UNIVERSIDAD DE GUAYAQUIL
DEPARTMENT OF CHEMICAL SCIENCES

Ciudadela Universitaria ¨Dr. Salvador Allende¨

Telephone: 2293680, E-mail: fcquimic@ug.edu.ec

Guayaquil, Ecuador

FINAL REPORT

CODE: 29/05

TITLE:
Establishment of the potential anti-inflammatory effect of the product known as **NONI,** originating from NutraMedix Laboratories, LLC, Florida.

OBJECTIVES:
To study the possible anti-inflammatory effect of NONI, measured by auricular edemas in laboratory mice.

BACKROUND:
The auricular edema is achieved by applying 12-0- Tetradecanoil Forbol-13 Acetate (TPA), one of the components responsible for the irritating action of croton oil, into the auditory pavilion of the mouse.

The inflammatory reaction consists of erythema, edema and infiltration by polymorphonuclear leukocytes. As such, eicosanoid-type mediators are freed, inducing degranulation of the mast cell.This technique thus allows the evaluation of the inhibiting substances of the biosynthesis of prostaglandins and leukotrienes.

As discussed in numerous international works, the pharmacological study of the above-mentioned effect is indispensable, and guarantees (within the margin of error associated with the technique) that the potential for producing anti-inflammatory effects in humans will be learned.

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The basis of this work is the pharmacological effect as an anti-inflammatory, as described in international literature (1, 2).

TECHNICAL, SCIENTIFIC AND SOCIOECONOMIC BENEFITS:

The demonstration of this product as an anti-inflammatory is important due to its potential as a new, plant-based medication, with its associated low toxicity. This was demonstrated by us in a previous work, allowing us to enter the product as a new medication in the appropriate Register.

VARIABLES TO MEASURE:

1. Weight of the treated and untreated ears
2. % of Inflammation
3. % of inhibition

PROCEDURES TO FOLLOW:

TEST MATERIALS:

Noni the procedure followed was that described by CYTED (1996) and the Gerhard Voegel (1997).

CHANGES IN THE CURRICULUM:

Changes did not take place in protocol proposed to the Unity of Quality Guarantee, whose number is referred to on Page 1**.**

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DATA FROM THE SAMPLE:
Organization soliciting services: NutraMedix Laboratories, LLC.
Person in charge of the Organization's application: Jose Icaza
Date of application: 4/20/05
Person in charge in the Executor Organization: MSc. Gastón Garcia Simón.
Organization that carried out the work: University of Guayaquil, Department of Chemical Sciences.
Address: Ciudadela Universitaria "Dr. Salvador Allende"
Form of presentation of the product: amber glass drop bottle containing 30 milliliters
Storage: The product was maintained at room temperature before and during the experiment, and as indicated was protected from light and kept in a locked cabinet.

INFORMATION WITH RESPECT TO THE HANDLING:
No special handling instructions were needed.

COMPOSITION OF THE PRODUCT:
Noni extract
Mineral water
Ethanol

EXPERIMENTAL PROCEDURE:

INTRODUCTION:
This experiment was carried out with the intention of determining the possible anti-inflammatory effect of NONI, utilizing croton oil as the inflammatory agent.

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DOSAGE USED IN THE TEST
50µL, divided into both auditory pavilions, was utilized in this study.

PRINCIPAL TEST:

METHODS AND TECHNIQUES:

Study Material: **Noni**

Animal Model: A single rodent species (mouse) was utilized, with a minimum of 5 animals of a single sex in each group. In this case, male mice with an average weight within ± 20% (3), belonging to the Swiss line and coming from the Chemistry Department of the University of Guayaquil were appropriate and were utilized in the experiment.

The animals were maintained in quarantine conditions and were acclimated according to established procedures (4,5), said period having a duration of five days minimum.

Access to the water and the food was "ad libitum"(6,7).

