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ORIGINAL

Manual of medicinal plants for the teaching

Manual de plantas medicinales para la enseñanza

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ABSTRACT

The use of medicinal plants centers the attention of the world scientific community who highlights its importance in the current and future sanitary system, it is so the Phytotherapy, as branch of the busy science of studying the use of the plants with medicinal ends, it has also charged a momentous importance. The objective of this investigation is to design a Manual of medicinal plants that can be used as teaching material, for the investigation and for the use of prepared medicinal starting from the same ones. Theoretical, empiric methods were used and of the descriptive statistic when validating the manual. The investigation was carried out in two stages: one of design and elaboration of the manual, and another validation stage for experts. A manual was elaborated formed basically by four fundamental parts (Introduction, Generalities, Monographs of the medicinal plants and Bibliographical References), the included medicinal plants were the result of studies etnobotánicos carried out in the whole area of the Council Popular Horseshoe whose information is supplemented with the knowledge of the residents and with data published in the scientific literature specialized in the topic. A manual of medicinal plants was developed that is useful in the process of teaching learning, for the investigation and its use with therapeutic ends, it was very appropriate according to the approach of the experts that you/they evaluated it.

Keywords: Medicinal Plant; Teaching Manual; Teaching Resources.

RESUMEN

El uso de plantas medicinales centra la atención de la comunidad científica mundial, quien destaca su importancia en el sistema sanitario actual y futuro, es así que la Fitoterapia, como rama de la ciencia se ocupada de estudiar el uso de las plantas con fines medicinales, ha cobrado también una importancia trascendental. El objetivo de esta investigación es diseñar un Manual de plantas medicinales que pueda utilizarse como material de enseñanza, para la investigación y la utilización de preparados medicinales a partir de las mismas. Se emplearon métodos teóricos, empíricos y de la estadística descriptiva al validar el manual. La investigación se realizó en dos etapas: una de diseño y elaboración del manual, y otra etapa de validación por expertos. Se elaboró un manual formado básicamente por cuatro partes fundamentales (Introducción, Generalidades, Monografías de las plantas medicinales y Referencias Bibliográficas), las plantas medicinales incluidas fueron el resultado de estudios etnobotánicos realizados en toda la zona del Consejo Popular Herradura, cuya información se complementa con los saberes de los pobladores y con datos publicados en la literatura científica especializada en el tema. Se desarrolló un manual de plantas medicinales que resulta útil en el proceso de enseñanza aprendizaje, para la investigación y su utilización con fines terapéuticos, resultó muy adecuado según el criterio de los expertos que lo evaluaron.

Palabras clave: Plantas Medicinales; Manual de Enseñanza; Medios de Enseñanza.

INTRODUCTION

Medicinal plants have been a traditional practice in many cultures around the world. Nowadays, the importance of integrating this knowledge into education has been recognized, especially in disciplines related to agriculture and agronomy. Medicinal plants are the focus of attention of the world scientific community, highlighting their importance in the current and future health system, given the trend in the demand for natural products for medicinal and therapeutic purposes. In this sense, the World Health Organization recommends the promotion of traditional medicines and medicinal plants due to their low cost and widespread acceptance in Primary Health Care.[1,2]

In Cuba, the use of medicinal plants as a therapeutic resource has acquired fundamental relevance in recent years due to their proven effectiveness and harmlessness, as they constitute the basis for the elaboration of alternative medicine systems, as a source of raw material for the pharmaceutical industry, in the substitution of imported raw materials for the elaboration of medicines and as a therapeutic weapon in traditional medical and phytotherapeutic systems.[3,4]

Medicinal plant-based medicines are finished and labeled curative products whose active substances are formed by the aerial or underground parts of the plants, or their compositions, in their natural state or in the form of different preparations, which are used for curative purposes proven by scientific studies. On the other hand, medicines obtained from medicinal plants are less aggressive, softer, more natural, and accessible to most of the population.[5,6]

The Ministry of Public Health (MINSAP) encourages and directs research into medicinal plants to obtain pharmaceutical forms that meet the technological requirements for bioavailable preparations.

