Press article

Vienna, March 2020

The supermarket check:

Paper carrier bags, reusable glass bottles, and organic produce bags: are these viable packaging alternatives or ecological nonsense?

As consumers, we have an ambivalent attitude towards packaging: on the one hand, we appreciate the convenience of a comprehensive local supply with food and goods of all kinds, but on the other hand, looking at the mountains of waste associated with this convenience sets the alarm bells in our ecological conscience ringing. Even though the impact on the environment can be minimized with a number of measures – short transport routes, recycling of cardboard, plastics, and glass, refillable instead of single-use containers – a world without packaging is unrealistic. To prevent food from perishing and thus avoid unnecessary waste, it must be adequately protected from external influences such as moisture, heat, and sunlight during transport and storage.

The packaging of food is therefore largely without alternative. Our much-cited common sense tells us that we need to choose the right kind of packaging for each product: namely the one that sufficiently protects the contents while leaving the smallest possible ecological footprint. This is where an important consideration that is currently gaining in popularity comes into play: design for recycling. In choosing and designing their packaging, companies now have a range of resources at their disposal, from design guidelines to internet platforms (e.g., RecyClass, RecyclingCompass), which help manufacturers to put their packaging through its paces. A good example of such a tool is the Circular Packaging Design Guideline of the University of Applied Sciences of Vienna "FH Campus Wien", which provides recommendations for designing recyclable packaging. These essentially cover the materials plastics, paper, glass, tinplate, and aluminum; design examples for, e.g., aluminum cans or HDPE bottles give a good impression of how a complete, recyclable packaging could look like.

Supermarkets: getting rid of plastic?

For a while now, the retail sector has been aware of the need for sustainable packaging solutions. Austrian supermarket chains proudly present their strategies for greater sustainability, from organic bags and reusable nets up to carrier bags made of jute. It is striking that a large part of these measures is directed against the material plastic. While SPAR limits its campaign to "saving plastics together", the REWE Group is taking a more aggressive approach with "getting rid of plastic". It almost appears as if merely dispensing with plastics was considered a guarantee for greater sustainability. Admittedly: plastics have an image problem. The media are full of pictures of polluted beaches, reports about the littering of the seas with plastic products and debates about the effects of microplastic on the human digestive system. But the problem is not plastic, it's what we do with it, as rightly stated in the UN strategy for single-use plastics. As with all other materials, the specific purpose for which the plastic is used determines the sense and sustainability of plastic packaging.

So how sustainable are the measures of local supermarket chains in reality? In the following, three of these measures will be examined in more detail: the banning of single-use plastic carrier bags, the expansion of the range of refillable glass bottles at the

expense of PET bottles as well as the shift from conventional plastic produce bags to various alternatives.

Carrier bags – even our common sense can be misleading

It's a fact that the ban on single-use plastic carrier bags is not something that the supermarket chains came up with, but a direct consequence of EU directive 2015/720, which aims to drastically reduce the per capita consumption of lightweight plastic carrier bags. As a reason, the EU directive states that the disposal of plastic carrier bags causes environmental pollution such as the accumulation of waste in bodies of water. Even though plastic bags constitute only a small part of marine waste, waste prevention is definitely a good thing, provided that the right measures are taken.

On the positive side, supermarkets generally call for waste avoidance and motivate customers to bring their own shopping bag or basket to the supermarket. Anyone wishing to purchase such a bag for multiple use may do so at the checkout; popular are, e.g., bags made of plastic nonwoven. For spontaneous purchases, bags made of recycled plastic are partly offered; however, in the single-use sector, plastic is increasingly replaced with (recycled) paper. "My common sense tells me: paper instead of plastic" is the catchy advertising slogan on REWE's shopping bags with which the group serves a common prejudice. In reality, it is doubtful whether paper bags are indeed the better alternative. Paper may have the reputation of being a natural, eco-friendly material, but from an ecological point of view, paper carrier bags do not perform better, but actually worse than their plastic counterparts.

