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A REVIEW ARTICLE ON: NATURAL ANTI-LEPROTIC DRUGS

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ABSTRACT

Leprosy is a chronic infectious disease which is caused due to the Mycobacterium leprae bacillus. It was considered to be an incurable disease for different ages. Currently leprosy is a departure disease although we can meet it mainly in the tropical zone countries. Brazil has the second supreme number of leprosy cases around the world with about 30,000 new cases diagnosed in 2005. The various herbal drugs like Amaranthus Spinosus, Terminalia Bellirica Roxb, Centella Asiatica, Curcuma longa etc known for their antileprotic activity. The different branded herbal formulations such as Divya Kayakalp Vati, Mahamanjishthai Ark, Mahatikta Ghrita and Kaishore Gugguluetc available in the market as antileprotic. It may be concluded that since ayurvedic formulations include number of different ingredients in which one of them may act to enhance or improve the action of other ingredient. Also as a result of so many ingredients present in the particular ayurvedic formulation it helps in skirmishing other diseases in addition to antileprotic activity.

KEYWORDS: Amaranthus Spinosus, Terminalia Bellirica Roxb, Centella Asiatica.

INTRODUCTION AND HISTORY

The Norwegian doctor Gerhard Hansen identified the biological causative agent, Mycobacterium leprae, which causes the infectious disease leprosy or Hansen's disease that affect mainly the peripheral nerves and human being skin. Bible contents passages that refer to lepra, however it is unknown if it is really Hansen's disease. This term was used to name

different dermatologic diseases of changeable origin and gravity. During much time lepra was incurable and much mutilator, forcing the isolation of patients in leprosaries,its mainly in Europe. Middle age, where they were obliged to take bells with them to announce their presence.[1]

Over than 5 million people around the world are infected with Mycobacterium leprae. Hansen's disease is more frequently in Asia, Africa, Latin America, and Pacific Islands. Many Hansen cases in developed countries affect people who have emigrated from developing countries. Over the last 20 years, a series of health policy reforms have been implemented in Brazil with the objective of decentralizing preventive health measures and basic services to the primary care network.[2] In order to 'eliminate' leprosy from all countries, the World Health Organisation formulated 'the final push', a strategy based on the early case detection and treatment with multi-drug therapy.[3] Plants symbolize or represent an important source of drugs, considering the extensive diversity of molecules with medicinal potential, and can make an effective contribution to the search of new bioactive products, semi-synthetic medicines or lead compounds for the synthesis of medicines.[4] The utilization and development of this potential medicine source requires all the botanical, pharmacological, chemical, biological, pharmacological and toxicological studies togetherly.[5]

TYPES OF LEPROCY

There are different types of laprocy

A. Lepromatous leprosy (LL)
B. Tuberculoid leprosy (TL)
C. Borderline lepromatous leprosy (BL)
D. Borderline tuberculoid leprosy (BT)
E. Indeterminate

CLASSIFICATION OF LEPROCY

WHO classified for therapeutic purpose.

A. Paucibacillary leprosy (non infectious) - TL, BT- with 2-5 skin lesions.
B. Multibacillary leprosy (Infectious) – LL, BL.- more than 6 skin lesions.

MYCOBACTERIUM LEPRAE

Mycobacterium leprae also referred as Hansen's bacillus spirally these are largely found in warm climate and warm tropical countries such as angola,aruba, benin etc.[6] Mycobacterium leprae an intracellular, pleomorphic, acid-fast and pathogenic bacterium. M. leprae is an aerobic bacillus (like rod-shaped) surrounded by the characteristic of waxy coating and unique to mycobacteria. In size and shape, it closely resembles to Mycobacterium tuberculosis. Due to its thick waxy coating, M. leprae stains with a carbolfuchsin rather than with the traditional Gram stain. The culture takes numerous weeks to mature.

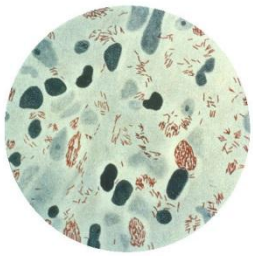

Fig. no. 01: Mycobacterium leproae.

SCIENTIFIC CLASSIFICATION

Domain: Bacteria

Phylum: Actinobacteria

Class: Actinobacteria

Order: Actinomycetales

Suborder: Corynebacterineae

Family: Mycobacteriaceae

Genus: Mycobacterium

Species: M. leprae

Binomial name: Mycobacterium leprae

Optical microscopy of M. leprae shows in clumps, rounded masses, or in groups of bacilli side by side and ranging from 1–8 μm in length and 0.2–0.5 μm in diameter.

