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# EFFECT OF ALKALIZATION OF 5% LIDOCAINE FORMULATION ON SKIN PERMEATION PARAMETERS.

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## Abstract

The first step in the development of products and techniques designed to increase the absorption of drugs and cosmetics through the skin consists of the study of transdermal diffusion capacity of these products.

### Key words:

Alkalization, lidocaine, topical anesthesia.

## Introduction

The skin is an organ with the main function to protect the body against the passage of substances, working as a barrier against external physical and chemical aggressions (Tadicherla & Berman, 2006)<sup>1</sup>. This organ is composed of dermis and epidermis. The dermis is denser and it is the portion located more internally. It measures approximately 250 µm, and is a vascularized region where there are free nerve endings, responsible for pain sensation (Sawyer et al., 2009)<sup>2</sup>. Human skin incised is considered the gold standard for permeation experiments. However, ethical considerations are a major problem for the use of human skin in this kind of experiment. Because of its structure, composition and permeability closer to human beings, the pigskin has been the choice for pre-clinical studies of permeation (Todo, 2017)<sup>3</sup>. The objective of this work was to observe the effect of alkali treatment of a topical formulation consisting of 5% lidocaine on permeation ability in your skin.

## **Results and Discussion**

Preparations were carried out of the pig ears and the making of the anesthetic gels that will be used. Immediately after slaughter (ex vivo tissue pigs) ears were transported in phosphate buffer (pH 7.4) to the lab.

#### Figure 1.

A: Removal the dermis from pig-ears with a scalpel blade. B: Cut the ears of pigs. C: removal of subcutaneous tissue and fat tissues with the dermamometer. D: Packed for freezing the -20°C.



	Flux	time lag	r <sup>2</sup>
Formulation	19,15 <sup>b</sup>	1,96 <sup>b</sup>	0,995
1	± 2,48	± 0,49	± 0,003
Formulation	36,07ª	3,99ª	0,995
2	± 1,62	± 0,93	± 0,002

## Figure 2.

Permeation of formulations.



#### Conclusions

Bicarbonate salt promoted significant improvement of permeation of lidocaine, showing potential to promote greater depth and duration of anesthesia.

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<sup>1</sup>Tadicherla S, Berman B. *Ther Clin Risk Manag.* 2006 ;**2**(1):99-113. <sup>2</sup>Sawyer J, Febbraro S, Masud S, Ashburn MA, Campbell JC. Br J Anaesth. 2009;**102(2):**210-5.

<sup>3</sup>Todo H. *Pharmaceutics*. 2017;9(3). pii: E33.