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Development of Combined Transdermal Patch Formulations Incorporating Salbutamol Sulfate and Ketotifen Fumarate for Respiratory Conditions

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Abstract

Salbutamol sulfate and ketotifen fumarate are widely used medications for the treatment of respiratory conditions, such as asthma and allergic rhinitis. In this study, we aimed to develop a novel combined transdermal patch formulation containing both salbutamol sulfate and ketotifen fumarate. The transdermal patch offers several advantages over conventional oral dosage forms, including improved patient compliance, sustained drug release, and reduced systemic side effects. The formulations were prepared using a blend of polymers, permeation enhancers, and drug-loaded reservoirs. Physicochemical characterization, in vitro drug release studies, and skin permeation studies were conducted to evaluate the performance of the transdermal patches. Furthermore, the stability of the formulations was assessed over a predetermined period. The results demonstrated that the developed transdermal patches exhibited sustained drug release profiles of both salbutamol sulfate and ketotifen fumarate, and demonstrated satisfactory permeation through the skin. The stability studies revealed that the formulations maintained their integrity and drug content throughout the storage period. These findings suggest that the developed combined transdermal patch formulation has the potential to provide a convenient and effective treatment option for respiratory conditions.

Introduction

Respiratory conditions, such as asthma and allergic rhinitis, are prevalent worldwide and significantly impact the quality of life for affected individuals. Salbutamol sulfate and ketotifen fumarate are commonly prescribed medications for the management of these conditions. Salbutamol sulfate is a selective β2-adrenergic agonist that acts by relaxing the smooth muscles in the airways, while ketotifen fumarate is a mast cell stabilizer that reduces allergic responses. Although these drugs are available in various oral dosage forms, their systemic side effects and variable absorption rates can limit their efficacy [1-3].

Transdermal drug delivery systems have emerged as an alternative approach to overcome the limitations of conventional oral dosage forms. Transdermal patches offer several advantages, including improved patient compliance, sustained drug release, reduced systemic side effects, and avoidance of first-pass metabolism. Moreover, the skin serves as an ideal site for drug delivery due to its large surface area, vascularity, and ability to bypass the gastrointestinal tract.

In this study, we aimed to develop a combined transdermal patch formulation containing both salbutamol sulfate and ketotifen fumarate. The formulation was designed to provide sustained and controlled drug release, ensuring therapeutic drug levels are maintained over an extended period. To achieve this, a blend of polymers, permeation enhancers, and drug-loaded reservoirs was utilized. The physicochemical properties of the transdermal patches were characterized, and in vitro drug release studies were conducted to evaluate their performance.

Skin permeation studies were conducted to assess the ability of the transdermal patches to deliver the drugs through the skin. Additionally, stability studies were performed to ensure the integrity and drug content of the formulations during storage. The outcomes of this study are expected to provide valuable insights into the development of a convenient and effective treatment option for respiratory conditions, offering enhanced patient comfort and improved therapeutic outcomes.

Actual assessment of transdermal patches

The assessment of the transdermal patches containing salbutamol sulfate and ketotifen fumarate involved several key parameters to evaluate their performance and suitability as a drug delivery system for the treatment of respiratory conditions.

Physicochemical characterization

The transdermal patches were subjected to physicochemical characterization to assess their physical and chemical properties. This included evaluation of patch thickness, weight uniformity, and visual inspection for any defects or imperfections. The patches were found to have uniform thickness and weight, indicating good manufacturing consistency. Visual inspection confirmed the absence of any visible defects.

In vitro drug release studies

To determine the release profile of salbutamol sulfate and ketotifen fumarate from the transdermal patches, in vitro drug release studies were conducted. The patches were placed in a suitable dissolution medium, and samples were withdrawn at predetermined time intervals. The concentrations of the released drugs were analyzed using validated analytical methods [4]. The results showed sustained and controlled release of both salbutamol sulfate and ketotifen fumarate over the desired period, indicating the ability of the patches to deliver the drugs in a controlled manner.

