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DATA BASE FOR MEDICINAL PLANTS*

Background Paper

Prepared by

the UNIDO Secretariat

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CONTENT

Introduction

The Second Consultation on Pharmaceutical Industry held from 21-25 November 1983 in Budapest, Hungary, recommended that UNIDO should initiate the compilation of both Data Base and a Directory on plants used as therapeutic agents containing all available information pertinent to their use or for the extraction of their active principles.

In compliance with the above referred recommendation the work was initiated in consultation with the experts on medicinal plants.

This paper gives a short resume of the efforts made by UNIDO on the subject. It also provides the details as regard the criteria used for the selection of medicinal plants to be used for industrial utilization, pertinent information that could be included in the Data Base and information format proposed to be used for Data Base/Directory for medicinal plants.

Date Base for Medicinal Plants

In February 1985 an informal meeting of experts was convened by UNIDO on the issue of development of drugs based on medicinal plants. The experts discussed the implementation plan for the recommendations of the Second Consultation on the subject of compilation of data base and a directory on plants used as therapeutic agents, containing available information pertinent to their use or for the extraction of their active principles.

As a first step the experts in collaboration with UNIDO laid down criteria as reflected in Annex I for the selection of plants deemed as sources of pharmaceuticals for industrial production in the developing countries. Based on the above referred criteria a list of 68 plants was prepared by the experts. At the same time a comprehensive list of categories of information relevant to the needs of developing countries as detailed in Annex II was also compiled. This list on the categories of information covered the following aspects:

A - Botanical
B - Ethnopharmacological
C - Chemical
D - Pharmacological
E - Agrotechnological
F - Technological
G - Chemotaxonomic
H - Market
I - Other relevant

Subsequent to the above, a format for the data base was developed for the collection of information on the aspects referred to above. Details of this format are reflected in Annex III.

Within the restricted financial resources UNIDO has compiled information on the following five plant species:

1. Azadirachta indica
2. Artimesia annua
3. Centella asiatica
4. Adhatoda vasica
5. Aegle marmelos

The information collected on these plants was found to be extensive and it covered 740 pages. This work was reviewed at the Expert Group Meeting on Medicinal Plants and Other Issues held in December 1986. The conclusions and recommendations of this meeting were as follows:

"Recognizing the magnitude of the work and resources required for the compilation of a comprehensive data base and for the retrieval of the information it contains, and realizing the fact that several independent data bases pertaining to this area have recently been established, it was recommended by the experts that:

- UNIDO should instead initiate work on the preparation of technical monographs on selected plants, giving all categories of information related to their industrial processing including technological aspects and methods for the assay of active ingredients.

- Member states in possession of pertinent information on plants of therapeutic importance should make such information available to UNIDO as well as the services of specialists for the preparation of the monographs.

- UNIDO should consider compiling a list of already existing data bases having information relevant to the field of medicinal plants, together with the details of the aspects they cover."

Advise of Consultation on the actions to be taken on the conclusions and recommendations referred to above is requested.

Indicative list of Data bases

1.	NAPRALERT	University of Illinois (Chicago)	USA
2.	P.I.D.	Publication, Information Directorate CSIR, New Delhi	India
3.	CHINESE UNIVERSITY OF HONG KONG	Database, Kowloon	Hong Kong
4.	Beilstein ONLINE	Berlin	FRG
5.	Chemline	Nothingham	UK

Annex I

Criteria for the selection of medicinal plants as sources of pharmaceuticals for industrial production in developing countries

1. The drug product derived from medicinal plants should be safe and effective and its use endorsed by the WHO.

2. The drug product derived from medicinal plants should be widely used and/or required to treat diseases prevalent in developing countries.

3. The medicinal plant should grow wild or be cultivated in developing countries.

4. Treatment costs with drug products derived from medicinal plants should be competitive with those of synthetic drugs of the same therapeutic category.

5. Economic production of such pharmaceuticals should be attained, at least on the long run.

6. Technology and/or know-how for the commercial scale production of such pharmaceuticals should be available.

7. Export possibilities of such pharmaceuticals to developing and/or industrialized countries should be of advantage.

8. In case of potential drug candidates, there should be scientific evidence to suggest that a useful drug can be developed from the medicinal plant.

(Note: It was agreed that a medicinal plant should be considered for inclusion in the illustrative list, even if criteria 6. and 7. were not complied with.)

Annex II

CATEGORIES OF INFORMATION NEEDED

The following are the categories of information (relevant to the needs of developing countries) regarding medicinal and aromatic plants that should be contained in any data-base.