In 1873 by the Norwegian physician Gerhard Armauer Hansen discovered this Mycobacterium leprae also referred as Hansen's bacillus, who was searching for the bacteria in the skin nodules of patients with leprosy. The Mycobacterium leprae was the first bacterium which is to be identified as causing disease in humans. The organism has been successfully grown on an artificial cell culture medium on a very inadequate basis by

researcher Arvind Dhople. Since in vitro cultivation it is not generally possible, it has instead been grown in mouse foot pads and more recently in nine-banded armadillos because they, like humans and are susceptible to leprosy.[7]

FERNANDEZ REACTION

The Fernandez reaction may be a reaction that happens to signal a positive end in the lepromin diagnostic test for leprosy. The reaction occurs within the skin at the location of injection if the body possesses antibodies to the Dharmendra antigen, one among the antigens found in leprosy bacillus, the bacteria that causes leprosy. The reaction occurs via a delayed-type hypersensitivity mechanism. This reaction occurs within 48 hours of injection of lepromin and is seen in just tuberculoid sorts of leprosy. In contrast, the Mitsudareaction (delayed granulomatous lesion) occurs 3-4 weeks after injection of lepromin and is merely seen in patients with the tuberculoid sort of leprosy (not the lepromatous form, during which the body doesn't mount a robust response against the bacterium).In terms of mechanism of action and appearance, the reaction is analogous to the tuberculin reaction of a positive Mantoux test for tuberculosis.

CLASSIFICATION OF ANTI-LEPROTIC DRUGS

Sulfones: Dapsone(DDS).

Phenazinedrivatives: Clofazimine.

Anti tubercular drugs: Rifampin, Ethionamide.

Other Antimicrobials: Ofloxacin, Moxifloxacin, Minocycline, Clarithromycin.

ROLE OF HERBAL DRUG IN ANTI-LEPROTIC ACTIVITY:

Plants represent a very important source of drugs, considering the wide diversity of molecules with medicinal potential, and can make an effective contribution to the search of new bioactive products, semi-synthetic medicines or lead compounds for the synthesis of medicines.[8]

Herbal medicines are among famous the public and improvements in their formulation have resulted in a new generation of phytomedicines that are more potent than before. This article highlights on the potential anti-leprosy of some herbal drugs used for treating leprosy disorders and recent developments in various herbal species.

Table 1 gives a comprehensive overview of the some of the crude drugs used for anti leprosy.

HERBAL DRUGS WITH ANTI-LEPROTIC ACTIVITIES

Table: 1. List of prominent medicinal herbs and their parts identifies to posses anti-leprocy activity along with other activities are described above.

BOTANICAL NAME	PLANT PART USED	VERNACULAR NAME	FAMILY	USES
AmaranthusSpinosus	Roots	Mullatotakura	Amaranthaceae	Antisnake venom, antileprotic, laxative
TerminaliaBellericaRobx	Bark	Bahera	Combretaceae	Diuretics, Anaemia, Leprocy.
CentellaAsiatica	Herb	Brahmi	Umbellifereae	Leprocy, T.B. Cardiotonic
CalotropisProcera	Decoction	Madar	AsclepiaDeceae	Asthama, Cold, Leprocy, Cough
Chaulmoogra Odorata	Root, Bark & Leaves	Chaulmoogra oil	Flacourtiaceae	Leprocy.
AdhatodaVasica	Bark, Root, Leaf	Adulsa	Acantheceae	Expectorant, leprocy
Curcuma longa	Tuber	Haldi	Zingibereceae	Cancer, Leprocy, Anti-oxident
Ipomoea Digitata	Roots	BidariKand	Convolvolaceae	Anticancer, Leprocy, Vomiting
NeriumIndicum (linn)	Root	Kaner	Apocynaceae	CNS Stimulant, Leprocy
Ipomoea Aquatic	Whole Plant	Sarnali, Kalmisag	Convolvolaceae	Leucoderma,Jaumdice, Leprocy
ButeaMonosperma	Flower	Palasa	Fabaceae	Eye disease, Leprocy, Leucorrhea
LawsoniaInermis	Whole plant	Heena	Lythraceae	Rhumatoid Arthritis, Ulcer,Leprocy, Cytotoxic

HERBAL DRUG OF CHOICE WITH ANTI-LEPROTIC ACTIVITY

***CHAULMOOGRA* OR HYDNOCARPUS WIGHTIANA**

Hydnocarpuswightiana or Chaulmoogra is a tree in the Achariaceae family. The oil from its seeds has been widely used in Indian medicine and Chinese traditional medicine for the treatment of leprosy. It entered early Western medicine in the 19th-century before the era of sulfones and antibiotics for the treatment of several skin diseases and leprosy.[9]

The oil is semi-solid at room temperature and doesn't have a strong odor. Gas– liquid chromatography analysis has shown.

