MEDICINAL HERBS AND PLANTS OF NEPAL HAVING HYPOGLYCEMIC PROPERTIES

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Nepal, a small Himalayan country with disproportionately rich cultural and ethnic diversity, is a landlocked kingdom bordered by China in the north and India in the east, west and south as its good neighbors. It extends between latitude 20°22’ and 30°27’ north and longitude 80°04’ and 88°12’ east, with area of 147,181 km², representing just 0.1% of the global land surface and population of 23 million (growth rate 2.1%). Climatically, Nepal lies in the temperate zone with an added advantage of altitude from 1220 to 8848 m above mean sea level, except for a few places that lie below 1220 m. It is distributed into three ecological zones – Northern Mountains, Middle Hills and Southern Tarai, accommodating 7, 46, and 47% of the population and 35, 42, and 23% of total land area, respectively (Dahal et al., 2005). Administratively, it is divided into five development regions: Eastern, Central, Western, Mid Western, and Far Western, 14 zones, and 75 districts. Nepal is renowned for its socio cultural diversity of 100 ethnicities, 92 languages and 9 religions (UNDP, 2004).

The diversity of species in Nepalese flora offers great opportunities for the search of medicinal substances, not yet described or discovered. Nepal has a record of over 700 species of medicinal plants. There is a store of still unwritten and undocumented traditional knowledge on the use of plants for healing purposes. The use of medicinal herbs in Nepal’s traditional medical system dates back to at least 500 AD. In Nepal, traditional medicine, although low profile, has been an integral part of the national health system. Parallel to the allopathic system, traditional medicine is encouraged in all spheres because of its efficacy, availability, safety, and affordability when compared to allopathic drugs.

Diabetes mellitus (DM), both insulin-dependent DM (IDDM) and non-insulin dependent DM (NIDDM) is a common and serious metabolic disorder throughout the world. Traditional plant treatments have been used throughout the world for the therapy of diabetes mellitus. Among many medications and other alternative medicines, several herbs have been known to cure and control diabetes; additionally they have no side effects. History showed that medicinal plants have been used in traditional healing around the world for a long time to treat diabetes; this is because such herbal plants have hypoglycemic properties and other beneficial properties, as reported in scientific literature (Kavishankar et al., 2011).

There is a growing interest in herbal remedies due to the side effects associated with the therapeutic agents (oral hypoglycemic agents and insulin for the treatment of diabetes mellitus).
A number of herbs found in Nepal have remarkable anti diabetic potential. Several Nepalese herbal plants contain significant antidiabetic potential although Nepalese medicinal herbs are presently limited only in traditional ayurvedic treatment (Joshi and Joshi, 2001). A study on the anti diabetic Potential of Nepalese Herbs conducted as a part of global study Functional Food for Chronic Disease (2008) said that the following herbs and food plants could have their applicability as important anti diabetic agents.

1. **Scientific name: Justicia adhatada, Family: Acanthaceae**

   **Nepali name:** Asuro

   **Tamil name:** Adathodai

   The leaf juice is shown to cure diabetes and liver relevant disorders. Two major alkaloids of J. adhatoda are vasicine and vasicinone which possess interesting biological activities including antihyperglycaemic effects.

2. **Scientific name: Centella asiatica, Family: Mackinlayaceae**

   **Nepali name:** Ghortapre

   **Tamil name:** Vallarai

   The whole plant made into a paste with water is used. An active chloroform fraction isolated from the plant extract of Centella asiatica is found to be an effective hyperglycaemic agent. The active principle could be one or more terpenoids and/ or coumarins.

3. **Scientific name: Holarrhena antidysenterica, Family: Apocynaceae**

   **Nepali name:** Indrajau

   **Tamil name:** Veppaalai Arisi

   The seed extract of Holarrhena antidysenterica has favourable effect not only on blood glucose levels, liver glycogen but also on serum lipids and body weight thereby promising its effect as an useful antidiabetic agent and also in diabetic complications.

4. **Scientific name: Terminalia bellirica, Family: Noctuidae**

   **Nepali name:** Barro

   **Tamil name:** Kalanduri

   The fruit extract of Terminalia bellirica reduces serum glucose levels in hyperglycaemic subjects.
5. **Scientific name: Terminalia chebula, Family: Combretaceae**

**Nepali name:** Harro  
**Tamil name:** Kadukkai  
Dried fruit powder of Terminalia chebula is used as a potential drug for the treatment of diabetes mellitus.

6. **Scientific name: Rhododendron arboreum, Family: Ericaceae**

**Nepali name:** Laligurans  
**Tamil name:** Maalaipoovarasu  
The flower extract of Rhododendron arboreum possesses antihyperglycemic and antihyperlipidemic active principle which acts by promoting insulin secretion and alterations in the carbohydrate and lipid metabolism.

