Report by: Designed by THEM

Topic: Environmental Wellness

How might we create a **sustainable form** of packaging protection that is easily **accessible** to all and can **effectively protect goods** being delivered to customers?

The problem with eCommerce packaging waste

Growth of eCommerce in Singapore

- In the eCommerce market, the number of users is expected to amount to 4.3m users by 2027.[1]
- User penetration will be 61.2% in 2023 and is expected to hit 70.2% by 2027.[2]
- World Wide Fund for Nature Singapore (WWF-Singapore), follows a study published last November, which found that about 200,000 e-commerce parcels from various platforms are delivered across Singapore daily. This figure is projected to increase by about 50 percent by 2025.[3]

Packaging waste from eCommerce

- 1 in 3 consumers here opted for reusable packaging for their e-commerce purchases in a pilot study conducted by World Wide Fund for Nature Singapore (WWF-Singapore)[4]
- Every year, e-commerce contributes a total of 17.7 million kilograms of packaging waste, according to world wide fund (WWF) Singapore. [5]
- Study by Straits Times showed that most e-commerce product packaging come with an average of 81% non product volume, and are a big contributor to waste.[6]

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[1] https://www.statista.com/outlook/dmo/ecommerce/singapore

[2] https://www.statista.com/outlook/dmo/ecommerce/singapore

[3] https://www.todayonline.com/singapore/pilot-reusable-packaging-commercially-viable-wwf-singapore-2148606

[4] https://www.straitstimes.com/singapore/environment/1-in-3-online-shoppers-opt-for-reusable-packaging-wwf-survey

[5] https://www.straitstimes.com/singapore/environment/1-in-3-online-shoppers-opt-for-reusable-packaging-wwf-survey

[6] https://graphics.straitstimes.com/STI/STIMEDIA/Interactives/2019/04/earth-day-online-shopping-packaging-waste-fails/index.html

Over 200,000 e-commerce parcels from various platforms are delivered across Singapore daily. Currently in the eCommerce market, product packaging comes with an average of **81% non product volume** (Straits Times), and contributes to **17.7 million tonnes of waste** in Singapore every year(World Wide Fund in Singapore). This number will only continue increasing as the number of users of eCommerce is expected to amount to **4.3m users by 2027**. The product packaging waste is **not biodegradable** and **takes up landfill space**. Additionally, when incinerated, it produces **toxic gas** such as dioxins, furans, mercury and polychlorinated biphenyls into the atmosphere, posing a threat to vegetation and human health.

Current Market: Packing peanuts, bubble wrap and foam

Packing Peanuts:

- Cushioning material to prevent packages.

Strengths	Limitations:
- **Cheap** - Comes in **different shapes** and sizes to accommodate the product	- Made out of styrofoam or woody biomass (**not biodegradable**) - **Wasteful** (requires entire package to be filled) - **Hard to store** (due to large amount needed to protect package)

Bubble wrap:

- Made of polyethylene, a type of plastic that contains hundreds of evenly spaced air pockets.

Strengths	Limitations
- Effectively protects packages - **Cheap** - **Light-weight** - Comes in **different shapes and sizes** to accommodate the product	- Requires **many layers** - **Not biodegradable** - Cause package to be **bulky** (due to product being wrapped in bubble wrap)

MOLU designed by them

Foam:

- Packaging foam is made from polyethylene, polystyrene or polyurethane.

Strengths	Limitations
- **Cheap** - Comes in **different shapes and sizes** to accommodate the product - Soft, able to protect from scratches	- **Not biodegradable** - If not disposed properly, can leach chemicals into the environment, **contaminating water sources**

From the current products in the market, we've gathered potential qualities our product should have — coming in different sizes and shapes, as well as being cost efficient; and weaknesses of the market our product should address — environmental impact of product, it should be easy to store and not require many layers to fully protect goods.

Our Solution

Target users

Online manufacturers who require packaging material for safe delivery of goods (as they would be using large amounts of delivery to ship their goods)

Platform for sales

Singpost centres - the local post office and via **MOLU** website

End consumer

Users who receive products delivered in **MOLU**

Our product: MOLU (**MO**lecule so**LU**ble)

Water soluble protective packaging made out of **natural starch** which is **soluble** under high pressure water. It is **biodegradable** and has an **interlocking feature** between each layer forming a **protective barrier** to protect goods.