This is mainly due to the fact that the production of paper carrier bags is very energy- and water-intensive; in addition, chemicals such as cooking liquor or bleaching agents are used which pollute the environment. Moreover, paper bags are poorly suited for multiple use, as they are not particularly tear-resistant and unable to withstand higher levels of moisture. So while waste avoidance and multiple use are good and important measures, simply replacing plastic with paper does not constitute an improvement, as long as the carrier bags are disposed of in a responsible way. Incidentally, the winner of the Life Cycle Assessment of the Swiss materials research institute EMPA is the carrier bag made of more than 80% recycled plastic; to achieve the same value per use, a paper bag would have to be used 7.4 times. The cotton bag achieved the worst rating, owing to the high environmental impact of cotton production.

Refillable glass bottles or PET recycling?

PET bottles are just perfect for the transport of beverages: they are light, flexible and some of them already consist of 100% recycled material (e.g., the mineral water bottles from Austrian beverage producers Römerquelle and Vöslauer). A life cycle analysis commissioned by the Swiss Federal Office for the Environment shows that the 1.5-liter PET bottle has the best balance of all mineral water bottles tested – only tap water with soda stream is more environmentally friendly. The glass bottle performs less well, as its production as well as the melting process require much more energy (liquefaction only from approx. 1,500 degrees, PET bottle from approx. 250 degrees) and its high weight causes considerable CO_2 emissions during truck transport. While glass bottles account for around 50% of the weight of a truckload, the maximum share of PET bottles is 10%. The higher weight also affects the transport home from the supermarket: With glass bottles, it is more likely that the consumer will use the car, which in turn generates CO_2. Even though refillable glass bottles have a better balance than single-use glass bottles, the

washing process also has a negative impact on the environment, and weight remains a limiting factor. For the PET bottle, a recycled content of 35% was considered in the analysis – so there is even room for further gains.

So why is the glass bottle currently celebrating a comeback in Austria's supermarkets? It is often generally assumed that glass bottles are ecologically more sustainable, and in the end measures are taken that are effective in terms of advertising but do more harm than good to the environment. Other reasons are the better image of glass in the population and higher sales volumes associated with it.
As already mentioned, transport routes have a major influence on the sense and nonsense of packaging. "Multi-use is ecologically the most sensible option for beverage packaging if the bottles go through many refills and the distances between bottler and consumer are as short as possible," says a statement on the website of the Austrian supermarket chain SPAR. According to the Swiss analysis, however, refillable glass bottles no longer make ecological sense if they are transported 230 km or more. In general, it is important to choose the best type of packaging in accordance with the type of beverage and consumption (at home or on the road), and larger containers are more environmentally friendly than smaller ones (1.5 vs. 0.5 liters) due to the content/packaging ratio.

Fruit and vegetables – how organic are bioplastic bags?

Another area in which the trade sector is renouncing the use of plastic is fruit and vegetables. Many types of fruit and vegetables such as bananas or avocados don't even need to be packed separately – their hard skin allows for them to be transported in the shopping trolley without the need for produce bags. The familiar produce bag made of thin plastic is increasingly being replaced by single-use alternatives that are often labelled "organic" or "eco". The good news first: most of these bags carry the label "OK compost HOME" and are therefore suitable for consumers' own compost heap. Furthermore, they are compostable according to the norm EN 13432, which means that they decompose in an industrial composting plant after 3 months to a large extent. Because these composting plants usually cannot distinguish between compostable and conventional films, and because the operators fear for the quality of the compost, these "organic" bags are usually sorted out and end up in the residual waste – just like conventional plastic bags. And organic bags do not belong in the yellow bin or in the yellow sack either, as their composition varies greatly:

	REWE eco bag	HOFER fruit and vegetable bag	SPAR organic bag
Manufacturer	NATURABIOMAT	VICTOR Güthoff & Partner	NATURABIOMAT
Material – what is stated on the bag	not specified	contains 40% renewable raw materials	based on renewable raw materials
Material – what is actually used*	acc. to REWE Group: potato starch and biodegradable plastics	the BASF bioplastic ecovio® consists of: fossil-based plastic, polylactic acid, and other additives	the basis of NATURABIOMAT® is formed by, e.g., starch, plant-based oils, cellulose, lactic acid, wood, sugar cane
Label OK compost HOME	✓	✓	✓

Source: REWE Group; BASF (bioplastic ecovio®); Naturabiomat (no information from SPAR available)

Biodegradable plastics can be bio-based, but they don't have to be. The "organic" bags examined here consist at least in part of renewable raw materials such as wood, potatoes or sugar cane, which require land, water and in most cases fertilizers and pesticides for their cultivation (although REWE emphasizes that only industrial waste is used in the production of the "eco" bag). However, some of the sacks still partly consist of fossil raw materials, which explains the aforementioned concerns about compost quality.

