

Hello and welcome to my presentation about the current packaging trends in Europe. My name is Marina Dodel and I'm Project Managerin in the Corporate Innovation Center of MULTIVAC in Germany.



Before giving an outlook to the future, I'd like to go back in time with you. On these pictures you can see the development of the famous "Heinz Tomato Ketchup" bottle. In the beginning it was an upright facing glass bottle, but the packaging in which we buy our ketchup nowadays is a plastic bottle that is standing on its cap. I'm curious to know that changes the future might bring for this product.



But now let's start with the current packaging trends.

Here I've got an overview of the official packaging trends for 2022 by Innova Market Insights. Innova is a global market intelligence company for consumer-packaged goods, specializing in the food & beverage and personla care sectors.

As you can see in this overview, the biggest trend is called. Food Waste

As you can see in this overview, the biggest trend is called "Food Waste Fighters"which deals with extending the shelf life of products to largely prevent food waste.

The second trend is called "Monomaterial mastery". This trend is about using monomaterials to improve recycling and strengthen the circular economy. The third big trend is called "Bioplastic boosters". This trend is about the increasing demand for bioplastics to reduce the use of conventional plastics made from petroleum.

The fourth trend is called "Labels unleashed" which is combining the big trend of digitalization on the one hand and the big trend of sustainability on the other. And last but not least trend number 5 is called "Caps uncovered". Here again this trend belongs to the big Megatrend Sustainability and aims to improve the recyclability of caps especially in the beverage market.

In the following slides I'll put a spotlight on every single point and give some

examples. Once I'm finished with these five, I'll continue with some trends which are not listed here, but which we as MULTIVAC additionally recognize on the market.

1. FOOD WASTE FIGHTERS

- food waste has a enormous carbon footprint
 - → minimizing waste through shelf-life extending packaging solutions
- due to Covid-19 more consumers accept or even want protective packaging

4 e.g. France recently banned plastic packaging on some fruits and vegetables



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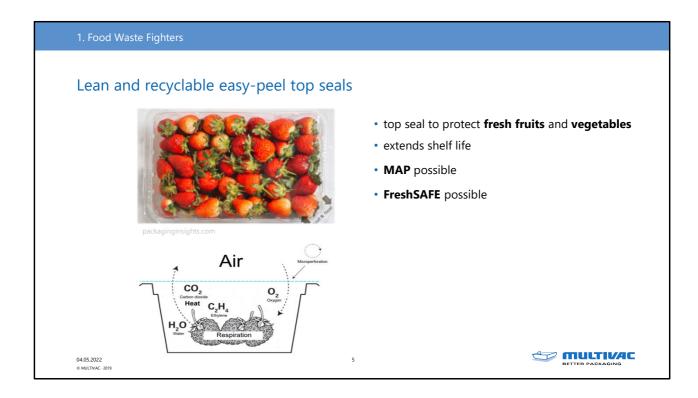
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As you already know, "Food Waste Fighters" seems to be the most important trend this year. Food waste has an enormous carbon foodprint. It actually is so big, that if food waste was a country it would be the third biggest carbon dioxide emitter right after China and the USA. As a result of this, minimizing waste through shelf life extending packaging solutions is the main goal.

A positive factor is that due to Covid-19 more consumers accept or even want protective packaging on their goods.

In contrast to people minds is for example France. The country recently banned plastic packaging on some fruits and vegetables completely.

In the following slides I'm going to show you some examples that follow this trend.



My first example in this presentation is an easy peel top seal that is also lean and recyclable. I'm sure you have already seen similar products in the supermarket. This film is made to protect fresh fruits and vegetables. MAP is possible and so the shelf life of a product can be extended.

