Review Article

Status of Research on Medicinal Plants in Nepal: A Review

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ABSTRACT

Nepal harbors distinct potential for traditional medicinal plants with its rich climatic and geographical variance, biodiversity and endogenous knowledge. Traditional medicinal plants are being used from ancient time in Nepal. Many communities and tribes of Nepal carries the knowledge of using medicinal plants for curing various diseases for their people, since Nepal lacks advance medical facility in most of the remote area till date. Several kinds of research have been conducted by National and International research community to their best in order to establish the scientific value and authenticity for the use of traditional medicinal plants. There is lack of proper governmental support, advance research equipments and sufficient funds for the researchers and research institutions to carry detail analysis on the medicinal plants of Nepal. This review analyses the current situation of traditional plants in Nepal and focus on recent researches and the challenges that the scientific community is facing for the research of ethnomedicinal plants in Nepal and gives suggestions based upon the current situations.

Keywords: Ethnomedicinal Plants, Nepal, Endogenous, Scientific Research, Challenges

INTRODUCTION

Human's symbiotic relationship with plants has given valuable benefits since ancient time. Plants are being used not only as the source of food but also as source of medicine to treat many diseases by human. Traditional medicine is widespread throughout the world and Nepal carries vast potential for exploring medicinal plants from the scientific perspective, because it is rich in biodiversity and endogenous knowledge of ethnomedicinal plants. At its 8th general proGram of meeting from 1990-1995, World Health Organization (WHO) redefined traditional medicine as comprising therapeutic practices that have been in existence, often for centuries, before the development and spread of modern scientific medicine and are still in use today. Currently, about 25–30% of all drugs available as therapeutics are derived from natural products or are derivatives of a natural product [1]. Due to the advancement of combinatorial chemistry, research into natural products is declining. However, recent evidence from the pharmaceutical companies shows that for some complex diseases, natural products still represent an extremely valuable source for the making new chemical entities, since the chemical structures are selected by millions of years of evolutionary mechanisms [2, 3, 4]. Various studies have been conducted to collect the database of medicinal plants in Nepal [5, 6, 7, 8] and few scientific research has also been conducted [9, 10, 11, 12]. This review focuses on the status of traditional plants in Nepal, its research trends and the challenges that the scientific community has been facing in research of Medicinal plants in Nepal.

The Status of Traditional Medicine in Nepal

Herbs are the primary source of medicinal plants after trees in Nepal and mostly being used for gastro-intestinal problems, followed by fever and headache [13]. Herbal Encyclopedia *Bir Nighantu* or *Bir pharmacopoeia* by Pandit Ghana Nath Devkota in 1969 is probably the first hand written effort towards a compilation of the

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traditional knowledge about medicinal plants of Nepal covering 750 plants in detail [14]. Work done by Banerji et.al in 1955 is the earliest published work based on medicinal plants in East Nepal [15]. 80 % of the Nepalese population are dependent on the traditional plant-based medicines for their primary health care needs [16]. Nepal consists of 1624 plant species as having medicinal and aromatic values, while for Sri Lanka it is about 1400, for India about 2500 and for China about 5000 [17, 18]. The numbers of ethnomedicinal plants are decreasing at an alarming rate due to lack of scientific data on organized and sustainable cultivation, lack of social awareness in plant use, market and proper management [19].

