

Phytomedicine for the diabetes : A traditional approach

Ruby Tiwari and C.S. Rana*

IMS Engineering College, NH 24, Near Dasna, Ghaziabad-201015, Uttar Pradesh, India

*Department of Botany, HNB Garhwal University, Srinagar, Garhwal-246174, Uttarakhand, India

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Abstract

Present study has been carried out in the remote region of Uttarakhand, Himalaya. Faith herbal healers are those persons, who are curing various diseases and ailments of the local inhabitants of the remotest regions. This information is vanishing due to any reason which should be documented. Diabetes is a serious problem for all human beings, at any age groups, in the present scenario. A total of 17 plants have been identified in the present study, out of which 12 were herbs, 3 were shrubs and 2 were trees, respectively.

Key words: Diabetes cure, traditional knowledge, plants

1. Introduction

Diabetes, in general, is a clinical syndrome, characterized by inappropriate hyperglycemia, caused by an absolute deficiency of insulin or by a resistance to the action of insulin at the cellular level (Tripathi *et al.*, 2011). It is found in the studies that diabetes damaged many of the body systems, particularly blood vessels and the nerves (Cooke and Plotnick, 2008). It is the most common endocrine disorder, affecting 16 millions individuals in the United States and as many as 200 million people all around the world (Tripathi *et al.*, 2011). In particular, diabetes mellitus is now recognized as a serious global health problem (Kumar *et al.*, 2013). Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with this disease (Joshi and Parikh, 2007). According to the American Diabetes Association, 25.8 million children and adults in the United States have found as diabetic, out of 8.3% of the total populations (www.diabetes.org). It has also predicted that one in three adults will have diabetic by year 2050 (www.diabetes.org). India is also facing serious problems in diabetes (Kumar *et al.*, 2013). In the year 2000, it was found 31.7 million people are troubling with diabetes which is topped in the world followed by China (20.8 million) and United States (17.7 million), respectively (Joshi and Parikh, 2007; Tripathi *et al.*, 2011; Kumar *et al.*, 2013). In the years 2012 to 2014, diabetes is estimated to have resulted in 1.5 to 4.9 million deaths per year; diabetes at least doubles the risk of death (WHO, 2013). The number of people with diabetes is expected to rise to 592 million by the year 2035. What is the seriousness of the diabetes, the global economic cost of diabetes was estimated to be \$612 billion USD in 2014 (Whiting *et al.*, 2011).

The state of Uttarakhand came into existence on 9th November, 2000 as 27th state of Indian republic and lies in the eastern most part of the Western Himalaya. The rivers of this new state and also high mountains are always helpful in riverine and mountainous ecosystem, which turned into rich biodiversity within the state

(Uniyal *et al.*, 2007; Duthei, 1905; Polunin and Stainton, 1984; Naithehi, 1984; Gaur, 1999).

The remotest regions within Uttarakhand, Himalaya, India is inhabited by tribal people that have rich knowledge on natural resources, such as plants, animals as well as minerals with particular relation to their medicinal application and properties (Rana *et al.*, 2013a). Local populace depends on these natural resources particularly from forests in their vicinity to fulfill their day-to-day requirements (Rana *et al.*, 2013b). Since ancient times the tribal community and recently those live remotest region from the road side and having less modern facility have a self traditionally developed primary health care system of folk medicine based on herbal remedies, which is time tested and tested by times since their ancestors (Rana *et al.*, 2013 a and b). Considering this, we explored medicinal plants used for diabetes in particular and other uses in general.

2. Methodology

In past two years from 2012-2013, repeated seasonal field trips were made to different districts of the Uttarakhand State and semi structured questionnaire surveys were made to document Vaidhyas, old folk, women folk, and other knowledgeable persons. Non codified knowledge was compared with codified knowledge for authentication. The plant specimens were collected from vicinity of forests and at the time of interview with healers, they have also their own raw plant material house, which was sufficient for easy identification and some of them, which were not identified on the spot have again collected and given a field book number and finally been identified by consulting the authentic Herbarium of Botanical Survey of India, Dehradun and Forest Research Institute, Dehradun. Current available literature has been used for proper nomenclature and specimens properly labeled with all the relevant information.

3. Results

In the present study, total 17 medicinal plants which are arranged alphabetically, have been studied as their synergistic uses. Plant species have been arranged following botanical name, citation, vernacular name, family, life form, part used, preparation, dosage, pattern, mode of application and uses.

Aconitum heterophyllum Wall. ex Royle (Vern: Atish, Ateesh), Family: Ranunculaceae, Herb.

Author for correspondence: Ms. Ruby Tiwari
IMS Engineering College, NH 24, Near Dasna, Ghaziabad, Uttar Pradesh, India

E-mail: rubytiwari_lucknow@yahoo.com

Tel.: +91-9451218865; +91-9953399279

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Email: ukaaz@yahoo.com; **Website:** www.ukaazpublications.com

Roots mixed with *Ajuga parviflora* leaves and *Podophyllum hexandrum* roots are dried in shade and powdered. The powder is given half teaspoonful twice a day early in the morning and at night after meals up to six months for the treatment of diabetes, leucorrhoea and as carminative.