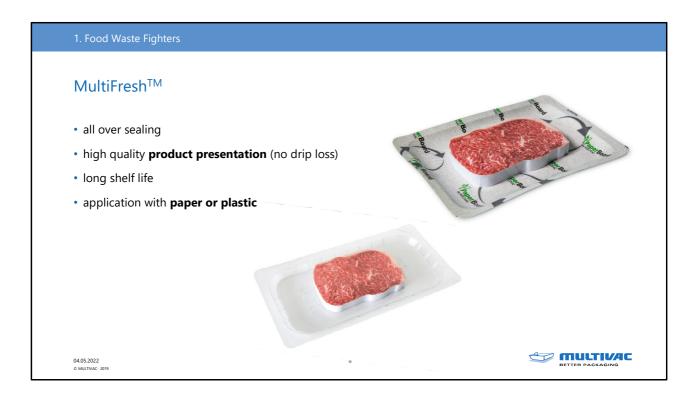
Another option especially for the fruit & vegetables market is the use of MULTIVACs so called FreshSAFE technology. This technology is a packaging system with an integrated perforation station for thermoforming packaging machines and traysealers, in which the upper web is perforated during the packaging process. The microperforations are created by a needle roller system or by laser technology. The number and size of microperforation holes always depends on the product. The micro-holes allow the products to breathe optimally, which makes it possible to perfectly adjust the shelf life of the products.



My second example is a sandwich skillet. It is designed to provide extended shelf life for the European food-on-the-move and convenience sectors. As before, MAP is possible with this kind of packaging that is also recyclable.



By packing minced meat in a tray like the one on this picture, the shelf life can be increased from 7 to 12 days. The reason for this extension are active additives that are also certified for food contact by EFSA. The food safety is guaranteed through antimicrobial technology. As before, this packaging has another positive effect with being recyclable.



This is my last example for the trend "food waste figthers". It's called MultiFresh and it's a invention from MULTIVAC. A long shelf life is provided by all over sealing. Furthermore this also guarantees a high quality product presentation since there's no drip loss. To be more sustainable it's possible to use a PaperBoard on the bottom that reduce the plastic content.

2. MONOMATERIAL MASTERY



- · trend towards monomaterial packaging
- aim: increased recyclability for a circular economy
- the EU Plastics Strategy requires all packaging to be recyclable or reusable in an economically viable way by 2030
- focus: simplification of material components

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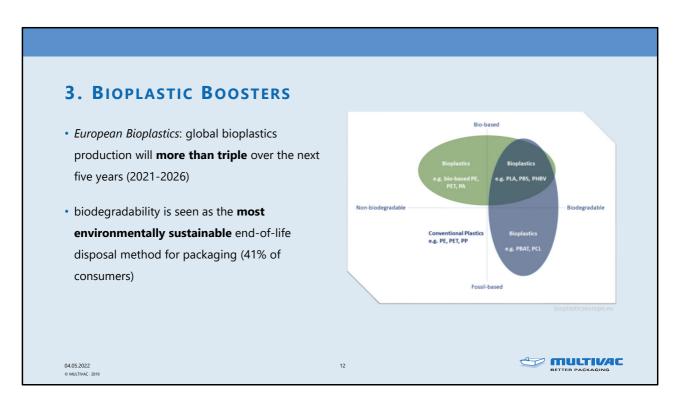
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"Monomaterial Mastery" is the second trend for 2022. It describes the movement towards monomaterial packaging with the aim to increase the recyclability to enable a circular economy. Another aspect is that the EU Plastics Strategy requires all packaging to be recyclable or reusable in an economically viable way by 2030. In other words, the focus is on the simplification of material components. Like before I'm going to show you some examples where this trend has already been implemented.



On the left hand side you can see monomaterial plastic pouches. Even though they're made of polypropylen, they provide a great barrier to protect the product.

At MULTIVAC we have a recyclable flexible film packaging in our portfolio that you can see on this slide. It is a coextruded eleven-layer film based on PE and PP. Since it has an EVOH barrier, it provides a long shelf life. Another consumer friendly point is that the packaging is easy to open due to an an easy-open corner and peel function. Besides the recyclability this packaging even brings more positive impacts in terms of sustainability through the use of thin, recyclable films.



As mentioned in the beginning, Bioplastic Boosters is the third packaging trend this year. On this graphic you can see the definition of bioplastics. The term comprises a wide field of different materials. They can be biodegradable, but they don't have to. They can be bio-based, but also fossil-based. European Bioplastics stated that the gobal bioplastics production will more than triple over the next five years, so it will become an important sector. One reason for that might be that biodegradability is seen as the most environmentally sustainable end-of-life disposal method for packaging. On the next slide I'll show you an example for a biodegradable packaging.