7. **Scientific name: Swertia chirayita, Family: Gentianaceae**

**Nepali name:** Chiraito  
**Tamil name:** Nilavembu, Shirattakuchi  
The whole plant has anti-diabetic, anti-pyretic, anti-malarial and anti-inflammatory potential. Many of the compounds that are responsible for its therapeutic properties are xanthones, flavonoids, terpenoids, iridoids, secoiridoid glycosides, Amarogentin, mangiferin and swertiamarin.

8. **Scientific name: Acacia catechu, Family: Fabaceae**

**Nepali name:** Khayar  
**Tamil name:** Karunkali  
The hard wood extract of Acacia catechu is used by diabetic patients.

9. **Scientific name: Cassia fistula, Family: Fabaceae**

**Nepali name:** Rajbrikksha  
**Tamil name:** Sarakonnai  
The extract of the bark of Cassia fistula possesses significant antidiabetic activity due to the presence of glycoside or flavonoid.
10. **Scientific name:** *Woodfordia fruticosa*, **Family:** Lythraceae  
**Nepali name:** Dhaniyaro  
**Tamil name:** Thathari poo  
The flower extract of *Woodfordia fruticosa* is used as an hypoglycaemic agent.

11. **Scientific name:** *Myrica esculenta*, **Family:** Myricaceae  
**Nepali name:** Kaphal  
**Tamil name:** Marudam  
Myrica esculenta is a small tree or large shrub native to Hills of Nepal and northern India. The extract of bark of the tree is used in treating diabetes.

12. **Scientific name:** *Nymphaea stellata*, **Family:** Nymphaeaceae  
**Nepali name:** Neelkamal  
**Tamil name:** Alli-tamarai  
The flower extract of *Nymphaea stellata* is used by hyperglycaemic and hyperlipidaemic patients.

13. **Scientific name:** *Cedrus deodara*, **Family:** Pinaceae  
**Nepali name:** Debdar  
**Tamil name:** Devadaram  
Extract of the bark of *Cedrus deodara*, diluted with boiled water is used as a potential anti diabetic drink.

14. **Scientific name:** *Rheum emodi*, **Family:** Polygonaceae  
**Nepali name:** Padamchal  
**Tamil name:** Iraval chinni  
The root extract of *Rheum emodi* exhibits antidiabetic activity by enhancing the peripheral utilization of glucose.
15. **Scientific name**: *Rubia manjith*, **Family**: Rubiaceae  
**Nepali name**: Majhitho  
**Tamil name**: Manditta  
The root extract of *Rubia manjith* is used.

16. **Scientific name**: *Sapindus mukorossi*, **Family**: Sapindaceae  
**Nepali name**: Ritha  
**Tamil name**: Boonthi vidhai  
The fruit extract of *Sapindus mukorossi* has antihyperglycemic and antihyperlipidemic properties.

17. **Scientific name**: *Bergenia ciliata*, **Family**: Saxifragaceae  
**Nepali name**: Pakhanbed  
**Tamil name**: Sirupilai  
The root powder or extract is used as a hypoglycaemic agent.

18. **Scientific name**: *Taxus baccata*, **Family**: Taxaceae  
**Nepali name**: Tulsipatra  
**Tamil name**: Vettilai  
Extract of the bark and seeds of *Taxus baccata* is used for its antidiabetic properties.

Plate 1 shows the different herbs and plants used for their hypoglycaemic properties.
PLATE 1: MEDICINAL PLANTS AND HERBS WITH HYPOGLYCEMIC PROPERTIES

Justicia adhatada

Holarrhena antidysenterica - Seeds

Terminalia chebula

Swertia chirayita
These medicinal herbs of Nepal found with high anti diabetic potential can be used in formulation of functional foods and other important medicines useful in diabetes, a major health problem worldwide. Medicinal plants are well-known natural sources for the treatment of various diseases since antiquities. To treat diabetes, rural Nepalese people use herbal treatment either alone or in combination with other forms of treatments, but therapeutic importance of many such herbs have not been investigated yet.

Diabetes is a serious metabolic disorder. Differences in social structure, psychic stress, obesity, hormonal imbalance and heredity are optimizing the growth of pandemic (Kunwar and Adhikari, 2005). At present, the treatment of diabetes mainly involves a sustained reduction in hyperglycemia by the use of biguanides, thiazolidinediones, sulphonylureas, D-phenylalanine derivatives, meglitinides and á-glucosidase inhibitors in addition to insulin. However, due to unwanted side effects the efficacies of these compounds are debatable and there is a demand for new compounds for the treatment of diabetes. Hence, plants can be suggested as a rich, as yet unexplored source of potentially useful anti diabetic drugs. However, only a few have been subjected to detailed scientific investigation due to a lack of mechanism-based available in vitro assays. Therefore, scientific efforts must be taken as an attempt to provide treatment for all and justify the role of novel traditional medicinal plants having anti-diabetic potentials.

REFERENCES:


