INTERNATIONAL

Plastic bags may be ‘eco-friendly’ than paper and cotton bags in cities like Singapore

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The team conducted a life cycle analysis of five types of bags to assess the environmental impacts associated with production, distribution, transportation, waste collection, treatment and end-of-life disposal. Credit: Nanyang Technological University

Scientists from Nanyang Technological University, Singapore (NTU Singapore) have modeled the environmental impact from the cradle to the grave of the use of different types of shopping bags and report that in cities like Singapore, disposable plastic bags (made of density polyethylene plastic high) have a lower environmental footprint than single-use papers and multi-purpose cotton bags.

Reusable plastic bags made from non-woven polypropylene plastics were the most eco-friendly option, followed by single-use plastic bags.

The model found that cotton and kraft paper bags have relatively larger environmental footprints due to their greater contribution to global warming and the potential for ecotoxicity in their production.

However, the NTU team stressed that their model was specifically implemented in Singapore and could be applicable in cities such as Tokyo, Hong Kong and Dubai. Reusable and disposable plastic bags would be a relatively better environmental option only in these cities, due to the model's

focus on densely populated metropolitan areas that have waste management structures with similar end-incineration equipment. of life.

The findings were published in Scientific *Cleaner Production Newspaper* in August 2020

Assistant Professor Grzegorz Lisak, Director of the Waste and Resource Assistance Center at the Nanyang Institute of Environment and Water (NEWRI), who led the research, said: “Our main message is that reusable plastic bags are the best option. , provided they are reused many times 50 times to be accurate.However, a surprising conclusion is that, in our model, in a single-use case, plastic bags, if properly treated afterwards, are less harmful to the environment than the other types of bags in this study

“It is essential to assess the case-by-case implications for plastic waste treatment. In a well-structured closed metropolitan waste management system with incineration treatment, the use of plastic bags may be the best option currently available. , provided there is no waste leak into the environment “.

To reach their conclusions, the team conducted a life cycle analysis of five bag types to assess the environmental impacts associated with the

production, distribution, transportation, waste collection, treatment, and end-of-life disposal.

The research team found that the global warming potential of a single-use kraft paper bag was higher, over 80 times greater than that of reusable plastic bags. Reusable plastic bags and cotton bags (reused 50 times) are estimated to have over ten times the global warming potential of reusable plastic bags (reused 50 times).

To compensate for the emission equal to that of creating a single-use plastic bag, a reusable plastic bag will need to be reused four times.

The team also observed that the negative environmental impacts of cotton and kraft paper bags on the model are due to their production processes consuming large amounts of water and natural resources. Therefore, improving production methods, optimizing resource use, and pursuing sustainable practices may favor the use of cotton and paper bags in the future.

Importance for cities and their waste reduction goals

In the case of Singapore, the team recommends the use of reusable plastic bags to the greatest extent possible to reduce the consumption of single-use plastic bags. Recycling disposable plastic bags would be a good intention to shorten their impact on the environment.

Asst Prof Lisak said that based on 2018 statistics in Singapore, reducing the consumption of single-use plastic bags in half could prevent over 10 million kg-CO_2 equivalent emissions in one year.

How stopping plastic bags can help New York mitigate climate change

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More information:
Ashiq Ahamed et al. Evaluating the life cycle of plastic food bags and their alternatives in cities with limited waste management structure: A case study in Singapore, *Cleaner Production Newspaper* (2020) DOI: 10.1016 / j.jclepro.2020.123956

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