The animals were randomly distributed from within the different groups.(8)

Food was denied 4 hours before exposure to the test material.

The experiment lasted 6 days (5 of acclimation and 1 of test).

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DEVELOPMENT OF THE METHOD:
The following three groups were constructed for the test:

TEST GROUPS	
1	**Oil of croton 20µL**
2	**Oil of croton 20µL + Feldene covering the two sides of the auditory pavilion.**
3	**Oil of croton 20µL + 50µL of Noni Juice concentrate**

The mice were denied food for four hours then weighed, after which began the experiment. After the fasting all animals were weighed to determine the appropriate dosage.

The irritant solution of 5% croton oil in acetone was applied topically in the right ear, at the indicated volume, using an automatic pipette.

The composite solutions were administered topically in the right ear immediately after the irritant, in the indicated volume.

30 minutes after the application of the irritant, the animals are euthanized in a saturated ether atmosphere, and their ears are cut along the edge. 6 mm discs were cut with a punch then weighed.

RESULTS CALCULATIONS:
Outcomes are rated by calculating the weight of each mouse's ears, both the treated and untreated.

The **percentage of inflammation** of the treated as opposed to the untreated ear is calculated using the following formula:

$$\% \text{ Inflammation} = \frac{T \times 100}{ST} - 100$$

Where T is the average of the weights of the treated ears (right) and ST is the average of the weights of the untreated ears (left).

$$\% \text{ Inhibition of inflammation} = \frac{C - T}{C} \times 100$$

Where C is the average value of % of inflammation of the animals of the control group and T is the average value of % of inflammation of the animals of the experimental group (either Croton and Feldene or Croton and Noni).

DESCRIPTION OF THE DOSAGE, METHOD OF ADMINISTRATION AND DURATION OF THE TEST:
The test was achieved by following the method established by CYTED and using the dose of 50µL each mouse.

The composite solutions were applied in the right auditory pavilion of the study animals, the left auditory pavilion being the control.

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ANALITICAL RESULTS:
The results of the average value of the weights of the right and left ears are found in Table #1.

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TABLE #1. STUDY OF THE POSSIBLE ANTI-INFLAMMATORY EFFECT OF NONI

Weight of Ears in mg, % Inflammation, % Inhibition

Group	Right Ear	Left Ear
Control Group Treated with Oil of Croton		
Mean ± s.d.	**13.4 ± 2.3**	**6.2 ± 3.3**
Croton + Feldene		
Mean ± s.d.	**9.38 ± 0.3**	**9.36 ± 0.7**
Croton + Noni		
Mean ± s.d.	**8.48 ± 0.77**	**8.42 ± 0.8**

From the values in the above table, the percentages of inflammation and inhibition are calculated. The results are in Table 2.

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TABLE #2. STUDY OF THE POSSIBLE ANTI-INFLAMMATORY EFFECT OF NONI (ORAL ADMINISTRATION)

% of Inhibition and Inflammation

Group	% Inflammation	% Inhibition
Croton	**116.12**	**-**
Croton + Feldene	**0.21**	**99.80**
Croton + NONI	**0.71**	**99.39**

The table demonstrates the marked anti-inflammatory effect of both the anti-inflammatory and analgesic Feldene at 0.5% level (Piroxicam), and our product, the Noni, against the effects of croton, a standard agent used to produce inflammation in experimental models.

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CONCLUSIONS:

1. **NONI** was demonstrated to have an anti-inflammatory effect in the animal subjects as compared with the well-known anti-inflammatory drug Feldene.
2. Feldene was also shown to have the effect for which it is sold.

GENERAL CONCLUSIONS:

NONI has demonstrated to have anti-inflammatory effect in tests using mice as subjects, and as appears in specialized literature.

PERSONNEL RESPONSIBLE FOR THE STUDY:

Responsible Professional:
MSc. Gastón García Simón.

Signature:

Date: 05/10/05

BIBLIOGRAPHY:

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