3. Bioplastic Boosters

Home-compostable laminate



packaginginsights.com

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certified to degrade in home and community composts

- two-ply laminate with **medium-barrier**
- for stand-up pouches, zipper pouches, pillow bags etc.
- suitable for packing e.g. dried fruit, nuts, cereals, spices and dry pasta



The pouch that you can see on this picture is said to be home-compostable. It consists of a two-ply laminate with medium barrier that is certified to degrade in home and community composts. The film can be turned into stand-up pouches, zipper pouches, pillow bags, just to name a few applications. Some examples for goods that can be packed inside this material are dried fruit, nuts, cereals, spices and dry pasta.

PLA (Polylactide)

- Based on current knowledge, thermoplastic PLA is the most practical alternative for producing thermoformed packs made of biopolymers from renewable resources.
- Due to its low barrier properties and impact resistance, the applications for thermoformed packs made of this material are comparatively limited.
- Dedicated to packaging products with short/medium shelf life (mainly fresh products)
- It is often used in the fresh fruit and vegetable sectors.
- Compostable as per DIN EN 13432





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Another solution which is already available on the market is the material PLA which is the abbreviation for Polylactic acid.

PLA has been around for many years and is mainly used for packaging fruits & vegetables due to its low barrier properties.

PLA is mainly made out of corn starch and is industrial compostable as per DIN EN 13432.

Currently there are many many developments going on at the market. Most of them go in the direction of biomaterials made from waste products so that they are not in competition with potential food products such as corn or wheat.

Unfortunately, most of them are currently still under development but are hopefully also available on the market in larger quantities in the near future.

4. LABELS UNLEASHED

- labels are notorious for hindering packaging recyclability
- industry shift toward easily-separable labels and recyclable or renewable label materials (Innova Marketing Insights)
- technologies like digital ecosystems and invisible watermarks
 - > easier sorting and recycling







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The fourth packaging trend by Innova Market Insights is "Labels Unleashed". Labels are notorious for hindering packaging recyclability since labels often are made from different materials than the main packaging. An industry shift toward easily-separable labels and recyclable or renewable label materials is recognizable and will be even stronger soon. Labels do also have the important function of giving information. As part of this, technologies like digital ecosystems and invisible watermarks can be used to make sorting and recycling easier. But theses technologies will be discussed later in my presentation. First I´II go on with some examples.

4. Labels Unleashed

Self-separating cup



- main issue: most consumers don't separate cardboard from plastic
- innovation: the cup's cardboard sleeve detaches
 by pressure at recycling centers
- unprinted cup can be recycled effectively
- by Greiner

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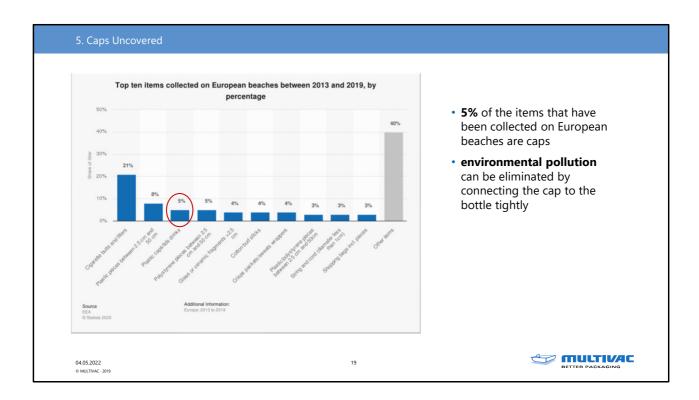
In this GIF you can see how a self-separating cup works. The main issue with full-wrap labels on cups is that most consumers don't separate the cardboard from the plastic. This makes both materials impossible to recycle. A new innovation might solve this problem: The cups cardboard sleeve detaches by pressurean recycling centers so that both materials can be collated to different recycling streams. Furthermore the cups don't have to be printed on since all the information is given on the cardboard sleeve. These unprinted cups can be recycled more effectively.