Function: Being able to **effectively protect goods from being damaged** during shipping **without producing extra waste going into our landfills**

Features of MOLU - with reference to our product posters

1) Its structure allows it to be **easily tearable**, into molustrips or molecules that can be reused to package goods of **different sizes**.
2) When dissolved in high pressure water, the dissolved natural starch solution produced can be used as **fertiliser** to help plants grow healthier.
3) Structure has air pockets in between, **increasing surface area to volume ratio**, **reducing the pressure** when the goods hit certain objects, **effectively protecting the goods** inside the package.
4) Natural starch **does not expire** and will not turn bad unless in water.
5) MOLU has a **four-sided structure**, helping it intersect with each other easily and creating a **stable and strong structure** to protect goods.
6) After MOLU is used, consumers can **return them** to Singpost for recycling, reducing the wastage of resources.
7) Alternatively, users can choose to **reuse** their MOLU as future packaging, fertiliser or dissolve it, **preventing MOLU from ending up into wastefills.**

As such unlike products currently in the market, MOLU utilises innovation in the design of each individual MOLUcules to effectively protect goods as packaging material without many layers while simultaneously producing zero waste that will end up in landfills with its water solubility, fertiliser qualities as well as using local services to recycle used product, addressing all the flaws of current market products into just **one simple solution.**

Why MOLU?

MOLU	Current Market
- <u>Biodegradable</u> Made from **natural starch** that can be dissolved under high pressure water	- <u>Non-biodegradable</u> Made from materials like polyethene and styrofoam which contributes to packaging waste
- <u>Enhanced protective features</u> The structure was specifically chosen to have a round spherical base to **increase surface area to volume ratio** and has a 4-sided structure to create **air pockets** in between for enhanced protection. The air pockets also allow for layers of MOLU to **interlock** with one another, creating a firm protective base which stays in place and doesn't move around.	- <u>Protective</u> Bubble wrap loses its effectiveness over time when the bubbles in the layer are popped and deflated. - Packing peanuts are easily breakable, reducing their protective efficiency in rough package handling. They also tend to move around in packages, shaking products and not holding them in place, increasing risk of damaged goods in transit. - Corrugated cardboard can be easily deformed when under heavy items.
- <u>Flexible in usage</u> MOLU is **multifunctional** as it serves many different purposes besides protective packaging. When dissolved, it can act as fertiliser for plants and numerous MOLUcules can be used as stuffing for bean bags or plush toys. Users can also get creative with MOLU and design their decorative packaging for gifts since it comes in tearable layers which split into strips and individual MOLUcules.	- <u>Serves the sole purpose of packaging</u> In the current market, products are produced only for packaging, contributing to waste since once it has served its purpose, there is no other function as such making them hard to recycle. - Additionally, products in the current market are mostly used as one type of packaging material, packing peanuts for odd shaped items, corrugated cardboard for flat items and bubble wrap is only effective with smaller items, but with MOLU and it's different forms, this one packaging material can accommodate to all sizes and shapes of goods.

Certain limitations and how we plan to mitigate them:

- If MOLU is bought online, won't it come in packaging and produce waste?

Online purchase of MOLU will come in a recyclable cardboard box that users can easily toss into their recycling bins, such boxes will also come with return addresses so it can be shipped back to our warehouses and reused for other shipping purposes.

- Since MOLU is made from natural starch, would it be more costly than other forms of packaging?

The retail price of MOLU is expected to be slightly higher than that of cheap styrofoam and cardboard, but since it can be used for multiple purposes, the price for environmental sustainability is not that much higher than the current products in the market. For local users, they can just head to SingPost centres where they send out parcels, and get MOLU for a cheaper price (without shipping costs) so we can have lesser carbon emissions from shipping of MOLU products. If they are receiving parcels with MOLU packaging, they can trade it into SingPost centres as well for a percentage of payback by mass of MOLU.

References

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