwattiga,
King Mongkut's University of Technology North Bangkok, Thailand
Lt. col. Assistant Professor Dr. Kittiphop Promdee, *Chulachomklao Royal Military Academy, Thailand*
Assistant Professor Dr. Peerapong Pornwongthong,
King Mongkut's University of Technology North Bangkok, Thailand
Dr. Sumeth Wongkiew, *Chulalongkorn University, Thailand*

EDITORIAL BOARD

Professor Dr. Steven W. Edwards, *University of Liverpool, UK*
Dr. Sarah Clement, *University of Liverpool, UK*
Professor Dr. Mark Morgan, *Missouri University, USA*
Professor Dr. Tan Shan Hwai, *University of Science Malaysia, Malaysia*
Professor Dr. Chitsan Lin, *National Kaohsiung Marine University, Taiwan*
Associate Professor Dr. Akihiko Terada,
Tokyo University of Agriculture and Technology Japan
Professor Dr. Akira Kondo, *Osaka University, Japan*
Professor Dr. Okamoto Shin'ichi, *Tokyo University of Information Sciences, Japan*
Professor Dr. Eiji Yano, *Teikyo University, Japan*
Professor Dr. Masami Furuuchi, *Kanazawa University, Japan*
Dr. Wei-Qin Zhang, *University of Auckland, New Zealand*
Professor Dr. Sompong Doolgindachabaporn, *Khon Kaen University, Thailand*
Assistant Professor Dr. Thapat Silalertruksa,
King Mongkut's University of Technology Thonburi, Thailand
Assistant Professor Dr. Sittipong Dilokwanich, *Mahidol University, Thailand*
Dr. Worradorn Phairung, *Chiang Mai University, Thailand*
Dr. Hatairattana Gariyavech, *Environmental Research and Training Center, Thailand*

TABLE OF CONTENT

Challenges to the Green Marine Economy in China:

Case Study of Qianhe Environmental Terminal's Bankruptcy

Qin Lin, Pathairat Pastpipatkul, Woraphon Yamaka, and Chatchai Khiewngamdee.....1

Marine Oil Spills: Implications on Response Plan

Binapani Pradhan, Madhumita Das, and Chinmay Pradhan.....13

Seasonal and Spatial Variation of Water Quality in Cardiff Bay:

Analysis of Historic Data and Future Trend

Md. Sultanul Islam, Md. Nazmul Islam, and Syeda Marzia.....23

Geochemical Characterization of Hot Spring Waters from Southern Thailand as the Base for Geothermal Energy Utilization

Wipada Ngansom and Helmut Dürrast.....37

Electrically Conductive Carbon-Ceramic Composite as Electrode on Indirect Electrochemical Oxidation Reactor for Remazol Black B Degradation

I Dewa Ketut Sastrawidana, I Nyoman Sukarta, and I Wayan.....50

Cost-benefit Analysis of PM_{2.5} Policy in Korea

Kim Suhyoung and Loi Kok Chng.....62

Estimation of PM_{2.5} Concentrations in Northern Thailand Using the Gappy Proper Orthogonal Decomposition Method

Kuntalee Chaisee, Suttida Wongkaew, and Ekkachai Thawinan71

Social Restriction Effects on Air Pollution: How the PM_{2.5} Concentration Changed with Lockdown Management of COVID-19 Pandemic Control in Bangkok Thailand

Thae Thae Han Htwe, Sarawut Thepanondh, Suphaphat Kwonpongsagoon, Chutarat Chompunth and Kanisorn Jindamanee80

An Artificial Neural Network Prediction Model of Respiratory Illness among Medical Students during Gross Anatomy

Arroon Ketsakorn, Saowanee Norkaew, Kanjana Changkaew, Chalermchai Chaikittiporn, Vanusaya Su-angkavatin, Pannathorn Thammabut, and Ratchapong Chaiyadej.....91

Cancer Risk Assessment Around Municipal Solid Waste Incinerators

Patsiri Srivieng, Pensri Watchalayann, and Warawut Suadee102

Evaluation of Potential Genotoxic Effects Induced by Chlorothalonil in Human Lymphocytes in Vitro

Awad A Algarni.....117

Life Cycle Assessment of High Pressure-Cooked Smoked Milkfish Production:

