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Research area: Product aims

Paper, paperboard and board // Packaging papers and paperboard

Key words:

Tamper verification, thermochromic print, folding box for pharmaceuticals

TITLE:**Tamper-proof hot melt bonding for folding pharmaceutical boxes****Background/Problem area**

According to an EU customs report from 2012, medicinal products make up 24% of all counterfeit or pirated goods, thus representing the largest product category of counterfeit goods discovered crossing the EU's external borders. These products can reach patients not only through illegal routes, but even via established delivery chains. The existing Directive 2001/83/EG was amended to counteract this growing threat. Attempted tampering will now be detected by safety features provided on the pharmaceutical packaging. One of the features is intended to make it possible to make the unauthorised access to the respective pharmaceutical product visible. This offers the consumer a nontamper guarantee. An important approach in this context is the hot melt bonding of the sealing flaps during the packaging process. This allows the folding box to be opened by a heated blade or using ovens and the contents to be selectively manipulated without leaving any discernible traces. Such a major weakness of the pharmaceutical box can also be exploited for large-scale manipulation.

Objectives/Research results

The objective of this project is to develop thermochromic dye formulations that are easily identifiable by the consumer for use with tamper-proof hot melt bonds for pharmaceutical boxes. To this end, a thermosensitive dye will be used that indicates renewed heating by undergoing a corresponding colour change. The indicator should be low-priced on the one hand and, on the other, be able to integrate into the process of manufacturing folding boxes so that any unauthorised, undetectable attempt to manipulate the contents of the pharmaceutical box can be prevented.

In an initial development stage, suitable thermosensitive dyes and application processes were chosen and evaluated. In consultation with one of the project partners, three suitable irreversible, thermochromic dye systems were chosen and their relevant physical properties characterised.

Appropriate color formulations were prepared based on the selected dye systems and validated for several application processes. Among the techniques evaluated the most suitable one was the spray method.

Another issue that was evaluated in the framework of the project was the positioning of the thermochromic counterfeit indicator on the folding box. Results demonstrate that an indirect application of the Hot-Melt bond on the folding box board, equipped with the counterfeit indicator, yielded the best results. Applying such processing methods prevented unwanted thermally induced color change during packaging process.

Trials on an industrial-scale demonstrated that the industrial integration of the counterfeit indicator is generally possible. Evaluation of folding box boards produced during the trials unequivocally showed the functionality of the indicator, preventing unwanted access to the folding box board for pharmaceutical products.

Application/Economic benefits

First and foremost, it is the manufacturers of folding boxes for the pharmaceutical sector as well as the pharmaceutical companies themselves who benefit directly from these results. In summary, the scheduled project objectives make a significant contribution to the innovative capacity of these Bavarian-based sectors. In addition, companies involved in the added value chain for the planned manipulation indicator will of course also profit from the results of the research project. These companies include on the one hand the manufacturers of thermochromic dyes, since they can expand their product application portfolio. On the other hand, they also include companies involved in the technical implementation of the counterfeiting evidence. They can expect to profit from additional business segments of their technical products, since the corresponding facilities will have to be upgraded. The maximum benefits from the project results, however, will ultimately be derived by the end consumers, since they will be able to tell from a simple colour indicator that the medicine they have purchased is the original.

Period of time: 01.02.2014 – 31.01.2015

Remarks

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