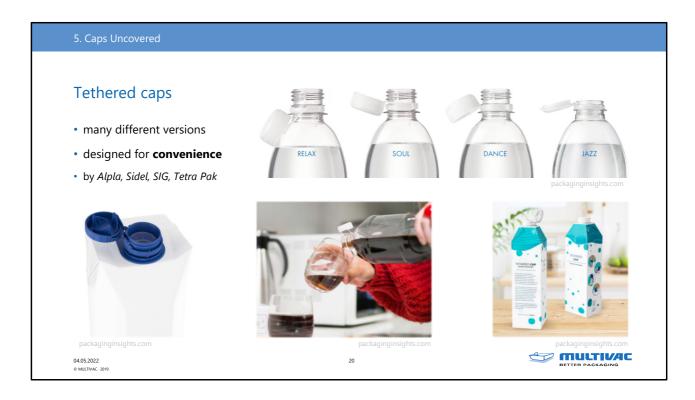
My next example is the PaperBoard tray with a full wrap label by MULTIVAC. It is made from renewable ressources and consists to 100% of paper. The label has a positive impact on the stability of the packaging so that high stability and good stackability can be guaranteed.



The last trend that you saw on the graphic at the beginning is Caps Uncovered. I bet that all of you have read the term "100% recyclable, excluding the cap" on a plastic bottle, but soon this expression might be the past. As I already mentioned in my presentation, recyclability is very important. Besides this there's an incoming EU legislation that stipulates that caps must remain attached to containers in the future. With these instructions innovations in caps, closures and spouts are already being made. In the next slide I'll give you a better explanation, why loose caps are a problem for the environment.



Take a look at this. 5% of the items that have been collected on European beaches are caps. 5% might not seem much but if you think about it, eleminating these 5% would be worth it, since it can be done easily. By connecting the cap to the bottle tightly some environmental pollution can be wiped away. I'll show you some examples where it's already been done.



On these images you can see many different versions of tethered caps. They're all designed for convenience and differ depending on the occasion. This is my last slide where I'm talking about the packaging trends by Innova Market Insights. On the following slides you'll get an impression of further trends that might have been around for some years but aren't any less important for the packaging industry.

VEGETARIAN / VEGAN / PLANT BASED

- the packaging has to show sustainability to transfer this feeling onto the product
- rising demand for plant based products

