TOWARDS ALTERNATIVE

SUSTAINABLE PACKAGING

FOR FOOD COMPANIES

A BOOKLET

BY ACADEMIC CONSULTANCY TEAM 3.058

This booklet, created as part of our Academic Consultancy Training course at Wageningen University and Research, presents our rigorous analysis and collaborative insights with the Future of Food Institute. Our goal is to empower businesses and consumers to make informed choices for a greener future.

Content

Who We Are

FUTURE OF FOOD INSTITUTE

The Team

We are a diverse team of 7 master degree students from Wageningen University and Research, specializing in environmental science, sensory science, and consumer studies. Through Academic Consultancy Training, we have worked full-time on a project focusing on developing appealing and sustainable packaging solutions. Our collaboration brings a well-rounded perspective to the table.

The Commissioner

Future of Food Institute (FFI), based in Den Haag, the Netherlands, is a market research agency focused on sustainable food packaging. Their mission is to combat climate change by empowering consumers with sustainable choices. FFI provides valuable insights on consumer behavior to their clients, enabling them to innovate and communicate effectively for successful sustainable packaging solutions.

Introduction

Welcome to the world of sustainable packaging! In this booklet, we will uncover the elements that make up the ideal sustainable packaging. These packages need to actually be sustainable, as we want to fight climate change. But just as important, the packages need to be perceived as appealing and sustainable by consumers so that they are willing to buy the product.

These elements of packaging were explored using 3 studies. First, we did a literature review to uncover which elements influence consumers' intention to buy products with sustainable packaging. Based on these elements, we selected the 12 best sustainable packages from all over the world. Second, we calculated the actual sustainability of these 12 packages. Finally, we created an online survey where people had to rate 6 of the 12 packages on how appealing and sustainable they perceived them to be.

The combined results of these 3 studies lead to an overall judgement of how good these practices are, which we will present in this booklet.

On each page, you will find one of the 12 packages. Next to a picture, we will give a short description of the package. Then, the package receives a score from 1 to 5 stars based on the results of each study, after which we will briefly explain what makes the package great and what can still be improved. After all packages are discussed, we will present a table where we score each package per element such as colour or naturalness. To wrap up, we give a list of general recommendation points for appealing, sustainable packaging to help FFI guide manufacturers to create the ideal package.

Team 3.058

Methodology

Literature Review

For the literature review we tried to uncover what makes packaging appealing, what makes packaging perceived as sustainable, and how this influences consumers' willingness to buy products with a sustainable package. We used a search query and browsed multiple search engines. The findings of the most relevant and high-quality sources were used to answer the research questions. The results of the literature review guided the selection of the 12 best packages.

Actual Sustainability

We measured the actual sustainability of the 12 best packages to ensure that, next to appearing as successful packaging, the packages are actually sustainable. It was measured using 4 criteria: the calculated carbon emission of the package, the potential toxicity, material recyclability and composability of the package. These scores were combined and formed an overall score of how sustainable the package is in general.

Sensory Questionnaire

A sensory questionnaire was done to gather our own data on how consumers perceive sustainable packaging. Consumers living in Europe had to answer questions about what their opinion was on 6 of the 12 best packages, asking them to judge the packages based on elements related to appeal and perceived sustainability. This questionnaire was spread online, with 356 consumers filling in the questionnaire completely.

Orion's Desert Choco Pie

We suggest increasing the number of choco pies in a box rather than just one piece. Moreover, reducing the kraft paper thickness will lead to less packaging material and thus improve its sustainability score. It is a quite unique package for this product, both material and shape-wise, and the graphics are appealing too. However, it was perceived as unsustainable, unhealthy and unnatural. Moreover, the colour was not liked, and the package was perceived as expensive. Our recommendation would be to add more green and blue colours in the design to make it look more sustainable and make use of labels like 'ecological' to make the consumers more aware of the sustainability of the package.

3.1/5

★★★☆☆

4.0
3.8
1.5

SAIKAI Cookie Packaging

The package's unique shape is innovative, but the lack of product visibility and perceived expense hinder its appeal. Sustainability is perceived as low, lacking a natural and healthy look. To address this, a price label can communicate sustainability and affordability. The color choice did not convey sustainability effectively; a green-blue palette is recommended. Actual sustainability can be enhanced by using unbleached kraft paper instead of bleached paper and exploring individual packaging for biscuits to ensure food safety. The current thickness of the package should also be reduced. By addressing these issues, the package can improve its visual appeal, convey sustainability, and enhance overall product quality.

3.8/5

★★★★☆

4.0
3.4
4.0

Fibre-based Tray

The fibre-based tray is protective and safe to carry and therefore very high in convenience. The colour and text used are appealing, and it is transparent. This package is, however, not standing out in any unique attributes, the shape for example is boring. It was not perceived as innovative since it looks no different from the average packaging in the supermarket. We recommend putting a label on the tray to convey the message that it is made from fibre. This will make it clearer to consumers that this package is actually sustainable while also increasing innovativeness. Moreover, the thickness of the tray should be reduced, and manufacturers should consider using a bioplastic film rather than regular plastic for these kinds of packages.

