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Smartly packaged - Pharma 4.0 opens up new possibilities in the packaging process and for communication between patient and pharmaceutical companies

The characteristics of pharmaceutical packaging are many and various. Delicate products must be protected from glass breakage and climatic factors. Packaging serves as an information medium for manufacturers and for their communication with customers. Its design is intended to contribute to reducing production and distribution costs. The application of security features enables products to be identified and is intended to ensure protection from falsification.

However, pharma companies have long been seeking more far-reaching solutions for packaging. By adopting so-called "smart packaging", manufacturers are pursuing various goals. Products and their packaging are to be personalized. Product safety, for example in terms of tamper evidence, traceability and the recording of variations in temperature, is to be further improved. Direct, two-way communication with the end user, in the case of test kits, for example, is to be made possible. And for the patient, functions with added value are to be created, going beyond using the actual product. The use of smart packaging can also contribute to production and packaging processes running even more smoothly and more efficiently, for example by enabling the pack and the packaging machine to communicate with one another.

From folding box to machine to folding box: communication in the production and packaging process

On the route through the production and packaging process, information which is stored on the product or the product packaging is read by the respective machines. In this way, production and packaging processes, for example machine set-up, can be controlled and activated in an individual and personalized way.

The packaging itself can “continue to learn” during the process: information is transferred from production to the pack. At a later point in the process, for example during the secondary packaging process, this information can be used to place the correct products in the correct folding boxes and these can then be printed individually with the appropriate customer and country-specific information.

Rondo and Dividella are currently working on the interaction between the folding box and the packaging machine. In this area they are opting to use Near Field Communication (NFC). With the help of the international transmission standard, data is exchanged over short distances using radio technology. The data is stored on chips which are integrated into the folding box blanks when they are manufactured. This data consists of information on the desired packaging process. At the right moment, it is transferred to the machine, which activates appropriate processes – for example the control of a robot, which performs filling of the secondary packaging with the personalized product.

A collaborative robot for efficient handling of small lot sizes

In the pharmaceutical industry, the trend is moving in the direction of small quantities of items and personalized packaging of medicinal products. Jürg Messmer, Head of Engineering Automation at Dividella is convinced: “Using a collaborative robot on an automated packaging system is the ideal extra factor to achieve the flexibility and efficiency demanded by the market, even for small lot sizes.”



At interpack 2017, Dividella is therefore presenting for the first time its highly flexible NeoTOP x packaging machine, equipped with an ABB collaborative robot. YuMi® is used as the manual insertion module of the packaging machine. With infinite stamina, reliably and above all making no mistakes, the robot increases the efficiency of the packaging system, which is tailored to increasing product segmentation and falling lot sizes. YuMi can insert any product - which may be blisters, syringes or injectors - into the pack, undamaged and in the desired quantity. "With manual filling there is a risk of activities being carried out wrongly, arising from the alignment of the product or the force which is applied. If that is not detected subsequently in quality control, it can have really critical consequences for the patient", explains Messmer. But if YuMi takes over filling, such sources of error can be eliminated.

QR codes, Near Field Communication (NFC) and Augmented Reality: a new method of direct communication

Two-way communication between manufacturers and end consumers has a lot of potential for both parties and can be further improved by using smart packaging. Within the packaging process, using inkjet and laser printing techniques, Dividella is able to apply a QR code to packs which have already been personalized with the customer's name. If this code is read using an appropriate application on a mobile device, for example a smartphone, patients are directed to an internet site which contains personalized information, for example about how to take the medicine.



Rondo is adopting a similar approach. Once again, the company is opting for the integration of NFC technology in folding boxes. All that is needed to read the data is a suitable terminal, for example a smartphone. “Our folding box enables direct communication between patient and packaging. In addition, it opens up new possibilities for dialogue between patient, physician and pharmaceutical company”, says Mark Helfenstein, Rondo's Head of Packaging Development. At interpack, Rondo is presenting five different applications.



(1) For clinical studies, data on an individual patient is placed on the chip. Via an app which the physician and patient download onto their mobile phone, both can communicate and exchange data during the study. (2) In addition, the chip can be used to remind the patient to take his or her medicine, thereby increasing compliance. (3) The patient can also be provided with additional information. For example, the enclosed leaflet can be read using the app. (4) Furthermore, using the NFC chip, it is possible to check whether the identification

number stored on it exists only once. In this way the chip serves as a safety check, in the same way as a serial number. (5) In future, re-ordering of a medicinal product could be initiated via a smart pack.

The use of Augmented Reality constitutes a new smart methodology. In this case, a specially developed app reads reference points on the pack which are invisible to the naked eye and generates a so-called Augmented Reality on the smartphone. In this way manufacturers of pharmaceutical products can extend the area on their packaging which is available for communication - theoretically infinitely. Rondo is also demonstrating this new application, which offers a lot of potential for test kits, for example, at interpack 2017.



Dividella, Rondo and Werum IT Solutions: smart co-operation is the key

Machine-builders Dividella and folding-box manufacturer Rondo are working closely with the software company Werum IT Solutions on refining these smart packaging projects and on developing new applications. The three Medipak Systems companies benefit mutually from each other's expertise and incorporate the Industrie 4.0 know-how of the other group companies in their conceptual approach. For instance, Dividella is working together with Werum IT Solutions and other Medipak Systems companies on a standardized interface solution for structured data exchange between production control software (Level 3) and the

equipment in a pharmaceutical factory (Level 2): this is an important precondition for implementing numerous Industrie 4.0 solutions.

Among other things, users and visitors can learn about the wide range of solutions at interpack 2017 (Hall 16, A25). This is where Rondo and Dividella will be presenting various smart packaging applications and other Industrie 4.0 concepts.

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Images

1.) Dividella_NeoTOP_x_YuMi



Dividella NeoTOP x - a highly flexible TopLoad packaging machine for processing small and medium lot sizes, equipped with a collaborative robot for maximum flexibility in terms of filling.

2.) Dividella_Personalized_package



Dividella personalizes packs with the customer's name and also applies a QR code using inkjet and laser printing technology. This code directs the user to an internet side with personalized information, for example on how to take the medicine.

3.) Rondo_NFC_1



The use of NFC technology in folding boxes opens up a number of possibilities for manufacturers, for example easier communication with the user in clinical studies.

4.) Rondo_Augmented-Reality



Augmented Reality can be used to exploit the surface of folding boxes as an additional communication area. With test kits in particular, this opens up some interesting new possibilities for manufacturers.

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