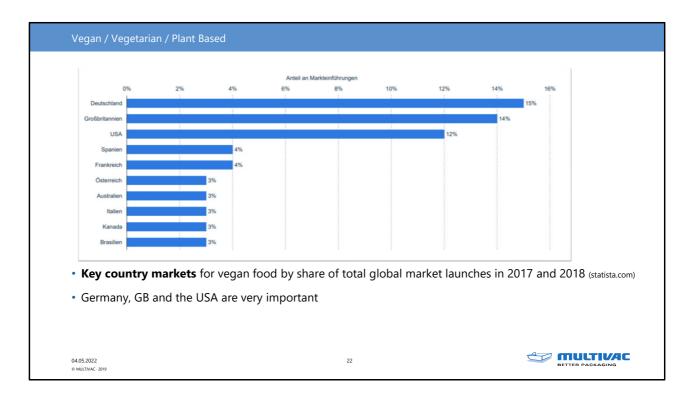


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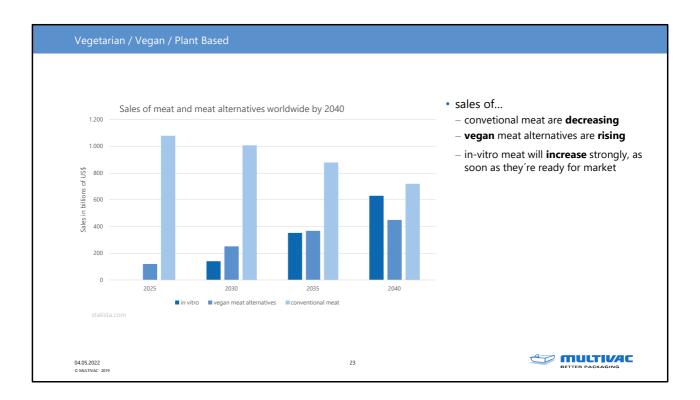
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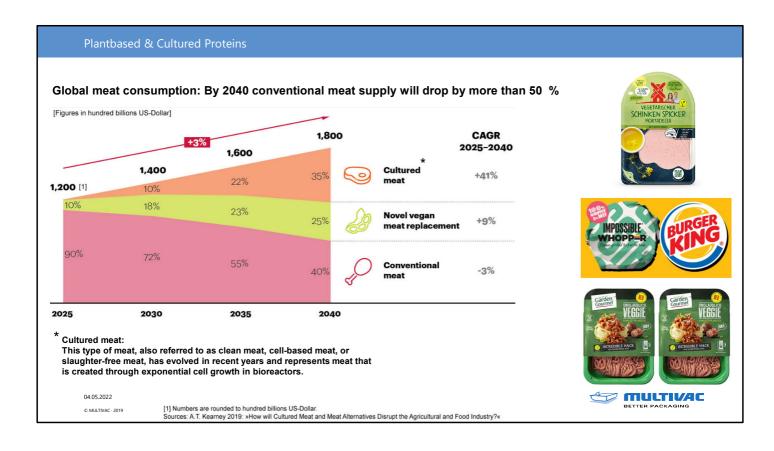
I bet that you've realised the growing offer on vegetarian, vegan and plant based options in the supermakets. For many consumers it's important that the packaging reflects the sustainable aspect of the product they're buying. Packaging has always been a way of communicating with the costumer. Today it has to give a feeling of sustainability. Let me show you how fast this sector already is and how fast it will be growing over the next years.



On this graph you can see the key country markets for vegan food by share of total global Market launches in 2017 and 2018. It's already four years old and the vegan food market is changing rapidly but this can give you an idea of the current situation. Since this graphic is in german I'll translate it for you. The title says "share in rollouts". On the left hand side you can see the different countries. Germany is number one, followed by Great Britain and the USA. In these countries the market for vegan products is already established and fast growing, but other countries are following these pioneers.



Let's have a look at this. It's a prediction for the sales of meat and meat alternatives worldwide for the next 20 years. As you can see the sales of conventional meat, illustrated in light blue, are decreasing. In contrary the vegan meat alternatives are rising. From like 2030 on in-vitro meat will enter the market and it's predicted that its sales will increase strongly. The reason for this development is the rising awareness for sustainability within the population. Next I'll show you an example on how vegan alternatives can be packed environmentally friendly.



Here again an overview about the rising market.

A.T. Kearney published an interesting study about the market in the next decades. The conventional meat supply will drop by more than 50%. The consumption of meat in general grow 3% year over year in the next twenty years.

But the high growth will be in cultured meat and vegan meat replacement like plantbased meat.

Plantbased & Cultured Proteins

Growing market for plantbased meat

Market experts assume that the niche market for plant-based meat will grow strongly in the coming years



Nestlé's vegetarian and plantbased products grow 40%

30-Jul-2020 By Oliver Morrison

The Swiss food giant revealed a big rise in the meatless trend in its half-year results as more consumers experiment with new food options in home.

HKScan cooperation's





HKScan is looking into opportunities to expand sales of plant-based protein products to the home markets.

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<u>The</u> world's largest food company Nestle also sees enormous potential for Plantbased protein products. Under the brand name Garden Gourmet they offers a wide range of different plantbased products.

Also HK Scan company is successful and sees the enormous potential in this sector. HK Scan bought this two companies HesproFodds and Boltsi which produce plantbased meat products.

Plantbased & Cultured Proteins







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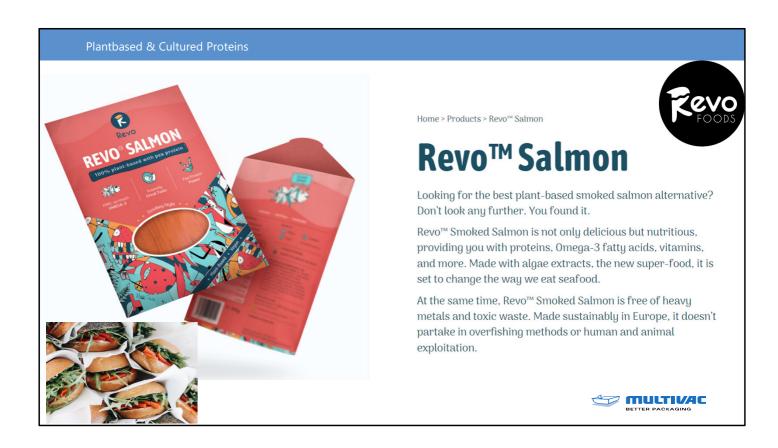
Protein sources: peas, oats, no soy