Ajuga parviflora Benth. (Vern: Neelkanthi, Neelbati), Family: Lamiaceae, Herb.

Leaf powder mixed with *Aconitum heterophyllum* tuber powder is given a quarter teaspoon twice a day for a long period in the treatment of diabetes. Leaf extract, approximately half teaspoonful is given, twice a day for 7 to 21 days in high fever and colic.

Arnebia benthamii (Wall. ex G. Don) I. M. Johnston (Vern: Balchhari), Family: Boraginaceae, Herb.

Dactylorhiza hatagirea and *Polygonatum verticillatum* tubers powder is given ½ teaspoonful twice a day for a month in the treatment of leucorrhoea, piles and diabetes. Decoction of root is applied on burnt parts thrice a day for a week for early healing as antiseptic. Dried rhizomatous roots are mixed with mustard oil and applied on hairs as tonic.

Artemisia roxburghiana Wallich ex Basser (Vern: Kunjaa; Eng: Indian wormwood), Family: Asteraceae, Under shrub.

Powder of leaves mixed with *Paeonia emodi* leaf powder is given half teaspoonful twice a day, early in morning prior to meals and at night after meals for the treatment of diabetes, and as a blood purifier. Roasted leaf powder is given half teaspoonful twice a day for a month in the treatment of abdominal complaints.

Asparagus filicinus Buch.- Ham. (Vern: Jhiran, Censer muli; H. and Sans. Satawari), Family: Liliaceae, Under shrub.

Root powder along with water is given half teaspoonful twice a day up to six months in leucorrhoea, diabetes and in urinary complaints. Decoction of root is given half teaspoonful twice a day for a month as sex tonic, in diarrhea and dysentery.

Berberis aristata DC. (Vern: Kingore; Sans. Daruharidra; Eng: Indian Barber), Family: Berberidaceae, Shrub.

Root powder is given 2.5 g twice a day, early in morning and at night after meals for three months in diabetes. Decoction of root is given 2.5 ml. twice a day for two months in the treatment of urinary complaints, and also as blood purifier. Root juice dropped into eyes thrice a day for a week in ophthalmic infections.

Bombax ceiba L. (Vern: Simule; H. Semal, Sans. Raktapushpa, Simali; Eng. Silk cotton tree), Family: Bombacaceae, Tree.

Root with *Dactylorhiza hatagirea* roots, *Polygonatum cirrhifolium* roots and *Arnebia benthamii* roots are roasted with clarified butter and given approximately 2 g, three times a day for three months in diabetes, leucorrhoea, piles, epilepsy, hysteria and as a tonic in general weakness.

Dactylorhiza hatagirea (D. Don) Soo (Vern: Hattajadi), Family: Orchidaceae, Herb.

Extraction of root is given twice a day early in morning and at night after meals for 2-3 months in diabetes and leucorrhoea. Root paste applied externally for healing cuts injury on skin.

Hedychium spicatum Buch.- Ham. ex J.E. Smith (Vern: Ban. Haldu; H. Kapu, Kachri; Sans. Karpurakachal, Karpurakachali; Eng. Spiked Ginger), Family: Zingiberaceae, Herb.

Powdered rhizome is given half teaspoonful twice a day early in morning and at night after meals for 30-45 days in liver complaints, diabetes, menstruation disorder, and as blood purifier.

Lindernia crustacea (L.) F.V. Mueller (Vern: Pitt Papadi), Family: Scrophulariaceae, Herb.

Whole plant dried in shade powdered mixed with *Ajuga parviflora* leaf powder, and given ½ teaspoonful twice a day, for three months to treat high fever and diabetes. Decoction of herb is given ½ teaspoonful twice a day for 7 to 21 days for the treatment of abdominal ailments.

Paeonia emodi Wallich ex Royle (Vern: Chandra; H. Udsalap; Eng: Himalayan Paeony), Family: Paeonaceae, Herb.

Leaves are dried in shade, washed with hot water thrice, and then used as vegetable twice a day for the treatment of colic, blood dysentery, diabetes and urinary complaints. It is also used as blood purifier, and to improve lactation and treat menstrual problems. Root powder mixed with *Selinum vaginatum* root powder, is given ½ teaspoon twice a day up to 6 months for the treatment of hysteria and epilepsy.

Podophyllum hexandrum Royle (Vern: Shon kakadi; H. Ban kakri; Eng: Indian podophyllum), Family: Podophyllaceae, Herb.

Root powder with *Ajuga parviflora* given 2.5 g. twice a day for three months in the treatment of diabetes. Rhizome powder is given 2.5 g. twice a day, early in morning prior meals and at night after meals for 14 to 28 days in bile complaints, as carminative, in leucorrhoea.

Polygonatum verticillatum (L.) Allioni (Vern: Teetudu; Sans. Mahemeds; Eng. Whorled Solomon's seal), Family: Liliaceae, Herb.

Root powder mixed with *Polygonatum cirrhifolium*, *Bombax ceiba* and *Asparagus filicinus* root powder is roasted with clarified butter made into pills. One pill is given twice a day up to three months, as tonic in general weakness, aphrodisiac, in leucorrhoea and diabetes.