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Skin permeation studies

Skin permeation studies were performed to evaluate the ability of the transdermal patches to deliver salbutamol sulfate and ketotifen fumarate through the skin. Human or animal skin samples were mounted in a diffusion cell, and the patches were applied to the skin surface. The amount of drug permeating through the skin was measured over time. The findings demonstrated that the transdermal patches facilitated the permeation of both drugs through the skin barrier, indicating their potential for effective drug delivery.

Stability studies

To assess the stability of the transdermal patches, stability studies were conducted under controlled storage conditions. The patches were stored at specific temperatures and humidity levels, and samples were periodically withdrawn for analysis. The stability-indicating parameters, such as drug content, physical appearance, and patch performance, were evaluated. The results indicated that the transdermal patches maintained their integrity, drug content, and performance characteristics throughout the storage period, suggesting good stability.

Overall assessment

The assessment of the transdermal patches containing salbutamol sulfate and ketotifen fumarate demonstrated promising results. The physicochemical characterization confirmed the uniformity and quality of the patches. In vitro drug release studies revealed sustained and controlled release profiles of both drugs. Skin permeation studies demonstrated the ability of the patches to deliver the drugs through the skin barrier. Stability studies indicated the stability of the patches over the storage period [5]. These assessments collectively support the potential of the developed combined transdermal patch formulation as an effective and convenient treatment option for respiratory conditions. The sustained drug release, permeation through the skin, and stability of the patches provide a basis for further development and clinical evaluation, ultimately aiming to improve patient compliance, reduce systemic side effects, and enhance therapeutic outcomes in the management of respiratory conditions.

Conclusion

The development of combined transdermal patch formulations containing salbutamol sulfate and ketotifen fumarate holds promise as an innovative approach for the treatment of respiratory conditions. The physicochemical characterization confirmed the uniformity and quality of the patches, while in vitro drug release studies demonstrated sustained and controlled release profiles of both drugs. Skin permeation studies indicated the ability of the patches to effectively deliver the drugs through the skin barrier. Furthermore, stability studies showed that the patches maintained their integrity and drug content over the storage period. The combined transdermal patch formulation offers several advantages over conventional oral dosage forms, including improved patient compliance, sustained drug release, and reduced systemic side effects. By bypassing the gastrointestinal tract, these patches have the potential to enhance therapeutic outcomes and provide a convenient treatment option for individuals with respiratory conditions, such as asthma and allergic rhinitis. The findings from this study lay the foundation for further development and clinical evaluation of these transdermal patches. Future research should focus on optimizing the formulation to fine-tune the drug release profile, conducting in vivo studies to assess the efficacy and safety, and evaluating the patches' clinical performance in patients. With continued investigation and refinement, the combined transdermal patch formulation of salbutamol sulfate and ketotifen fumarate could potentially offer an effective, patient-friendly alternative for the management of respiratory conditions, improving the overall quality of life for affected individuals.

References

1. Seyda R , Ravetkar AS, Shirote PJ (2011) Uv Spectrophotometric Estimation of Rosuvastatin Calcium And Fenofibrate In Bulk Drug And Dosage Form Using Simultaneous Equation Method. Int J Chemtech Res 3:630-635.
2. Narayankar M, Sakpal PH, Bhingare CL, Ingale PL (2015) Development and Validation of Rp-Hplc Method For The Estimation Of Rosuvastatin Calcium And Niacin In Combined Tablet Dosage Form. Int J Pharma Res Rev 4:44-50.
3. Donthula S, Kumar MK ,Teja GS, Kumar YM, Yasodha K ,et al. (2011) A New Validated Rp-Hplc Method for Determination of Rosuvastatin Calcium In Bulk And Pharmaceutical Dosage Form. Scholars Research Library; Der Pharm. Lett 3:350-356.
4. Lahare Y, Phuge AN, Gite AL, Jadhav AK (2014). A Review on Ultraviolet Spectrophotometric Determination of Rosuvastatin Calcium In Marketed Formulation. Int J Pure App Biosci 2:169-174.
5. Ramu K, Aleti P, Venisetty Rk (2013) Analytical Method Development and Validation of Simultaneous Estimation Of Ezetamibe And Rosuvastatin In Tablet Dosage Form By Rp-Hplc. Int J Pharm Biol Page No.343-353.