Application: Multivac thermoform solution with carton board trays

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Another successful company is Endori, formerly Amidori, which pack their product in our sustainable carton board solution with protective atmosphere for longer shelf life.



How they produce plant-based smoked salmon? with 3D-printing! Revo Salmon uses plant based materials filled in 3D-printing machines and print salmon filets. Revo Foods will build a 3D Printing facility for plant-based fish. This technology can realize specific structures of fish.



In our society the number of people who order food online is constantly rising. It's predicted that this number will grow by 66 percent by 2023. On the graph you can see the development over the last years. As a result of this, packaging doesn't need to convince at the point of sale anymore. This makes appearance become less and less important. The new focus is set on weight reduction so that the cost for delivery are as small as possible.

E-Commerce

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Shelf life & Product freshness

- second-largest barrier stopping European shoppers from buying food online: avoiding food waste
- shelf life and product quality must be guaranteed
- Amcor's new packaging prolongs freshness and shelf life



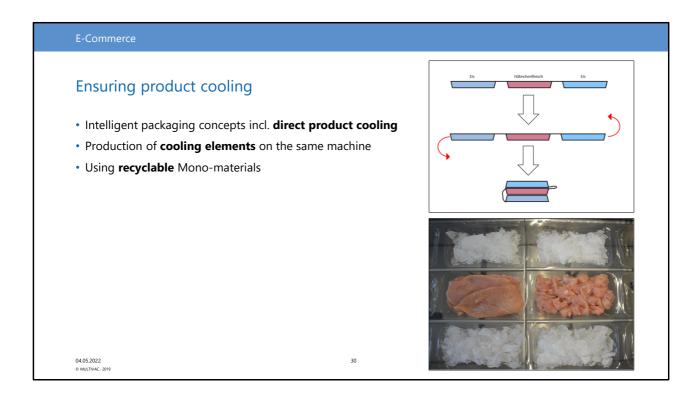
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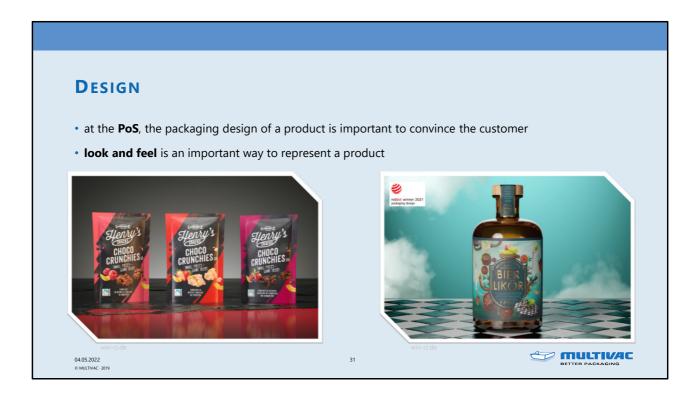
Another important aspect is that shelf life and the product quality has to be guaranteed. The second largest barrier stopping European shoppers from buying food online is that they want to avoid food waste. They believe that fresh goods perish faster when they buy them online and not in their local supermarket. Amcor invented a pouch that prolongs freshness and shelf life. In that way the consumers needs are fulfilled.



In order to be able to guarantee freshness and quality, for most of the products cooling elements are mandatory in the online business.

Therefore it's possible to produce cooling elements or even intelligent packaging concepts with direct product cooling on the same machine than the products are packed.

By using recyclable Mono-materials you can improve the recyclability of the packs and you can also reuse the cooling elements several times!