Research Trends on Nepalese Medicinal Plants

Scientific research on medicinal plants are generally conducted by institutions like Kathmandu University, Tribhuvan University, Pokhara University, Nepal Academy of Science and Technology (NAST), Department of Plant Resources, National Ayurveda Research and Training Center (NARTC), Agriculture and Forest University and various other colleges and research institutes in Nepal. Research was done on traditional medicinal plants by Nepalese researchers in Nepal like *Berberis aristata* [20]; *Juniperus recurva* [21]; *Swertia chirayita* and *Dendrobium amoenum* [22]; *Allium wallichii* [23]; *Artocarpus heterophyllus* [24]; *Bauhinia variegata* [25, 26]; *Ocimum sanctum*, *Eugenia caryophyllata*, *Achyranthes bidentata* and *Azadirachta indica* [27]; *Colquhounia coccinea, Rhododendron setosum, Eucalyptus globules, Elsholtzia fructicosa* [10]; *Achyranthes aspera*, *Arnebia benthamii, Berberis aristata, Cissampelos pareira, Tinospora sinensis* [28]; *Cynodon dactylon, Cinnamomum camphora, Curculigo orchioides, Curcuma longa* [29]; *Stephania glandulifera*, *Cuscuta reflexa*, *Bergenia ciliata*, *Drymaria diandra*, *Jasminum humile*, *Viola serpens* [30]. Foreign researchers has also published articles based upon samples of Nepalese medicinal plants like *Centipeda minima, Drymaria diandra, Macaranga pustulata, Corydalis longipes, Didymocarpus primulifolius Hypericum elodeoides* [31]; *Elephantopus scaber, Macaranga pustulata, Pogostemon benghalensis, Lygodium japonicum, Sibbaldia mieropetala, Valeriana jatamansii* [32]; *Bergenia ligulata*, *Nerium indicum, Holoptelia integrifolia, Asparagus racemosus, Salvia coccinia* [33], *Curcuma zedoaria, Chamomilla recutita, Ocimum basilicum, Cymbopogon martini, Mentha canadensi, Rhododendron anthopogon* [34]; *Bergenia ciliate* [35]. List of research done by national and international researchers on traditional medicinal plants in Nepal is quite interesting. Many plants from Nepal have been identified to show antimicrobial, anticancer, anti-inflammatory, antidiabetic and even antiviral properties. With recent developments in the field of Biotechnology, there has been slight shift in research towards validation of the mechanism of action of medicinal plants in cancer [21,23].

Challenges that Researchers are Facing in Medicinal Plants Research

Although, the vast amount of work has been done to identify the traditional medicinal plants of Nepal, but due to geographical, climatic and topographical complications, sometimes it is difficult for the researchers to collect the valuable samples that they could get from extreme locations of Nepal. There is also lack of special plant protection centers for traditional medicinal plants in Nepal due to which important plants of medicinal values are also in the phase of extinction. There is also a lack of funds and sophisticated equipments in the field of medicinal plant research for the institutions in Nepal which is limiting the research in screening antimicrobial and phytochemical properties. Advance equipments like Gas Chromatography, Mass Spectrophotometer and Infrared Spectrophotometer, should be maintained by the government for identifying the compounds in Nepal itself rather than exporting the samples in the foreign country which can create threats for Intellectual Property rights. Also relevant efforts should be carried out to establish collaboration between universities and local or international pharmaceutical companies, to produce new medicines with scientific proof of safety, quality and efficacy by conducting pre-clinical pharmacological studies and randomized clinical trials. Furthermore, emphasis on domestication, production and biotechnological studies, followed by genetic improvements to medicinal plants should be given.

CONCLUSION AND RECOMMENDATION

Majority of the populations in Nepal are still using traditional medicinal plants to treat diseases based upon ancient Ayurvedic prescriptions. Modern pharmaceutical practice demands for rigorous analysis of medicinal herbs and compounds present in them with the data of pre-clinical and clinical trials before prescribing them for the human use. The efforts in the traditional medicinal plant research of Nepal by national and international researchers is honorable and the results obtained from them clearly signifies the importance of traditional medicinal plants of Nepal and justifies its use by Nepalese from ancient time for treatment of various diseases. Medicinal plants from extreme locations can contain new phytochemical and chemical entities. Hence appropriate facilities and funding should be managed by local government, University Grants Commission (UGC) and other donor bodies for exploring the potential of traditional medicinal plants in Nepal. Also a great effort should be placed in training more scientists and researchers in the relevant areas in

order to establish a logical and sustainable exploitation of Nepalese biodiversity.

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