A Case Study in Semarang, Indonesia

Novie Susanto, Heru Prastawa, Nora V. Sembiring, and M. Mujiya Ulkhaq.....124

Life Cycle Assessment of High Pressure-Cooked Smoked Milkfish Production: A Case Study in Semarang, Indonesia

Novie Susanto, Heru Prastawa, Nora V. Sembiring, and M. Mujiya Ulkhaq*

Department of Industrial Engineering, Diponegoro University, Semarang, Indonesia

*Corresponding author: ulkhaq@live.undip.ac.id

Received: April 29, 2021; Revised: June 16, 2021; Received: June 30, 2021

Abstract

This research aims to assess and measure the environmental impacts of high pressure-cooked smoked milkfish (HPCSM) production. Although the literature about measuring the environmental impact is abundant, research about this topic implemented in a HPCSM production remains limited. The assessment was performed using the life cycle assessment (LCA), which is considered as a holistic assessment since it regards the entire life cycle of products from cradle to grave. To make a contribution, the LCA was supplemented with the eco-efficiency index to assess the affordability and sustainability status of the business. To exhibit the methods, a case study has been carried out in Semarang, Indonesia, where the centre of HPCSM production is located. Forty enterprises (thirty-one small-, eight medium-, and one large-scale) were assessed. Results showed that the production process has several environmental impacts, such as climate change, photochemical oxidant formation, acidification, fine dust, eutrophication, ecotoxicity (fresh water), human toxicity, metals depletion, waste, and water stress indicator. In addition, the analysis of eco-efficiency index revealed that all type of products is considered as affordable but not sustainable. The recommendations for the improvement to minimize the environmental impacts and the sustainability status of the enterprises are also provided.

Keywords: Eco-efficiency index; Life cycle assessment; Water scarcity; High pressure-cooked smoked milkfish.

1. Introduction

Life cycle assessment (LCA) is a measurement method which quantifies numerous environmental impacts related to the whole life cycle (i.e., from cradle to grave) of particular products, processes, or activities (Finnveden *et al.*, 2009). Especially in manufacturing and construction, LCA has been broadly applied; for example, in iron and steel industries (Olmez *et al.*, 2016; Ma *et al.*, 2018; Rossi *et al.*, 2017), in building analysis (Fay *et al.*, 2000; Ramesh *et al.*, 2020), and food productions (Andersson *et al.*, 1998; Cederberg and Stadig, 2003; Beauchemin *et al.*, 2020). However, to the best of our knowledge, there is limited—or even no—study analysing the environmental impacts using LCA in high pressure-cooked smoked milkfish (HPCSM) production.

Milkfish (*Chanos chanos*), which is the sole living species in the Chanidae family (Nelson, 2006), is a big toothless silver fish which exists in warm parts of the Indian and Pacific oceans. The species is called “bandeng” in Bahasa. It has many bones that makes it difficult to eat. As the technology and demand of more nutritional consumption are increasing, processing milkfish with high pressure cooker is made. This makes the bones of the fish get softened so that it is easier to be consumed—it is usually called soft-boned or boneless milkfish, or “bandeng presto” in Bahasa Indonesia—while the nutritional value is not being affected and decreased.

Challenges to the Green Marine Economy in China: Case Study of Qianhe Environmental Terminal's Bankruptcy

Qin Lin, Pathairat Pastpipatkul, Woraphon Yamaka,
and Chatchai Khiewngamdee*

Faculty of Economics, Chiang Mai University, Chiang Mai, Thailand

* Corresponding author: getliecon@gmail.com

Received: February 7, 2021; Revised: March 12, 2021; Accepted: July 12, 2021

Abstract

The expansion of the world fleet has increased consequently discharge of oily sewage and garbage, which has become a threat to the marine ecology environment. Qianhe Terminal for Oily Wastewater and Garbage (Qianhe) was the first professional terminal to receive and dispose of oily sewage and garbage from ships in Ningbo-Zhoushan Port which was the largest port in the world. However, this terminal bankrupted after only two years of operation. In this study, the Interpretative Structural Model (ISM) is used to investigate why the bankruptcy of Qianhe happened as it was and find out the causes from different perspectives. The ISM-based model analyzed the interrelationships among those causes and their positions in the structural hierarchy from high- to low-level. The contributions provide lessons learning from the bankruptcy for ecology environment economy and offer managerial insight for the port policy.