Another important topic when speaking about packaging is "design". When it's not sold online, the design is important to convince the customer at the point of sale. An important way to convince someone to buy a product is the look and feel of the packaging. If it's appealing, a customer is more likely to buy a product. On these two pictures you can see examples of packaging that is also "made for instagram". It looks so good that some people might buy it only to own the product since they really like its appearance.

Design

Representing a brands intention

- cleaning products based entirely on natural ingredients
- the brands DNA was translated into a clean and bold design language with straight colourcoding and natural touch
- refers to the good old days with grandma's natural cleaning ingredients
- won the German Packaging Award 2018



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Another well known function of packaging is to represent a brands intention. On this slide you can see some cleaning products that are based entirely on natural ingredients. For marketing Intention, the brands DNA was translated into a clean and bold design language with straight colourcoding and natural touch. The packaging refers to the good old days with grandma's natural cleaning ingredients.



The last trend I want to mention in my presentation is digitalisation. This trend is occurring in nearly every part of our lives. Digitalisation opens many new possibilities. One that most of us have already used at some point are QR-codes. They provide further information without using lots of space on a surface. Via internet the whole world is connected. There are many examples how digitalisation can be used within packaging and I'll show you two new ones.

Digitalisation

Digimarc – invisible digital watermarking







Performs Like This

- watermarks are repeated many times to make scanning more efficient
- · provides a number of key benefits:
 - Brand Protection: protects digital and physical assets for greater security, authenticity and trust
 - Traceability: variable data printing and serialized identities that ensure the authenticity of the products and reveal new insights throughout the global supply chain
 - Recycling: improvement of the automated sorting of recyclable plastic waste

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The first one is called Digimarc. It can be described as inivsible watermarking and on the left you can see how it works. The invisible watermarks are repeated many times to make scanning more efficient. This invention provides a number of key benefits:

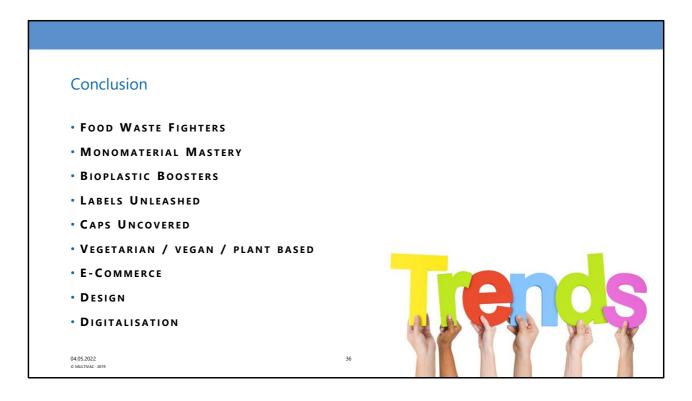
- First benefit is the brand protection. The Digimarc codes protect digital and physical assets for a greater security, authenticity and trust!
- Second benefit is the traceability. Due to the Digimarc codes the authenticity of the products and insights rhroughout the global supply chain can be ensured
- Third big benefit is the improvement of the recycling. Big target of the Digimarc Codes is to improve the automated sorting of plastic waste. Due to the codes the near infrared scanners on a plastic waste sorting plant can detect the materials very easily and can therefore sort out it in the rigth direction!



A further and also the last thing I want to present to you is R-Cycle.

R-Cycle is a cross-industry consortium, which is working on an open and globally applicable tracing standard.

R-Cycle permits high-quality recycling by tracing the life cycle of packaging. While doing that it permits high-quality recycling by tracing the life cycle of packaging. R-Cycle has the capability to map all recycling-related data digitally so that they can be recalled from anywhere in this world. One way to apply this technology without destroying the design of your packaging is using the Digimarc technology which I showed you on the last slide.



Summarized, we defined 9 big Trends which we think this will influence the packaging industries in the next years.

From our point of view these are the most important topics for the next years and if you have any questions or you need any packaging solutions therefore, please feel always free to get in contact with me and my MULTIVAC colleagues!

Be ready for something new! We are at your side!



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Last but not least, I would like to leave you with the following. Please be open and ready for something new, be brave and also faithful to try new trinks and therefore we are at your side!

Thanks!