Available online on 15.10.2019 at http://jddtonline.info

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

Open Access Research Article

Topical Anti-inflammatory evaluation of new hydrazone: 4-chloro-3-nitrobenzylidene) isonicotinohydrazide

Kamel Mokhnache*, Ahlem Karbab, Soraya Madoui, Hanane Khither, EL-Khamsa Soltani, Noureddine Charef, Lekhmici Arrar

Laboratory of Applied Biochemistry, University Ferhat Abbas Setif 1, 19000, Algeria

ABSTRACT

The anti-inflammatory effects of the investigated compounds; Isoniazid, hydrazone, and Indomethacin were evaluated in this study. The experiment was performed using xylene induced topical ear edema method in mice model, at the dose of (0.5 mg/ear). Results showed that the compounds; Isoniazid, hydrazone, and Indomethacin exerted 85, 90 and 89% of inhibition percentages, respectively. The effect of hydrazone was statistically similar to the effect of indomethacin which is a standard anti-inflammatory drug.

Keywords: inflammation, hydrazone, ear edema**,** topical.

Article Info: Received 18 July 2019; Review Completed 29 Aug 2019; Accepted 13 Sep 2019; Available online 15 Oct 2019

Cite this article as:

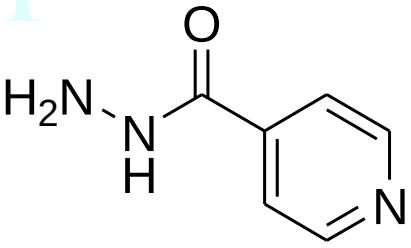
Mokhnache K, Karbab A, Madoui S, Khither H, Soltani E, Charef N, Arrar L, Topical Anti-inflammatory evaluation of new hydrazone: 4-chloro-3-nitrobenzylidene) isonicotinohydrazide, Journal of Drug Delivery and Therapeutics. 2019; 9(5-s):1-3 http://dx.doi.org/10.22270/jddt.v9i5-s.3433

***Address for Correspondence:**

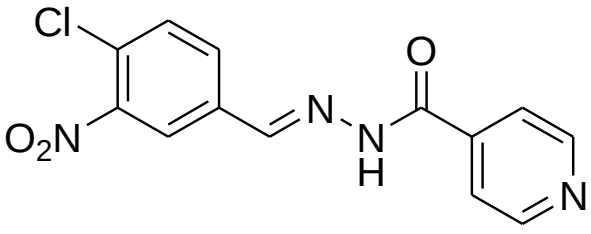
Kamel Mokhnache, Laboratory of Applied Biochemistry, University Ferhat Abbas Setif 1, 19000, Algeria

INTRODUCTION

Inflammation is a physiological defense of the body against aggression that results in tissue damage. It can be triggered by trauma, burns, radiation or the penetration of external pathogens (viruses, bacteria, parasites, antigens) [1]. This complex response mainly mediated by two enzymes: cyclooxygenase and lipoxygenase that generate prostaglandins and leukotrienes respectively [2]. Two stages of inflammation exist, acute and chronic inflammation. Acute inflammation is an initial stage of inflammation (innate immunity), which is mediated by activation of the immune system [3]. If the inflammation lasts for a long time, the second stage of inflammation or chronic inflammation sets in and may predispose the host to various chronic diseases, including cancer [4]. The primary function of inflammation is to eliminate the aggressor and allow tissue repair [5]. As a result, the search for new substances with anti-inflammatory activities is very useful for improving human health, while avoiding the adverse effects of existing drugs. In this context is part of this research work whose main objective is to verify the anti-inflammatory activity of a new molecule; 4-chloro-3-nitrobenzylidene) isonicotinohydrazide and compared with both drugs; indomethacin, and isoniazid (**Scheme 1**);

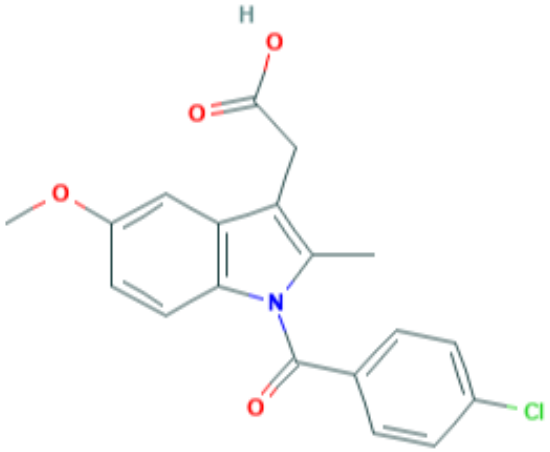


Isoniazid



Hydrazone

Scheme 1. Chemical structure of Isoniazid and hydrazone



Indomethacin

Scheme 1. Chemical structure of Indomethacin

The topical anti-inflammatory activity of this bioactive substance was performed using Xylene induced topical ear edema method in mice model.

MATERIALS AND METHODS

All chemicals and reagents used throughout this study were obtained from commercial sources and used without further purification; Isoniazid (BHD chemicals Ltd Poole England), indomethacin, Xylene (Sigma).

Experimental animals

Experiments were performed using young female Swiss albino mice and weighing 25-30 g. They were obtained from Pasteur institut (Algeria) and housed in plastic cages under normal laboratory conditions (12 h light / dark cycle, 23 ± 2 °C) for an acclimatization period of 7 days prior to the experiments. All the animals were given food and water *ad libitum*.

Xylene-induced ear edema in mice

Adult albino female's mice (25-30g) were randomised into different groups of 6 mice each were used for the experiment. The investigated compounds (0.5 mg/ear edema), were topically applied to various groups. Inflammation was induced in mice by topical application of 30 µl of xylene and 30 µl of different synthetic product at the inner surface of the right ear. The thickness of the ear is measured before and half hour after the induction of inflammation by a digital caliper. The difference in thickness before and after the application of xylene is calculated [6].

