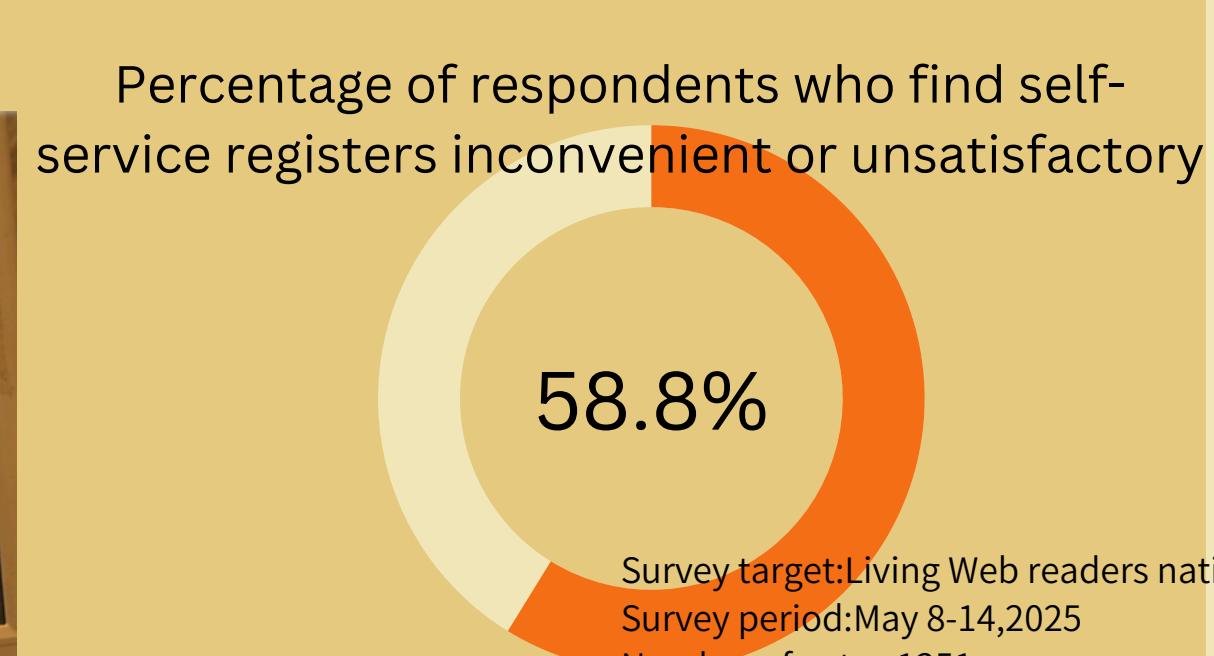
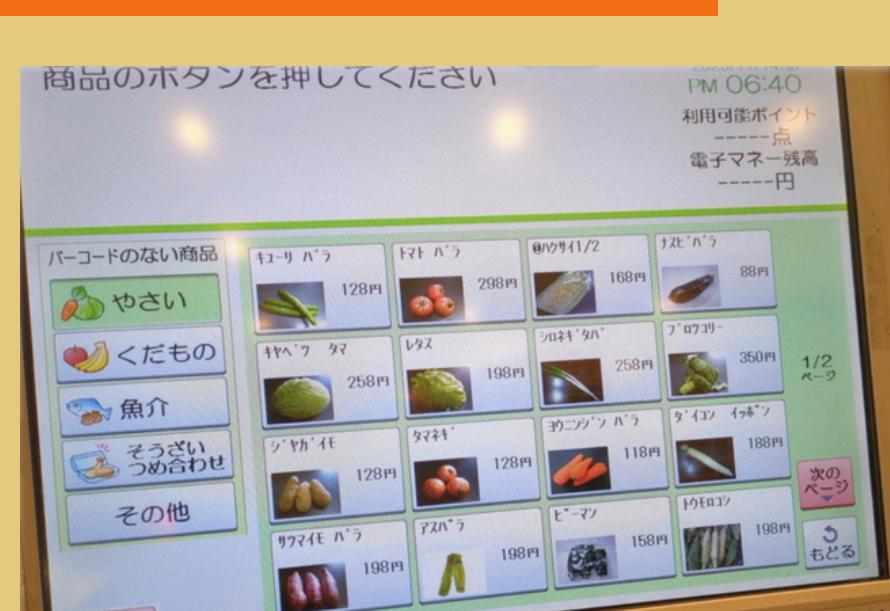


# Vegetable packaging suitable for self-service registers



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## Problem

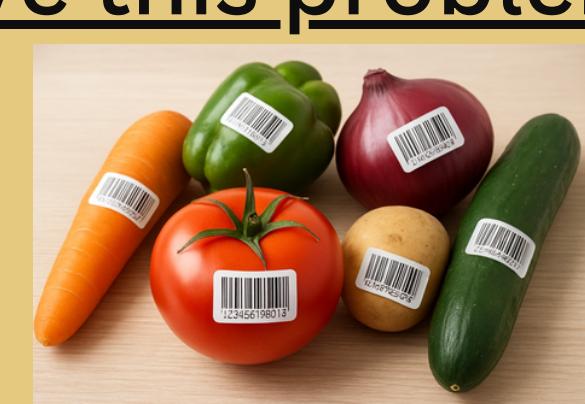


Some people have difficulties operating self-service registers.

## Hypothesis

Applying barcodes to vegetables may help solve this problem.

But



- Conventional stickers raise safety concerns.

- The benefits of unpackaged products—ability to check their condition—should be preserved.

## Solution1

### “Packing by bamboo leaves”



↑ Taken at a supermarket in Vietnam

In Vietnam,

Some supermarkets use **banana leaves** to package vegetables.

Could be used in Japan as well

Wash bamboo leaves

Remove moisture

Wrap vegetables

Attach barcode



#### <Good point>

- High **antibacterial** properties
- Has **antioxidant** effects
- Bamboo trees = 20% of Japan's forests



#### <Bad point>

- Large leaves are difficult to obtain.
- Not suitable for irregularly shaped vegetables
- The contents may be **hidden** by the leaves.

## Considerations

- A key advantage of unpackaged products is that consumers can visually check and select items by hand. Solution 2, the edible-material sticker, maintains this advantage because it does not conceal the product.
- Solution 1, the bamboo leaf wrapping, offers strong antibacterial and antioxidant properties. However, continuous harvesting of bamboo leaves raises concerns regarding sustainability. Therefore, the edible-material sheet is considered to be more practical from the perspectives of usability and sustainability.

## Future work

- Several challenges must be addressed before the edible-material sheet can be practically applied.
- One major issue is that it hardens over time, resulting in reduced adhesiveness. This should be evaluated through experiments in which the sheet is attached to vegetables and observed over time.
- In addition, unlike bamboo leaves, the sheet lacks antibacterial and antioxidant properties, which limits its ability to maintain freshness.
- To address this issue, we aim to develop an edible-material sheet that incorporates bamboo leaves with antibacterial and antioxidant functions.

## Reference

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セルフレジは本当に便利? 全国6割の読者がNO! その理由に「わかる!」の嵐 [https://mrs.living.jp/tokyo/a\\_feature/article/6213215](https://mrs.living.jp/tokyo/a_feature/article/6213215)

KDDI「さよなら現金」意識調査 <https://news.kddi.com/kddi/corporate/newsrelease/2018/04/04/3057.html>

学校間総合ネット「缶の抗菌作用」<https://school.gifu-net.ed.jp/ena-hs/ssh/H22ssh/sc2/21042.pdf>