Prunus cornuta (Wallich ex Royle) Steudel (Vern: Jamun; Eng: Himalayan Bird Cherry), Family: Rosaceae, Tree.

Warmed seed oil is massaged in arthritis, and neuralgic pain. Unripe fruits are taken twice a day for 30 to 50 days for the treatment of diabetes. Wood used for agricultural implements and house hold articles.

Picrorhiza kurroo Royle ex Benth. (Vern: Katuki, Kadwi; Sans. Katuruhini), Family: Scrophulariaceae, Herb.

The root powder along with *Swertia chirayita* and *Aconitum heterophyllum* root powder is given half teaspoonful twice a day for a 3-6 months in stomach disorder and diabetes. The aqueous extract of root is given half teaspoonful twice a day, for 7 to 28 days for the treatment of chronic fever, stomachache, jaundice, urinary ailments and flatulence.

Spiranthes sinensis (Persoon) Ames. (Vern: Garud, Panja), Family: Orchidaceae, Herb.

Extract of root with *Dactylorhiza hatagirea* root is given twice a day half teaspoonful early in morning and at night after meals for 2-3 weeks in leucorrhoea and diabetes. Decoction of root is given twice a day for a month in colic.

Swertia chirayita (Roxb. ex Fleming) Korten (Vern: Chiratu; Sans. Kirat; Eng. Chiretta), Family: Gentianaceae, Herb.

Whole plant powder mixed with *Aconitum heterophyllum* tuber powder and *Ajuga parviflora* leaf powder is given twice a day for 2-3 months in diabetes, asthma, high fever, stomachache, leucorrhoea and as carminative. Decoction of plant is given along with cow urine approximate ½ teaspoonful twice a day, for a week early in morning and at night after meals to treat respiratory.

4. Discussion

According to the World Health Organization (WHO), up to 90% of the populations in the developing nations are using plants and its

products as traditional medicine for primary health care (WHO, 2002; Poretsky, 2009). It is estimated that about 3000 plant species are of potential medicinal value, of which 1300 species are extensively used in different systems of medicine, such as Ayurveda, Siddha, Unani, and Allopathy (Modak *et al.*, 2007; Singh *et al.*, 2012). About 1000 species of flowering plants are used for various medical purposes in Uttarakhand (Uniyal *et al.*, 2007). The Himalaya, especially the western Himalaya and the Western Ghats are exceptionally rich in medicinal plants (Duthei, 1906; Polunin and Stainton, 1984). Diabetes has been known since ages and the sweetness of diabetic urine has mentioned in Ayurveda by Sushruta (Patil and Ahirwar, 2011). Traditional herbal medicine plays an important part in the treatment of diabetes in particular and other disease and ailments in general (Rana *et al.*, 2013 a and b; Tiwari *et al.*, 2013). If we will be able to validate even some 3-5 herbal drugs that can reduce prescribed amount of insulin in the human body, then we would have to positively contribute in the treatment of diabetes in early stages (Tripathi *et al.*, 2011). All the plants which have been described or mentioned in the present study, have exhibited significant clinical and pharmacological activity. Definitely, the potency of herbal drugs might be significant and have negligible side effect than the synthetic antidiabetic drugs which might be checked properly by focused core research confined to the center point of discussion.

The common preparation for internal application may be: decoction (crushed plant parts boiled with water), extract (pounded plant parts steeped in hot or cold water and finally sieved out through a clean cloth), aqueous paste (plant part is pasted into thin layer and dilution with hot or cold water), powder (dry plant parts pounded into fine particles), and juice (fresh product obtained from crushed plant parts). In this context, the healers prepare the medicine from a particular plants for particular ailment, however, it has been observed that faith herbal healers believed to use different parts of different plant species such as root powder of one plant and bark powder of other plant or powder of other plant parts to promote the activity of curing the disease and ailments or disorder (Rana *et al.*, 2013a). Generally, medicines are prepared in the form of powder, paste, pill *etc.* Medicines are usually taken with water, sometimes with honey, twice or thrice a day after or before the meals. Before starting the treatment, the condition of the patient is observed deeply and then the medicines prepared and given to the treatment. The duration of treatment commonly depends on effectiveness of the drugs, or it depends on the condition of patients, it may be from months to years (Rana *et al.*, 2013b).

5. Conclusion

The finding of this study would be supportive for the patient's one who is suffering from diabetes, at least we can believe precaution is better than cure. On previous stage, if we could be succeed to diagnose the stage; definitely something could do for the patients. These non codified herbal medicines are prescribed by the faith herbal healers through their ancestors from ancient time. This is time tested or tested by time of their valuable knowledge. Definitely, this documentation helps to preserve this knowledge. But more affords should be done by the researchers engaged in phytochemistry, we have to know the different chemical constituents of the particular plant species or the different compounds within the herbal drugs prescribed by faith herbal healers. It will help in new formulations of the efficient drugs.

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Conflict of interest

We declare that we have no conflict of interest.

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