3.4/5

★★★★☆

4.0
3.6
2.5

Leaf Packaging

Leaf packaging is a very innovative, sustainable packaging option. It looks healthy and natural, and the green colour is appealing. It has a high influence on consumers' willingness to buy the product. You can see the product well and it doesn't look expensive. Something that could be improved is the convenience: we should find a safer way to carry and protect products using the same packaging material to cover the vegetables a bit more. This package is perfect to use in regions where banana trees grow since it is a banana leaf. We suggest that the European market uses leaves from trees that naturally grow there instead, as transporting banana leaves won't be sustainable.

4.4/5

★★★★½

4.5
4.2
4.5

Biodegradable Sandwich Packaging

This packaging is perceived to be very sustainable, healthy and natural. It is convenient and the shape is unique. It is perceived to not be expensive, which positively contributes to the appeal. Weaknesses include a lack of innovativeness, and that the food inside is not visible. We suggest putting pictured instructions on the package that demonstrate how to biodegrade the package to a new plant. Moreover, it should be used to store dry food only rather than wet food, as the humidity from the food can cause unwanted sprouting from the seed. Moreover, we suggest the addition of a food grade water repellent coating for the inner layer made of seaweed for example to increase the shelf life of the package.

3.9/5

★★★★☆

4.5
3.8
3.5

Karma Reusable Sandwich Wrap

The practice was highly disappointing due to inconvenience. The material stains easily, requiring extensive washing and drying compared to plastic bags. The panel disliked the shape and color of the package. Redesigning it with a minimalistic approach, using blue and green colors, holds potential. This will give a more natural and tidy appearance. To enhance sustainability, use a stain-free, wash-free material. Clearly label it as a reusable sandwich wrapper. Consider implementing a returnable business model for the wrappers. Sustainability depends on extensive reuse. Lastly, switch from virgin to recycled fiber to improve overall sustainability.

2.3/5

★★☆☆☆

3.5
1.8
1.5

Biodegradable Seal Energy Bar Wrap

The material used for this package looks sustainable and natural. This package design is quite minimalistic, using little text and pretty colours, making the package appealing. Moreover, this package has a unique shape, adding the value of innovative elements. It is also perceived to protect food quality and safety well. This package is, however, less sustainable than it appears: it contains an inner layer that is less sustainable than the outer layer. We suggest reducing the layering material in the packaging.

3.9/5

★★★★☆

4.5
3.2
-

Bamboo Rice

Using bamboo as packaging material is perceived as very innovative, as it is not a function of bamboo consumers are used too. It is also perceived as sustainable: it looks green and natural. For appeal, this package does not score as well. There is very little information or other text on the package, and there are no graphics either. Moreover, the food inside is not as visible. This package has the potential to be very appealing with the addition of more appealing elements like using burn marks to put text or graphics on the package. For the actual sustainability we recommend using tree stems from the native area, meaning the use of bamboo will be less suitable in Europe.

3.8/5

★★★★☆

3.5
4.0
-

Notpla (Seaweed)

At first sight, this package looks very sustainable. The material already looks sustainable on its own, and the use of a seaweed film enhances that further. The use of seaweed also adds a unique, innovative element to the package. The design is very clean but contains little text. We propose informing the consumer better about what the package is made of and how sustainable it is by adding more informational text on the package. Moreover, we feel the percentage of kraft paper material should be reduced while the seaweed concentration, which is very low as of right now, should be increased.

4.3/5

4.5

4.0

-

Biodegradable Food Packaging into Plant

This package is perceived to be very sustainable since it looks very natural. Its ability to turn into a plant adds a fun and innovative element, and the shape is unique as well. The packaging contains informative text, which communicates the use clearly to the consumer. Unfortunately, it also has some very unappealing characteristics: there aren't any appealing colours or visuals on the package, and it is not transparent either. We suggest making the design more appealing with visuals demonstrating the seed growing process and adding green and blue colours. Moreover, this package should be used to store dry food only, since the humidity from the food can cause unwanted sprouting from the seed.

3.7/5

3.5

3.8

-

SEALPAC – Fibrestyle Thermoformer Packaging

This package has a fun, unique element: it can be heated. This innovativeness adds to the appeal of this package, as does the transparency. However, the colours used are quite bleak, and the shape is boring. We suggest using cooler colours and changing the shape into something unique. Moreover, the package would be more sustainable if the thickness of the paper material was reduced.

3.5/5

3.5

3.4

-

Minimax Jungle Multivitamin Gummies

For this package, we looked at the box, not the individual gummy packaging. The box has a unique shape: it is appealing and convenient that you can pick it up. Especially children like to carry their stuff around, therefore this shape idea can be used as a children toy concept as well. We suggest adding more graphics to the package and adding more colours to make it more appealing for children. A big sustainability issue with this package is that packaging within packaging is not sustainable and possibly unnecessary. Moreover, we think the kraft paper thickness should be reduced.