PHYSICAL CHARACTERISTICS AND COMPOSITION

the oil contains the following fatty acids – hydnocarpic acid, chaulmoogric acid, gorlic acid, lower cyclic homologues, myristic acid, palmitic acid, stearic acid, palmitoleic acid, oleic acid, linoleic acid and linolenic acid.[10]

MEDICAL USE

The active constituent that produces antimicrobial activity has been identified as hydnocarpic acid, a lipophilic compound. It acts by being an antagonist of biotin.[11] The oil was used intravenously or intramuscularly in the early part of the 20th-century against leprosy disease. An ethyl ester of the oil was developed by Alice Ball in 1916[12] which led to the preparation and marketing of it by Burroughs Wellcome (modern GlaxoSmithKline) in the early 1920s. The oil preparations were used intravenously for the patients having leprosy, often producing local reactions. The oil was obtained directly from trees in India, Sri Lanka or Africa. Doctors would locally prepare ethyl esters to treat their leprosy patients. In May 1928, doctors reported cure of leprosy in some patients after treatment with alepol.[13] In the 1940s chaulmoogra oil was replaced by the more effective sulfones.[12]

Although a little component in the oil with no antimicrobial activitiy on its own, it plays a role in preventing multidrug resistance among some bacteria such as Staphylococcus aureus. It enhances the action of berberine (which is not found in chaulmoogra oil) by preventing its removal from within Staphylococcus aureus bacterial cells. Thus using the oil or an extract of the hydnocarpic acid in combination with extracts from other plants could help increase antimicrobial activity due to synergistic effects.[14]

In view of its anti-mycobacterial activity, in 1922 it was also experimentally tried on other conditions caused by mycobacteria such as tuberculous laryngitis.[15]

COLLECTION AND PREPROCESSING − PROCESSING − EXTRACTION

Fruits are plucked by climbing the tree or using long sticks with a sickle tied to it. The fruits are peeled by knife and the seeds are washed in water and then dried in sun.[16] Seeds are dehusked by mallet, hand hammer, or decoricator. They may also be crushed in an expeller and rotary. The kernels yield 43% oil. The extracted oil is stored in zinc barrels until exported.[17]

CONCLUSION

Herbal medicines makes an valuable contribution to primary health care and have shown great potential in modern phytomedicine against numerous ailments and therefore the complex diseases and ailments of the fashionable world. There will always be risks when appropriate regulations do not mandle the appropriate formulations of the remedies or when self medication fosters abuse. This work aimed at searching for literature available data about plants and natural products which has anti leprotic activity. It might be observed that they played a crucial role as efficient therapeutic path against leprosy centuries ago. This fact isn't so different from nowadays because it's necessary the utilization of natural origin drugs to which no similar synthetic compound has been found within the main polychemotherapeutic regimen proposed by modern medicine for the confirmed disease cases.

REFERENCES

1. Anu Rahal, Rajib Deb, Shyam K Latheef , Hari Abdul Hamid; Review Article on potential Anti-leprotic Herbal Drug: A Comparative review of Marketed Preparation; Journal of Bioscience, 2012; 15(16): 754-774.
2. Jose M. Barbosa-Filho; Review Article On Natural Products With Anti-leprotic Activity; PHARMACOGON, 2007; 17(1): 141-148.
3. Mc Murry DN; “Mycobacteria and Nacordia” In Baron s; Barons Medical Microbiology (4^{th} edition) University Of Texas Medical Branch, 1996.
4. Jean-Paul Anthony, Lorna Fyfe; Huw smith; Plants active compound-a resource of antiparasitic compound; Jounal of parasitology, 2005; 21(10): 462-468.
5. Norton, SA; Useful plants of dermatology. I. Hydnocarpus and chaulmoogra; Journal of the American Academy of Dermatology, 1994; 31(4): 683–689.
6. Sengupta, A.; Gupta, J. K.; Dutta, J.; Ghosh, A.; "The component fatty acids of chaulmoogra oil". Journal of the Science of Food and Agriculture, 1973; 24(6): 669–674.
7. Jacobsen, PL; Levy L; "Mechanism by which hydnocarpic acid inhibits mycobacterial multiplication"; Antimicrobial Agents and Chemotherapy, 1973; 1(3): 373–9.
8. Mendheim, Beverly; "Lost and Found: Alice Augusta Ball, an Extraordinary Woman of Hawai Nei"; Northwest Hawaii Times, 2007; 1(3): 1-22.
9. Simpkin, Alice; "The Treatment of Leprosy"; British Journal of Nursing, 2011; 313(4): 1-10.

10. Stermitz, F. R.; "Synergy in a medicinal plant: Antimicrobial action of berberine potentiated by 5'- methoxyhydnocarpin, a multidrug pump inhibitor"; Proceedings of the National Academy of Sciences, 2000; 97(4): 1433–1437.
11. Lukens, RM; "CHAULMOOGRA OIL IN THE TREATMENT OF TUBERCULOUS LARYNGITIS"; JAMA, 1922; 78(4): 274–275.
12. Opromolla PA, Martelli ACC. Terminology related to Hansen's disease. An Bras Dermatol, 2005; 80: 293-294.
13. Global leprosy situation, 2012. Wkly Epidermiol Rec, 2012; 87: 317-328.
14. Draper P. The bacteriology of mycobacterium leprae. Tubercle, 1983; 64: 43-56.
15. A Textbook of Pharmacology; AITBS PUBLISHERS, INDIA.
16. Textbook of Essential Medical Pharmacology; Seventh edition; K D Tripathi; JAYPEE BROTHERS MEDICAL PUBLISHERS.
17. SEA Hand Book, 2009 by the Solvent Extractors' Association of India.