Of course, that much eco-friendliness is not exactly cheap – the change from conventional bags to "organic" bags creates additional costs (about 3 euro cent apiece), which in most cases have to be borne by the consumer. In addition to the single-use produce bags, REWE and SPAR also offer washable reusable nets for sale in packs of three, with the weight of the nets being deducted at checkout. REWE offers a cellulose net made of wood-based fibers, SPAR a plastic net made of polyester. The advantage of cellulose nets is that they cannot shed microplastics during washing; however, it must be taken into account that raw materials have to be cultivated for their production and again chemicals (cooking liquor) are used.

Summary

Every packaging material pollutes the environment – there is no variant without significant disadvantages. However, a few general recommendations can be derived:

- The multiple use of carrier bags makes sense and is rightly encouraged. Replacing single-use plastic carrier bags with paper bags, on the other hand, is ecological nonsense, especially since carrier bags made from more than 80% recycled plastic (as well as bags made from virgin plastic) perform much better in a life cycle analysis.
- In the case of beverage bottles, the general rule is that refillable glass only makes sense for short transport distances (below 230 km). The PET bottle has a better eco-balance due to its low weight and good recycling possibilities – and also because less energy is used in the production and recycling process.
- The "organic" bags offered in Austrian supermarkets are now compostable – at least on consumers' own garden compost. In industrial plants, they are classified as foreign substances and sorted out. As their composition varies greatly, they do not belong in the yellow bin or the yellow sack.

Images and captions (all shutterstock.com):

Image 1: Carrier bags – even our common sense can be misleading.

Image 2: Refillable glass bottles or PET recycling?

Image 3: Fruit and vegetables – how organic are bioplastic bags?

Sources:

Circular Packaging Design Guideline: Empfehlungen für die Gestaltung recyclinggerechter Verpackungen [Recommendations for the design of recyclable packaging]. FH Campus Wien. 2019. https://www.fh-campuswien.ac.at/de/forschung/kompetenzzentren-fuer-forschung-und-entwicklung/kompetenzzentrum-fuer-sustainable-and-future-oriented-packaging-solutions/circular-packaging-design-guideline.html

Ökobilanz Getränkeverpackungen [Life Cycle Analysis of beverage packaging]. Carbotech im Auftrag des Bundesamts für Umwelt Schweiz. 2014. https://carbotech.ch/cms/wp-content/uploads/Carbotech-LCA-Getraenkeverpackung-2014.pdf

Ökobilanz von Tragetaschen [Life Cycle Analysis of carrier bags]. Hischier, Roland. Technology & Society Lab Empa, St. Gallen. Swiss Federal Laboratories for Materials Testing and Research. 2014. https://www.empa.ch/documents/56122/458579/Oekobilanz-Tragetaschen.pdf/490f9506-a9d1-4ad8-ac56-e797cc39246a?version=1.1

Richtlinie (EU) 2015/720 des europäischen Parlaments und des Rates vom 29. April 2018 [Guideline (EU) 215/720 of the European Parliament and the Council]. Amtsblatt der Europäischen Union. https://eur-lex.europa.eu/legal-content/DE/TXT/HTML/?uri=CELEX:32015L0720&from=DE

About Starlinger & Co. Ges.m.b.H.:

Starlinger is a Vienna-based engineering company with production sites in Weissenbach and St. Martin, Austria, as well as Taicang, China. As the world's leading supplier of machinery and complete lines for woven plastic bag production, recycling and PET ex trusion and refinement, Starlinger & Co. Ges.m.b.H. is a synonym for leadership in quality and technology in over 130 countries. Founded in 1835, the family-owned business has been exporting machines worldwide for more than 50 years with an export quota of over 99.5 %.
Sales and service centres in Brazil, China, India, Indonesia, Mexico, Thailand, Russia, South Africa, USA and Uzbekistan ensure quick and professional technical support and service.

Contact for press enquiries:
Andrea Hackl
Starlinger & Co. Ges.m.b.H.
Sonnenuhrgasse 4
1060 Vienna, Austria
T: +43 1 59955-1251
F: +43 1 59955-180
E: sales.hac@starlinger.com
www.starlinger.com