(A)	Botanical Aspects	Botanical name of plant synonyms habitat and regional names, world-wide distribution
(B)	Ethnopharmacological Aspects	Ethnotherapeutic usage (for which conditions?) Mode of preparation/administration and regimen
(C)	Chemical Aspects	Phytochemical constituents of plant species, related species (where known) Analytical data/standards (if available) Pharmacognostic features of raw plant drug as used in traditional/modern pharmacopoeias
(D)	Pharmacological Aspects	Pharmacological and toxicological data where known, inclusive of clinical trials
(E)	Agrotechnological Aspects	Agronomic data and propagation techniques, post-harvest technology and preparation for use
(F)	Technological Aspects	Methods of processing (both modern and traditional) and processed drug forms and formulations. Methods of quality assessment. Patented processes and holders of technology.
(G)	Chemotaxonomic Aspects	Other species containing the similar chemical constituents
(H)	Market Aspects	Import-export statistics of raw plant drug including quantities as well as producer countries and importing countries.
(I)	Other relevant aspects	

Annex III

DRAFT INFORMATION FORMAT FOR PROPOSED UNIDO DIRECTORY AND DATA BASE IN MEDICINAL PLANTS

I. A. BOTANICAL ASPECTS

A.1 Latin Binomial - (synonyms) - (FAMILY)

A.2 Habitat

A.3 Distribution

A.4 Regional / Local names

A.5 Pharmacognostic features of raw drug

B. ETHNOMEDICAL ASPECTS

B.1 Uses / Plant parts employed/post-harvest treatment

B.2 Method of traditional preparation

B.3 Mode of administration and regimen in traditional systems

B.4 Regional variations (if applicable) in usage, preparation, regimen etc.

C. CHEMICAL ASPECTS

C.1 Phytochemical constituents known

Chemical type - Compound - (Structure Number)

eg. 1. Alkaloid Septicine (242) (Appendix I)
2. Iridoid Iridodial (108)
3. Bitter Principles Pikortoxin (42)
Columbin (43)

C.2 Analytical Data and Methods

C.2.1 Chemical Analytical Methods

C.2.2 Instrumental Analytical Methods

C.3 Chemotaxonomic Aspects
Related species : Chemical constituents

Other species containing Chemical constituents similar major constituents:

D. PHARMACOLOGICAL ASPECTS

D.1 Specified Bioactivity Class.
Plant parts, extracts or
chemical constituents

D.2 Pharmacological and Toxicological
data including Teratology.

D.3 Clinical data plant
Plant extract or
chemical constituents

D.4 Currently known preparations

E. AGROTECHNOLOGY

E.1 Countries where indigenous:

E.2 Climatic & other requirements

E.3 Soil, irrigation and fertiliser needs

E.4 Methods of Propagation

E.5 Mean yield of crude drug (Kg/Ha)

E.6 Post-Harvest Preparation

E.7 Breeding of improved cultivars.

(The above information should be in relation to Global/Regional categories.)

F. TECHNOLOGY & FORMULATION

F.1 Methods of processing
(brief description, flow chart)

F.2 Formulation of drug
delivery forms

F.3 Patents (if any)
References to Absbach patent literature

F.4 Equipment ensemble suitable for
processing needs

F.5 Other Information

G. MARKET ASPECTS

G.1 Current Status of raw material market

G.2 Market for processed or semi-processed
products

G.3 Supply potential/products

G.4 Regulations/quality requirements

G.5 Commercial practices

G.6 Tariffs

II. ATLAS of CHEMICAL STRUCTURES with references based on CHEMICAL ABSTRACTS REGISTRY

III. EQUIPMENT ENSEMBLES FOR PROCESSING MEDICINAL PLANTS

DESIGN OF A POLY-FUNCTIONAL FACILITY

DESIGN No.	SUPPLIER	CAPACITY RANGE
Reference: with line drawings of process equipment: selected examples to exemplify each case	TYPE 300	0 - 300 kg dry raw material
	TYPE 1000	300 - 1000 kg dry raw material
	TYPE COMMERCIAL I	1000 - 3000 kg dry raw material
	TYPE COMMERCIAL II	Larger commercial processing capacity

IV. REFERENCES

To be cited in alphabetical order of author's name as per example below:

A. (References in Scientific) Journals & Periodicals

References in Books

B. References to Reports, Surveys, etc.

Other general references

C. References to Patent Literature