In the province of Pinar del Rio, these phytotherapeutic preparations are made in the Drug Production Laboratories or dispensaries that exist in all the municipalities;[7,8] in these laboratories, there are sources of information about the most used medicinal plants in the province, which are dispersed and mostly in electronic format, which makes it difficult for health professionals and technicians, in charge of the experimentation, production, and use of medicines based on medicinal plants.[9,10]

The general objective of the research is to analyze the impact of the medicinal plant teaching program in the agronomy specialty, evaluating the influence of this knowledge on the professional skills of the students and its application in sustainable agricultural practices. This is based on the implementation of a manual that constitutes a physiotherapeutic guide for research and treatment using medicinal plants.

METHOD

The manual was developed using theoretical methods. The bibliography related to the subject, as well as the printed and electronic information sources on medicinal plants, was exhaustively reviewed and analyzed in depth.

A desk-based study was carried out to define the general structure of the manual, which consisted of the following: Cover, Prologue, Index, Introduction, Generalities, Conceptual Framework, monographs of Medicinal Plants, and Bibliographic References. Each part was completed according to the proposed objective.

Empirical methods

Surveys and interviews with specialists were developed and applied.

The entire process of validating the manual was carried out by consulting experts virtually via Zoom and email.

First

A discussion workshop was held to analyze the manual produced and to improve and complete it. It was structured over four days, the first three devoted to discussing the manual with each group selected according to their relationship with the proposed manual and its use.[11,12,13]

- Group I: Specialists in research with medicinal plants, with recognized scientific and teaching careers, who could contribute critical criteria of content, structure, and methodology.
- Group II: Doctors, Nurses, and Pharmacists are the representatives who will use the manual.
- Group III: Agricultural engineers and teaching staff of the degree as representatives of those who cultivate and establish the plants.
- Group IV: Housewives and farmers who grow and develop these medicinal plants in courtyards and plots in rural areas.

The first three days were devoted to analyzing and discussing the manual, using brainstorming as a tool. A

coordinator was appointed to lead the discussion and generation of ideas, following the sequence:

1. Individual production of cards with ideas (unlimited number of cards, one idea per card)
2. Classification of the cards by affinity of ideas
3. Debate and consensus.

The cards had to answer a specific question:

1. What problems does the manual present that affect the fulfillment of its objective?
2. What problems does the manual present that affect its use as informative and educational material?
3. What problems does the manual present hinder its understanding and application?

Second

After the corrections indicated by each group had been made, they were sent a copy of the improved manual for review.

Thirdly, a fourth working session was organized, in which experts evaluated the final manual using a guide with precise guidelines for the review. Each expert had to score between 1 and 5, where 1 was the lowest score and five the highest. The aspects to be evaluated were as follows:

1. Structure of the manual
2. Ease of understanding of the content
3. Instructional qualities
4. Educational qualities
5. Fulfilment of the objective

The results were processed to obtain the final evaluation of the manual (percentage of acceptance). The rate of acceptance was calculated using the formula:

$$Aceptación = \frac{\sum PO}{\sum PAO} * 100\%$$

Where:

PO - Points Awarded

PAO - Points to be Awarded

The assessment ranges according to acceptance percentage were:

- Very Adequate - 81 and 100 %
- Quite Adequate - 61 and 80 %
- Adequate - between 41 and 60 %
- Poorly adequate - between 21 and 40 %
- Inadequate - between 0 and 20 %

Validation of the manual

To improve the organization of the method discussion workshop and minimize errors in its evaluation, the number of experts participating in it was ensured to be at least seven or more than 30. The panel of experts had a total of 15 members. Descriptive statistical methods were used, given in absolute numbers and percentages.

DEVELOPMENT

Design and preparation of the manual

The information in each of the chapters was completed, seeking adequate organization and the necessary logical sequence to facilitate their understanding.

The work resulted in a reference manual for research on medicinal plants and for the use of medicinal preparations made from them.

1. A table of contents at the beginning was decided to better locate topics and subtopics.
2. An introduction was included to justify the need for and importance of the manual.
3. A brief historical review and a conceptual framework were included.
4. It was decided that the bibliographies consulted would be included at the end of each chapter and follow the Vancouver Standards 2023.

The following was established for the format of the manual:

1. The manual should have a simple, attractive cover related to the topic to encourage consultation.
2. Information that was previously scattered was compiled into the design of its different parts, which leads to a better understanding of each subject.

The title was defined as the next step in completing the work of designing the manual: "Manual of Medicinal Plants for Teaching."

The information is presented as a manual, being as brief and precise as possible. The fundamental theoretical elements and considerations of the topics covered are listed so that they can be used in daily practice.