Keywords: Port environment; Interpretative Structural Model (ISM); Bankruptcy; Policy

1. Introduction

With the development of the world economy, trade and global influence is expanding rapidly. China is the world's largest country in goods trade since 2001. Among the top 10 world ports, 7 ports are in China. However, the increasing number of the ship brought an increase in illegal discharge of garbage and sewage from ships, which threatened the marine ecology environment in China. According to the international conventions, oily sewage and garbage should be received and treated in the ports. Therefore, the ports must build an oil sewage and ship garbage receiving facilities, which contributes to the development of the green environmental protection industry.

Ningbo-Zhoushan Port is the largest port in the world. In 2019, this port handled 1.12 billion tons of cargo and welcomed more than 3500 ships each day on average. The vast ship traffic has brought a considerable demand for receiving the

garbage and sewage from the ships. That's why Qianhe Environmental Protection Terminal was built. Qianhe is the first comprehensive environmental protection terminal in China to dispose of abandoned oil-polluted water and ship garbage. However, the terminal was in operation for only two years and was shut down by June 2020. This was a shocking event in the green marine industry of China. It would be a valuable issue arousing our concerns.

Nowadays, whether a port is good or not depends not only on its economic condition but also on its ecological environment. Good and well-planned environmental practices contribute to enhancing the competitive position of ports (Wakeman, 2009). Because of the complexity of the port-construction, the analysis of the ecological and environmental protection system of the port must be carried out from several levels (Bekovnik and Bajec, 2015):

Marine Oil Spills: Implications on Response Plan

Binapani Pradhan^{1*}, Madhumita Das², and Chinmay Pradhan¹

¹Department of Environmental Science, Utkal University, Bhubaneswar, Odisha, **India**

² Fakir Mohan University, Balasore, Odisha, India

*Corresponding Author: binapanipradhan.kjr@gmail.com

Received: February 11, 2021; Revised: March 12, 2021; Accepted: May 5, 2021

Abstract

Understanding oil spill detection, modelling is critical in formulating oil spill response to minimize the catastrophic environmental impact due to oil spill. This paper provides the key research results for oil spill response from various published literatures over few decades which are based on case studies, laboratory tests, field visits and modelling work. This paper presents an overview and summary of literature reviews on offshore oil spills, fate of spilled oil, response plans and cleanup methods. A brief discussion on the technological advancements in identifying oil spills and oil spill modelling is presented. Discussions on the response methods include recent advances in spill response plans and cleanup methods. The synthesis of published literatures from various previous work on understanding and mitigation strategies of oil spill disaster would immensely contribute scientific knowledge to deal with the future oil spill.

Keywords: Oil spill; Response plan; Cleanup; Environment

1. Introduction

Huge demands for crude oil in recent times have increased offshore exploration and production activities around the world. Exploration and Production (E&P) activities, as well as oil transportation, carry the risk of the oil spill in the marine environment. The marine oil spill has a catastrophic impact on marine ecology, coastal ecosystems, and human health (Jafarinejad, 2017). With the advancement of technology in recent times and the implementation of technological changes like improvements in ship hulls and navigation systems have reduced marine spill cases in many folds (Chang *et al.*, 2014). Although there has been much more advancement in transportation technology and safety measures, still oil transportation continues to be a highly risky activity. Last decade, there have been 62 spills of different sizes resulting in 164,000 tons of oil lost (ITOPF, 2019). This review paper deals with the offshore oil spill, fate of the

oil, which could be useful in developing effective response plans. This discussion would help create new strategies to solve the complexity of oil spill events. Many researchers have studied the various aspects of oil spill, new technologies and advancements in response plan, which are being discussed here for better insight.

2. Major oil spills around the world

Marine oil spills can be in the form of few barrels to thousands of barrels. The volume of oil spills is not a measure of the severity of the damage. The geographical location of the discharge and sensitivity of the nearby shore is also crucial. A map showing some of the prominent oil spills around the world in figure 1. Ecological impact related to some of the significant oil spills are presented in table 1.