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New plastic could be more eco- than paper or cotton

by Staff Writers
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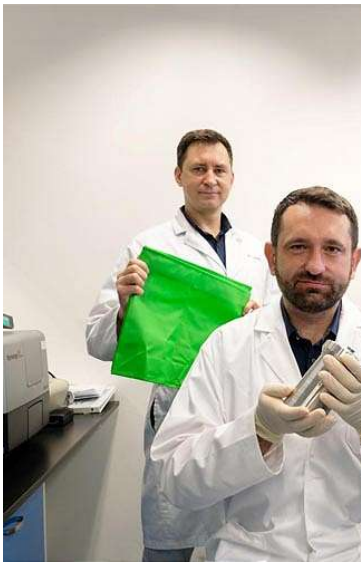

(Left to Right) Members of the NTU research Research Fellow at the Residues and Resour Environment and Water Research Institute (N Lisak, Director of the Residues and Resource Research Associate Ashiq Ahamed.

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

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

The model revealed that cotton and kraft paper bags have relatively bigger environmental footprints due to their greater contribution to global warming and eco-toxicity potential in their production.

However, the NTU team stressed that their model applied specifically to Singapore and might be applicable in cities such as Tokyo, Hong Kong, and Dubai. Reusable and single-use plastic bags would be a comparatively 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-of-life incineration facilities.

The findings were published in the scientific Journal of Cleaner Production in August 2020.

Assistant Professor Grzegorz Lisak, Director of Residues and Resource Reclamation Centre at the Nanyang Environment and Water Institute (NEWRI), who led the research, said: "Our main message is that re-usable plastic bags that they are re-used many times - over 50 times to be precise. However, one surprising conclusion is single-use case, plastic bags, if treated properly afterwards, are less environmentally detrimental than this study."

"It is essential to evaluate the implications case by case for dealing with plastic waste. In a well-structu waste management system with incineration treatment, using plastic bags may be the best option that provided that there is no significant leakage of waste into the environment."

To reach their conclusions, the team carried out a life cycle analysis of five types of bags to evaluate th associated with their production, distribution, transportation, waste collection, treatment, and end-of-li

The research team found that the global warming potential of a single-use kraft paper bag was the high reusable plastic bags. Single-use plastic and reusable cotton bags (reused 50 times) were calculated to global warming potential of reusable plastic bags (reused 50 times).

To offset the emission equivalent to equal that of the creation of one single-use plastic bag, a reusable reused four times.

The team also observed that the relative negative environmental impacts of cotton and kraft paper bag their production processes that consume immense amounts of water and natural resources. Hence, imp methods, optimizing resource usage, and following sustainable practices could in future favour the usa and paper.

Relevance to cities and their waste reduction goals
In the case of Singapore, the team recommends the usage of reusable plastic bags to the greatest exte consumption of single-use plastic bags. Reprocessing single-use plastic bags would be a good policy go environmental impact.

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

Moving forward, the team will be embarking on further studies connected to plastic waste managemen the development of new products

Research paper

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