ID: 2003

Formulation of a Food Supplement Based on Moringa Oleifera

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ABSTRACT

This work aims at the valorization of a plant introduced in the arid zones of the Algerian desert and more particularly in the region of Boussaâda; it is about Moringa Oleifera belonging to the family of Moringaceae. A food supplement based on this medicinal plant was formulated and controlled from the point of view; evaluation of anti-inflammatory and anti-oxidant activities. The study of the toxicity of the plant extract concluded that the aqueous extract of Moringa oleifera leaves is not toxic and has a significant anti-inflammatory effect, comparable to that of diclofenac sodium. The antioxidant activity of the methanoic extract of Moringa powder was evaluated by the DPPH free radical scavenging method. The results showed that the extract has a very high antioxidant activity with a maximum inhibition percentage of about 54.2% at a concentration of 2.5µg/ml. In view of the results obtained, it is suggested that Moringa oleifera could represent a promising natural source that has very important biological activities and the elaboration of a food supplement in the form of capsules is possible and does not present a danger for the consumer.

Keywords: Moringa oleifera, Food supplement, Antioxidant activity, Toxicity, Anti-inflammatory effect

1 Introduction

Algeria is known for its biodiversity, particularly its rich and diverse flora. There are approximately 3000 plant species, 15% of which are endemic and belong to several botanical families. Medicinal plants are those that have pharmacological activity leading to therapeutic use. They are used in human and veterinary pharmacy, cosmetics, as well as in the making of beverages, either in their natural form, as a galenic preparation, or as active principles, serving as raw material for the production of medicines. This work was carried out as part of the valorization of medicinal plants growing in Algeria. The objective of this study is to produce a 100% organic dietary supplement based on Moringa oleifera powder, as well as to evaluate some biological activities (anti-inflammatory, antioxidant).Moringa oleifera (syn. Moringa pterigosperma Gaertn) is more generally known as Moringa worldwide **[1].**Originally from India, Moringa oleifera is now widely spread throughout the tropics, particularly in Africa, where this species is attracting increasing interest from non-governmental organizations (NGOs), scientists, and even entrepreneurs. The nutritional quality of its leaves, which are very rich in vitamins, minerals, and proteins, is currently inspiring numerous initiatives in Africa, Europe, and the United States in the fields of nutrition and dietetics.

2 Experimental

The Moringa was cultivated in Algeria, specifically in the Boussaada region, in the form of dried leaves harvested in March. The part used is the leaf. The leaves were ground to obtain a powder, which was stored in a sealed jar under normal conditions. For the encapsulation of this powder, we used size 0 opaque gelatin capsules provided by the Hydrapharm group. To evaluate the anti-inflammatory activity, we used male albino mice weighing between 18g and 23g. According to the method of Levy (1969), cited by **[2],**the injection of carrageenan under the plantar aponeurosis of a mouse's paw causes an inflammatory reaction that can be reduced by a product with an anti-inflammatory effect. This study allows for the comparison of

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DOI: 10.21467/abstracts.169 ISBN: 978-81-970666-4-1 (eBook)

the reduction in plantar edema after administration of equal doses of the reference product (Diclofenac) and the anti-inflammatory product to be tested (Moringa).To study the antioxidant activity of the different extracts, we opted for the method that uses DPPH as a relatively stable free radical absorbing in the visible range at a wavelength of 515 to 528 nm. The test involves exposing the DPPH radical (violet in color) to molecules called antioxidants to measure their ability to reduce it. The reduced form (diphenylpicryl-hydrazine: yellow in color) no longer absorbs at 517 nm, resulting in a decrease in absorbance **[3].**

3 Results and Discussion

3.1 Results of the anti-inflammatory activity

The evaluation of the anti-inflammatory effect of Moringa powder is carried out using the paw edema method. The results obtained are summarized in the following table.

Table1: *Result of the anti-inflammatory activity*

	Weight of the left paws (mg)	Weight of the right paws (mg)	Percentage of edema (%)	Percentage of edema reduction (%)
Control "Physiological water"	109	76	43.42	0
Reference "Diclofenac sodium"	169	139	21.58	50
Aqueous extract of Moringa	155	121	28	35
Methanolic extract	137	114	20	54

The treatment of inflammation with the extract led to a more significant reduction of 54%, which is markedly higher than that of the reference anti-inflammatory (50%).

3.2 Results of the antioxidant activity

The antioxidant activity of Moringa powder extract against the DPPH radical was evaluated using a spectrophotometer and measured at 517 nm, by monitoring the reduction of this radical. The results of the antioxidant activity of M. oleifera powder extracts are presented in the following figure.

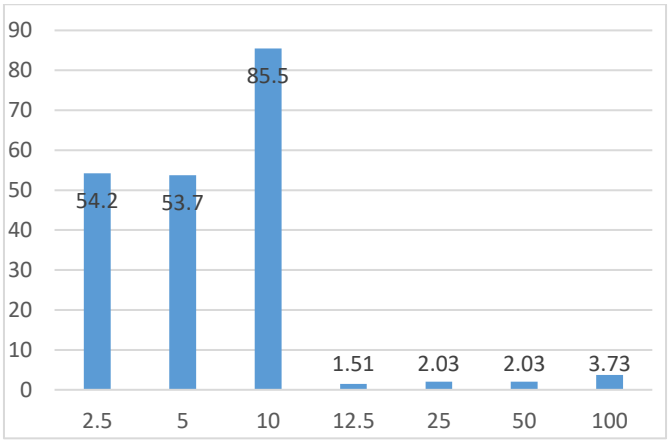

Figure1: Percentage of inhibition of the DPPH free radical as a function of the concentrations of Moringa oleifera extract.

The chemical analysis confirms the presence of antioxidant properties as revealed by the DPPH test (with a maximum inhibition percentage of about 54.2% at a concentration of 2.5 µg/ml-1). This is attributed to the richness of this plant in antioxidants.

ISBN: 978-81-970666-4-1
Series: AIJR Abstracts
DOI: 10.21467/abstracts.169

4 Conclusions

At the end of this study, we can conclude that the extract from the leaves of Moringa oleifera has a significant anti-inflammatory effect, comparable to that of diclofenac sodium. Additionally, the antioxidant activity of the methanolic extract of Moringa powder was found to be very significant, with a maximum inhibition percentage of about 54.2% at a concentration of 2.5 µg/ml.

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ISBN: 978-81-970666-4-1

Series: AIJR Abstracts

DOI: 10.21467/abstracts.169