The basic information in the manual, related to the medicinal plants that make it up, was extracted from the results of the MAS Project: Traditional use of medicinal plants by the population of the planning area of the Herradura People's Council, belonging to the municipality of Consolación del Sur, information on the traditions of the inhabitants, experts in the field, and a review of articles published in scientific journals were taken into account to ensure that the manual contributes to research and therapeutic use. The manual consists of three parts:

Introduction

General: This section contains the history of medicinal plants and phytotherapy, concepts, and other essential aspects of this branch to help readers better understand the manual.

Monograph of medicinal plants: This monograph recorded more than 50 medicinal plants used by the Herradura People's Council's planning area population.

The monograph of each plant includes:

- Common name by which the inhabitants know it.
- Other common names.
- Scientific name.
- Botanical family.
- Botanical description.
- Phenology.
- Origin.
- Location.
- Useful part.
- Harvesting method.
- Recognized medicinal properties.
- Pharmaceutical forms described.
- Routes of administration.
- Other attributed properties (not yet approved).
- Warnings.
- Plant components.
- Preparation.
- Dosage.
- How to grow them.

With regard to the characteristics of the panel of experts (table 1), it is important to point out that it was made up of doctors in specific sciences (33 %) and masters in science (13 %). Of these, 33 % were full professors, and the rest were instructors or assistant professors, which guarantees an adequate evaluation of the manual from a scientific and methodological point of view.[14,15,16]

Table 1. Composition of the panel of experts in the discussion workshop for the proposed manual

Group of Experts	Scientific Degree				Teaching Category			
	DrC.		MsC		PP		PA	
	No.	%	No.	%	No.	%	No.	%
I (n=8)	6	75	3	37,5	5	62,5	4	50
II (n=7)	2	25	4	57,14	3	37,5	4	50
Total (n=15)	8	50	7	47,32	8	50	8	50

PhD: Doctor of Science; MSc: Master of Science; Senior Lecturer; Assistant Lecturer.

The main recommendations made by the experts during the first three days of the workshop were:

- Increase the information related to mango, tamarind, soursop, and avocado, considering the boom

in research with these plants.

- Design a more attractive cover.
- Add a chapter containing the basic steps to follow when experimenting with medicinal plants and how to establish them.

With these recommendations, the manual was improved and submitted to a new review by the panel; a final day was held for its final evaluation. The results of this evaluation are recorded in table 2. As can be seen, the total number of experts who evaluated the proposed manual issued very favorable criteria, giving it an acceptance percentage of over 96 %, making it clear that the manual is very suitable for research, production, and use of medicines from medicinal plants.

The experts made several positive observations about the manual. One that stands out is that it brings together essential information related to medicinal plants that are widely scattered among different sources, thus facilitating access for potential users.

Table 2. Overall evaluation of the manual by the members of the panel of experts (n=15)

Aspects to be evaluated	Points to be awarded	Points awarded	% Acceptance
Structure of the Manual	75	72	96,0
Ease of understanding of the content	75	70	93,3
Instructional qualities	75	74	98,7
Educational qualities	75	73	97,3
Fulfilment of the objective	75	75	100,0
Total	375	364	97,1

The study's results indicate that including a teaching program on medicinal plants in the training of agronomists has multiple benefits. First, the students developed a greater knowledge and appreciation of biodiversity and the importance of medicinal plants in agricultural systems. In addition, an improvement was observed in the practical skills of identification, cultivation, and management of these plants.

The teachers also reported increased student interest and participation in class and a greater willingness to apply the knowledge acquired in field projects and professional practices. Integrating traditional knowledge with modern science resulted in a more complete and holistic education for future agronomists.

For the health sector, it will be beneficial, as the natural products described in the manual will be used, which will benefit the population by improving their state of health; for professionals, they will be used in continuous improvement and research, with a multidisciplinary and intersectoral approach; as expressed in one of the reviewed articles, the province of Pinar del Río strengthens the development of teaching and research processes in the area of Natural and Traditional Medicine.[17,18]

CONCLUSIONS

As a result of the ethnobotanical studies carried out in the People's Council of Herradura, the Handbook of Medicinal Plants was designed. It is useful in the teaching-learning process, for research and for therapeutic purposes, and was considered very adequate by the experts who evaluated it.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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