RESULTS AND DISCUSSION

Xylene induced topical ear edema

Xylene-induced ear edema in mice, is a model of acute inflammation, was used to evaluate the anti-edematous effect of the investigated hydrazone and the anti-tubercular drug; isoniazid and the anti-inflammatory drug; indomethacin. Xylene-induced ear edema is a reproducible experimental model and concedes a good predictive value for the screening of anti-inflammatory agents. The application of xylene on the ear induces fluid accumulation leading to the formation of edema which is characteristic of acute inflammation[7]. The difference in the thickness of the ear of the mice before and half an hour after the local application of xylene was used in the present study to evaluate the anti-edema effect of the investigated compounds.

Results showed that the compounds; Isoniazid, hydrazone, and Indomethacin exerted 85, 90 and 89% of inhibition percentages, respectively (**Figure 1)**. The effect of hydrazone was statistically similar to the effect of indomethacin which is a standard anti-inflammatory drug.

In literature, molecular and cellular mechanism by which xylene induces inflammation involves capsaicin-sensitive sensory neurons that, following stimulation, release a number of mediators that can initiate the inflammatory response[8]. In addition, the mechanism of action of indomethacin on inflammation is based on the inhibition of pro-inflammatory prostaglandin synthesis[9]. From these results we can conclude that the hydrazone could be an inhibitor of the synthesis of the pro-inflammatory prostaglandin.

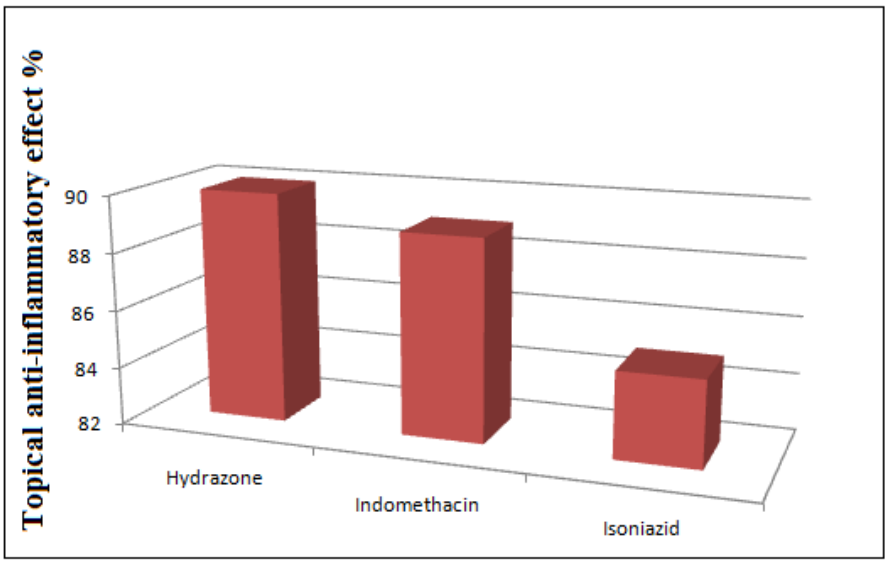


Figure 1. topical anti-inflammatory activity of hydrazone, indomethacin, and isoniazid

CONCLUSIONS

A new hydrazone, derived from the antitubercular drug; isoniazid was investigated for their topical anti-inflammatory effect. The test was evaluated by the method of xylene induced topical ear edema in mice model. Results revealed that the investigated hydrazone has an important anti-inflammatory effect. Results obtained in the present studies indicate that the hydrazone can at least be a potential topical anti-inflammatory agent.

REFERENCES

1. Schoroderet M (1992). Phrmacologie, des concepts fondamentaux aux applications thérapeutiques. Volume 2. Eds, Office des publications universitaires (Alger), pp : 523- 530.

2. Nagi MN, Mansour MA (2000). Protective Effect of Thymoquinone against Doxorubicin induced Cardiotoxicity in Rats: A Possible Mechanism of Protection. Pharmacological Research. **41:** 283–289.

3. Serhan C.N., Ward P.A. and Gilroy D.W. (2010). Fundamentals of inflammation. *Cambridge University Press*. p. 13-14.

4. Dorward D.A., Lucas C.D., Rossi A.G., Haslett C. and Dhaliwal K. (2012). Imaging inflammation: molecular strategies to visualize key components of the inflammatory cascade, from initiation to resolution. Pharmacology and Therapeutics. 135(2), 182-199.

5. Weill B, Batteux F, Dhainaut J (2003). Immunopathologie et réactions inflammatoires. ds, De Boeck Université (Paris), pp: 12-23.

6. Delaporte R H, Sarragiotto M H, Takemura O S, S´anchezc G M, Filho B P D, Nakamura C V (2004). Evaluation of the antioedematogenic, free radical scavenging and antimicrobial activities of aerial parts of Tillandsia streptocarpa Baker Bromeliaceae. Journal of Ethnopharmacology, 95, 229–233.

7. Okoli CO, Akah P A, Nwafor S V, Anisiobi A I, Ibegbunam I N, Erojikwe O (2007) Anti-inflammatory activity of hexane leaf extract of Aspilia africana C.D. Adams. Journal of Ethnopharmacology, 109, 219–225.

8. Rotelli A E, Guardia T, Juárez A O, de la Rocha N E, Pelzer L E (2003). Comparative study of flavonoids in experimental models of inflammation. Pharmacological Research, 48, 601-606.

9. Li H, Lu X, Zhang S, Lu M, Liu H (2008). Anti_Inflammatory Activity of Polysaccharide from Pholiota nameko. Biochemistry, 73, 669-675.