

Herbal products from high altitude plants of Ladakh Himalaya

Herbal-based medicated products have drawn considerable attention of research institutions and industries in recent years at the national and international level. The World Health Organization (WHO) has given emphasis on development and utilization of herbal products and medicines for the benefit of world population and to see cost effectiveness and minimum side effects of these products. The organization has also estimates that about 80% of the population living in developing countries relies on herbal medicine-based products for their healthcare needs. According to WHO estimates, herbs and herbal products are an integral part of most of the traditional and alternative systems of medicines worldwide. In developed countries like Belgium (31%), USA (42%), Australia (48%), France (49%), Canada (70%), a significant percentage of the population (shown in parentheses against each country) has used traditional and alternative remedies at least once for health care¹. It is estimated that more than 7800 manufacturing units are involved in production of natural health products and traditional plant-based herbal formulations in India, which require more than 2000 tonnes of medicinal plant raw material annually².

Development of herbal-based products has increased manifold in the past few years in all parts of the world and thus the present age is also referred to as 'the age of herbal products'. The Field Research Laboratory, Leh – the world's highest research laboratory of Defence Research and Development Organization (DRDO), located in the extreme heights of Leh-Ladakh – has also formulated certain high value medicated herbal products in the past few years. High altitude regions of Himalayas are well known for their rich sources of quality medicinal plants. Ladakh is situated at 2900–5900 m asl where the temperature drops below –30°C or less at different locations in the winter months and where it remains frozen for more than 5–7 months every year. These extremely harsh climatic conditions provide favourable environment for high altitude plants of potential medicinal property.

Ladakh has a unique traditional medical system called Amchi system of medicine and is able to provide cure and relief to

more than 60 per cent of tribal population. The high medicinal and nutritional value of these plants make the products highly beneficial for local residents as well as for troops deployed at high altitude, near the line of control, e.g. Siachen glacier.

Some of the valuable species of high altitude plants are *Achillea millefolium*, *Bunium persicum*, *Caparis spinosa*, *Carum carvi*, *Dactylorhiza hatagirea*, *Hippophae rhamnoides*, *Medicago sativa*, *Mentha longifolia*, *Ocimum basilicum*, *Origanum vulgare*, *Rheum webbianum*, *Rhodiola imbricata*, *Rosa webbiana*, *Saussurea lappa*, etc. The major products developed at Ladakh are 'Herbal multivitamin beverage' from *Hippophae rhamnoides* (Seabuckthorn), a high altitude bushy plant and 'medicated herbal health beverage (tea)' from eleven potential high altitude medicinal plants. A 'Herbal Appetizer' has recently been patented and is now under clinical trials. The benefit of these products is not only for meeting army requirement at high altitudes but also for providing better adaptational and functional health to the tourists, surveyors, researchers, common people and tribal communities. The efficacy of these products has been critically analysed through preclinical, pre-medical and organoleptic trials. These products were also analysed for medicinal, nutritional and toxic effects and were found to be non-toxic. The multivitamin herbal beverage successfully developed in 2001, was patented and the technology transferred to six national vendors. These products were subsequently launched in all the states of India with trade names like Leh Berry by Ladakh Foods Ltd, New Delhi; Ladakh Berry by Kohinoor International Agro Products Ltd, Srinagar; Madrid Berry by Mamta Foods Industries, New Delhi; Sindhu Berry by Sindhu Fruit Processing, Leh-Ladakh, etc. It is also available in blended brands such as Guawa–Seabuckthorn nector, Pineapple–Seabuckthorn nector, Mango–Seabuckthorn nector, Orange–Seabuckthorn nector, Apple–Seabuckthorn nector, etc.

The multivitamin herbal beverage from Seabuckthorn is known as a storehouse of vitamins such as vitamin A (11 mg/100 g), vitamin B₁ (2.67 mg/100 g), vitamin B₂ (6.23 mg/100 g), vitamin C (300–

1600 mg/100 g), vitamin E (162–255 mg/100 g), vitamin K and vitamin P, tannins (0.22 mg/100 g) and β carotene (12,839.67 μ g/100 g). Seabuckthorn is also rich in certain minerals like sodium (41.28 mg/kg), potassium (1499.96 mg/kg), calcium (383.0 mg/kg), iron 11.68 mg/kg), magnesium (47.7 mg/kg), zinc (0.94 mg/kg), copper (4.6 ppm) and phosphorus (0.02%). It generates about 106.66 kcal energy per 100 g of fruit pulp. It has a comparatively higher percentage of vitamin C than Aonla (*Embllica officinalis*) which is about 300–600 mg/100 g. It is a good source of flavinoids, phenolic compounds and proteins. The fruit, seeds and leaves are the best source of over 100 biologically active compounds³. This multivitamin herbal beverage is the first ever known product with the richest source of multi-vitamins and other nutritional and medicinal (anti-ageing, anti-radiation, anti-freezing, energizing and digestive) properties.

