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Extended Abstract
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# Biopolymer Congress 2018: The impact of different backing films on adhesion properties of transdermal patches

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In this work, the effect of different support films on the adhesive properties of Ketoprofen transdermal packs was investigated. Four supporting films, two types of plastic and two types of plaster, were used as support layers to prepare transdermal pieces containing Ketoprofen. The same formulation was applied to all samples and skin, tack, tensile, and contact angle analyzes were performed in detail. Contact angle test results showed the difference in surface energy and hydrophilicity of various supporting films. It was also observed that an increase in the surface energy of the back films gives higher skin strength of the samples. Another thing is an unstable relationship between the tack properties of the samples and an elastic modulus of the backing material for support films with a low elastic modulus. In addition to this, it was observed that supporting films play a major role in the design of Ketoprofen pieces and the adhesion level depended on back cover types.

A transdermal patch is a medication adhesive pack. For delivering a specific dose of medication through skin and into the blood stream, a transdermal patch is applied. Often, this promotes healing to a vulnerable area of the body. The main disadvantage to transdermal delivery systems comes from the fact that the skin is a highly effective barrier; consequently, only medicines containing molecules small enough to penetrate the skin can deliver this method. A wide variety of medications are now available in transdermal patch form.

A transdermal bath is used to deliver medication through the skin. An adhesive patch containing medication is applied to the skin, and a specific dose is then absorbed through the skin and into the bloodstream.

For patients and caregivers, it is a non-invasive, painless method of prescribing medication that provides a sustained therapeutic dosage for a limited time.

Apparently conventional treatments mentioned, bandage, massage or applied to the skin (Figure 1A) were probably originally used, with the practices emerging with the appearance of written records, such as on the clay tablets used by the Sumerians. (Kramer, 1963). In fact, it has been suggested that a liquefied mixture of ocher, made 100 000 years ago and found at Blombos Cave in South Africa, may have been used for skin decoration and protection (Henshilwood et al ., 2011). Ancient Egyptians used oil (eg castor, olive and sesame), fat (mainly animals), perfumes (eg bitter almond, peppermint and rhododendron) and other ingredients to enhance their cosmetic and dermatological products. (unguents, creams, pomades, rouges, powder, and eye and nail paints) (Forbes, 1955). The mineral ores of copper (malachite: green) and lead (galena: dark gray) were used to prepare kohl, a package used for painting the eyes. Rough ether was used as a lip or face paint, and a mixture of lime and powdered oil was used as a cleaning cream (Lucas and Harris, 1962). The old lead-based products have been applied for both appearance and, based on religious beliefs, for protection against eye infections (Tapsoba et al., 2010). However, these effects may be true as recent studies involving low lead ion density by skin cells produced NO (Tapsoba et al., 2010), which is known to will provide protection against infection (Coleman, 2001).

Several of Alza's early competitors - Key Pharmaceuticals, Theratech, Cygnus, Noven and LTS - used the matrix concept for nitroglycerin,

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oestradiol and testosterone to overcome the intellectual property challenges associated with Alza's technology in the 1980s. Collectively and at individual times, these matrix designs became the dominant product within the transdermal market (Figure 3). This market situation was achieved by being not only thinner and more flexible and therefore more comfortable and compliant, but also cheaper to manufacture. The design of the matrix surpassed both Alza's intellectual property ownership in reservoir design / rate control and most of the boundaries described herein related to that design.

Regulatory

There are usually three types of studies used to evaluate the outcome of a completed transdermal patch: product quality tests, in vitro drug product performance tests and in vivo drug product performance test. Outcomes of product quality typically include description (visual inspection of the patch), identification, assay (drug product content), asymmetry, dosage form dressing, residue clearance rates, cold flow properties (adhesive migration) out of the edge of the patch at storage or when the patch is applied to the patient), polymorphism and microbial boundaries. Other quality attributes may be product-specific such as water content (for hydroalcoholic reservoir patches), quantity of quantities (when drug substance is suspended in the patch), crystal formation test (when drug substance diffuse in patch) and leakage test (for liquid reservoir patch) (Van Buskirk et al., 2012; USP, 2014a).

Crystallization is a particular problem that can arise from superstitious systems that are thermodynamically unstable and where a drug may crystallize during storage. Crystallization was first observed with scopolamine patches in the late 1980s when the previously liquid base appeared immediately as crystalline hydrates (Campbell et al., 1989b). Later, polymorphic oestradiol crystals could generate a more stable and soluble semi-hydrate in the presence of environmental humidity for any market oestradiol bath (Horstmann et al., 1998; Muller and Horstmann, 1999). When the formation of 'snowflake' crystals in transdermal rotigotine patches, the product was withdrawn from some markets, reinforcing the harsh effect that crystallization can have on a patch shape (Chaudhuri, 2008; Waters, 2013). Low MW surfactants (e.g. Cremophor®), co-polymers of methacrylic (e.g. Eudragit®) (Kotiyan and Vavia, 2001; Cilurzo et al., 2005) and polyvinylpyrrolidone (Jain and Banga, 2012) are now added. - often referred to as the crystal of defenders.