3.7/5

3.5

3.8

-

Summary

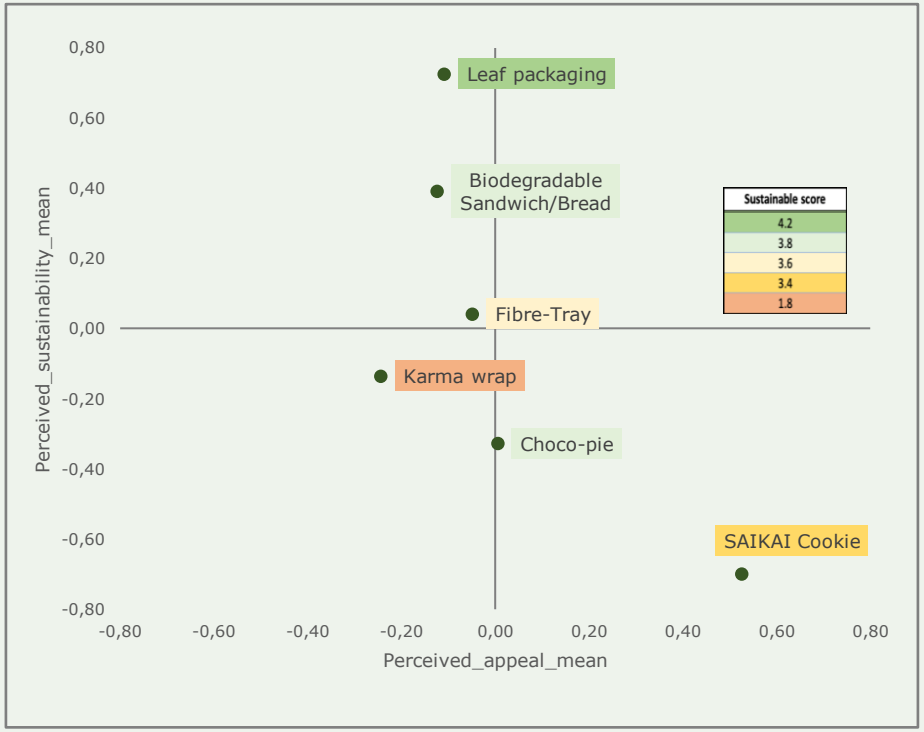
This table gives an overview of how the 12 packages scored for specific elements on appeal and sustainability. For products 6 to 12, the appealing elements are not rated because we do not have sensory data on them.

	Colour liking	Shape liking	Naturalness	Convenience	Innovativeness	Expensiveness	Health	Carbon emission	Potential toxicity	Recyclability	Composability
Orion's Desert Choco Pie	-	+	-	+	+	-	--	++	++	++	+
SAIKAI Cookie Packaging	++	+++	-	+	+++	--	-	+	++	++	+
Leaf packaging	+++	++	+++	-	++	+++	+++	+++	+++	--	+++
Fibre-Based Tray	++	+	+	+++	--	+	+	++	++	++	-
Karma Reusable Sandwich Wrap	--	--	-	--	+	-	+	--	++	-	--
Biodegradable Sandwich Wrap	+	++	+++	++	--	+	+++	++	++	-	+++
Biodegradable Seal Energy Bar Wrap								+	++	-	+++
Bamboo Rice								+++	+	-	+++
Notpla (Seaweed)								++	++	++	++
Biodegradable Food Packaging into Plant								++	++	-	+++
SEALPAC – Fibrestyle Thermoformer Packaging								++	++	+	-
Minimax jungle multivitamin gummies								++	++	++	+

+ this element makes the consumer more willing to buy

- negatively influences consumers' willingness to buy

Compositional Perceptual Mapping On Perceived Attributes and Actual Sustainability



- ✓ Natural, health, sustainable highly related with perceived sustainability. Which is important to be identified on package appeal.
- ✓ **None** of the 6 best practices were **perceived both appealing and sustainable**.
- ✓ **SAIKAI** is perceived as the most appealing, but least sustainable while also low in actual sustainability.
- ✓ **Leaf packaging** excels in perceived sustainable and actual sustainability but score lower in perceived appeal.

Recommendation

Optimize packaging efficiency and waste by removing unnecessary layers or reducing material thickness without affecting food safety.

Biofilm can work as a sustainable and transparent substitute for plastic because plastic looks expensive and has no sustainable appeal.

Inform and communicate sustainable insights with literal information through packaging design and sustainable brand marks to raise consumers' awareness of sustainable choices and prevent greenwashing practices.

Consider packaging options with a unique shape, natural look, and a cool-toned colour palette, in which natural materials are a preferable option.

Invest more in compostable plastic infrastructure and consumer education on proper composting procedure.

Use local materials that naturally grow in the area. For instance, bamboo and banana leaves in East Asia.

Implement systems that make use of the reusability of packaging such as the deposit return business model.