The medicated herbal health beverage (tea) was also successfully developed, patented and technology transferred to two national vendors. The product was launched by Arctic Bio-Pro Ltd, New Delhi with trade name of 'Si-berry' in tea sticks. It is developed by using 11 potential medicinal plants of high altitude, namely *A. millefolium*, *Bidens pilosa*, *B. persicum*, *C. carvi*, *D. hatagirea*, *H. rhamnoides*, *M. longifolia*, *O. basilicum*, *O. vulgare*, *R. imbricata* and *R. webbiana*. The herbal tea has been analysed for medicinal, nutritional and toxic value. The tea is rich in antioxidant value 1200 μ l/ml, flavinoids 3.42% m/m, carotenoids 1.0% m/m, catechin 2.05% m/m, phenols 15 mg/g and no toxicity was observed. The major benefits of herbal tea are that it is a sedative, cooling, energizing stimulant used against high fever, cold, cough, headache, high altitude mountain sickness, stress, fatigue, memory loss, dysentery, diarrhoea, gastritis, influenza, restlessness, indigestion, hypertension, lethargy, etc⁴. These products are also being introduced in the Indian army special high altitude ration on the recommendations of HQ 14 Corps and Quarter Master General, Army Head Quarters, New Delhi.

The herbal appetizer is under clinical trials and it contains *A. millefolium*, *C.*

spinosa, *C. carvi*, *H. rhamnoides*, *M. sativa*, *M. longifolia*, *O. vulgare*, *R. webbii*, *S. lappa* and is biochemically rich in aloin (0.82 mg/100 g), carvone (4.7 mg/100 g), thymol (8.0 mg/100 g), t-anethole (7.3 mg/100 g) and menthol. The usefulness of this appetizer is because of its medicinal properties like its digestive and laxative efficacy and appetite enhancement.

The natural resources in Ladakh Himalayas are very limited and will not be available for long term use without scientific and sustainable utilization. The wild species depend upon the good amount of snowfall because of an acute scarcity of water on the barren mountains. Only a few species are cultivated by farmers. However, long-term exploitation from natural habitat, illegal trade,

unscientific collection, grazing by domestic and wild animals, herbivores, seed predators, Himalayan rabbit, marmot, Blue sheep and Himalayan mice or Pyka (*Ochotona roylei*) remain high threats to the wild resources in the extreme heights of the cold desert. Presently most of the valuable species are on the verge of extinction due to continuous exploitation over a long time. Conservation of high altitude plant resources through *ex situ* and *in situ* conservation is now being initiated by Government agencies, NGOs and local farmers.

1. World Health Organization document, WHO/EDM/TRM/2002.1, WHO, Geneva, 2002.

2. Ramakrishnappa, K., In *Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries*, FAO, 2002; <http://www.fao.org/DOCREP/005/AA021E/AA021e00.htm>
3. Dwivedi, S. K., Singh, R. and Ahmed, Z., *The Seabuckthorn*. Field Research Laboratory (DRDO), Leh-Ladakh, 2006.
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B. BALLABH*
O. P. CHAURASIA
Z. AHMED

Field Research Laboratory (DRDO),
C/O 56 APO,
Leh-Ladakh 194 101, India
*e-mail: ballabhbb@yahoo.co.in

NEWS

MEETING REPORT

Self help and low cost, integrated treatment of lymphatic filariasis for rural communities*

According to a recent WHO estimate, there are a billion people at risk of getting lymphatic filariasis (LF) in about 80 countries. Over 120 million have already been affected by it, and over 40 million of these are seriously incapacitated and disfigured by the disease. India is the worst affected country as one third of the people infected with the disease live here. LF is grouped under 'neglected disease' as it affects people living in poorest conditions and no research is undertaken on such disease. Even the drugs for the neglected disease initiative (www.dndi.org) have not given a priority to the development of any treatment for LF. A morbidity control agenda of the Global Alliance for

the Elimination of Lymphatic Filariasis (GAELF) is in its infancy. A clinical management trials working group of GAELF recommended exploring the current practices of skin care in filariasis-endemic areas and evaluation of effectiveness of traditional methods for lymphoedema treatment¹. The Institute of Applied Dermatology (IAD) developed a self-help, low-cost and integrated treatment by combining ayurveda, yoga therapy and biomedicine on a pathophysiological basis derived from biomedicine². This research was mentored by T. J. Ryan (Department of Dermatology, Oxford Medical School) and was conducted as an extramural project of Kerala State Council for Science, Technology and Environment (KSCSTE), Thiruvananthapuram during 2004–05. Both the Indian Council for Medical Research (ICMR), New Delhi and KSCSTE supported the peer review of this treatment protocol (pilot study) during the First National Seminar³ on 'Evidence-based and Integrated Medicine for Lymphatic Filariasis, other Chronic Dermatoses

and HIV/AIDS' during February 2005. Later the International Society of Lymphology awarded its President's prize to this study during the 20th International Congress of Lymphology held in Brazil (2005) and ICMR discussed this protocol in the Medical Development Congress (2006). Fifteen Indian states are endemic for LF and estimated 1.7 crore population is disabled. Against this background, the Second National Seminar was held during 14–16 February 2007.

Ragunath (Sir Dorabji Tata Centre for Research in Tropical Diseases, Bangalore) delivered the keynote address on 'Filarial worms in India and pathogenesis of lymphatic filariasis'. This was followed by presentation of 46 patients as the representative population of 354 lymphoedematous patients who received integrated treatment. Patients of all stages of primary and secondary lymphoedema, who were performing this self-help treatment from 15 days to 3 years, participated in this 3 h session. Each patient's base line and follow-up photographs and clinical data

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