Export of cultivated *Picrorhiza kurrooa* is profitable but requires rigour

Picrorhiza kurrooa Royle ex Benth and *P. scrophulariiflora* Pennel are the two species of *Picrorhiza* growing in the Indian Himalayan Region. *P. kurrooa* is confined to the western Himalaya while *P. scrophulariiflora* occurs in the eastern Himalayan region and parts of Tibet[1]. Recently, *P. tungnathii* Pusalkar has been described as a separate species from its related species *P. kurrooa*[2]. The genus *Picrorhiza* contains almost 132 chemical constituents[1] and biologically all species of *Picrorhiza* are hepato-protective, free radical scavengers, anti-inflammatory and immunomodulatory[1]. *P. kurrooa* is a herbal drug in great demand; however it is also an endangered herb. Cultivation of *P. kurrooa* is useful for its conservation and sustainable supply (Figure 1). Therefore, its experimental cultivation in some mountain villages was tested 2001 onwards[3].

During 2001, some farmers of Ghes village (2300–2500 m asl, Chamoli, Uttarakhand) were motivated by the High Altitude Plants Physiology Research Centre (HAPPRC), Srinagar-Garhwal, Uttarakhand, for introductory cultivation of *P. kurrooa*. After creation of the state of Uttarakhand in 2000, legal and policy issues for cultivation and marketing of medicinal and aromatic plants (MAPs) have been effectively addressed[4]. The Herbal Research and Development Institute (HRDI), Gopeshwar, Chamoli has been assigned by the Government of Uttarakhand for promotion of MAPs[4]. Currently, a total of 50 farmers in Ghes are cultivating *P. kurrooa* in about 5 ha area. In due course, the non-government organizations (NGOs), Uttaranchal Youth and Rural Development Centre (UYRDC) based as Narayanbagar, Chamoli and Dunagiri Foundation based in Goa were encouraged by HAPPRC and HRDI for export of cultivated *P. kurrooa* from Ghes.

Figure 1. Cultivation of *Picrorhiza kurrooa* at Ghes village, Chamoli, Uttarakhand, India.

Average productivity of *P. kurrooa* is estimated to be around 500 kg/ha. Annually, on an average 1.43 metric tonnes (1 metric tonne = 1000 kg) cultivated *P. kurrooa* @ Rs 243.25/kg or US$ = 3.62 (@ US$ 1 = Rs 67.11, as on 14 January 2016) was marketed during 2007–2010 from Uttarakhand[5]. However, it is encouraging that in 2015–16, a total 253.00 kg @ Rs 1500.00/kg or US$ 22.35 *P. kurrooa* from Ghes was exported to the United Kingdom with the collective efforts of an innovative farmer, UYRDC, DF, HAPPRC and HRDI. If the same quantity, i.e. 253.00 kg *P. kurrooa* were sold in the Indian market, the total profit may have been around Rs 113,850.00 or US$ 1696.47 (@ Rs 450.00/kg or US$ = 6.70, the current market price for *P. kurrooa*). Whereas export to the UK has resulted in Rs 379,500.00 or US$ 5654.90 (@ Rs 1500.00/kg). Therefore, the gross profit is almost 3.34 times better from export of *P. kurrooa* compared to usual marketing.

Cultivation of medicinal plants takes high inputs in terms of manpower and time, and also, export of the produce of CITES species is still a challenge[6]. *P. kurrooa* is enlisted in Appendix II of CITES and a Legal Procurement Certificate (LPC)[7] is required for export of CITES species. Farmers cultivating *P. kurrooa* in Ghes are registered with HRDI and on this basis, transit-pass (permission for transporting cultivated produce up to national destination) has been granted to any buyer to whom farmers want to sell the MAPs produce. The guidelines for harvesting, primary processing, drying, packaging and storage are strictly followed[8]. In order to meet compliances to regulatory requirements for international regulations and guidelines, an application was filed at the Office of the Wildlife Crime Control Bureau (WCCB), India, for obtaining export permit. The WCCB referred the matter to the concerned division of the State Forest Department for issue of LPC. Accordingly, a joint verification of cultivation site was ordered by the state forest department in the presence of its officials, promoting organization and facilitating NGOs. Physical verification of the cultivation site, showing photographs of cultivation, harvesting, processing and packaging helped the applicant to obtain the LPC. It is important to note that, in Uttarakhand, HRDI is assigned for promoting the cultivation of MAPs; however, LPC is granted by the department of forest

LPC is the only valid document for obtaining the export permit for CITES species. However, the Performa of WCCB[7] for obtaining CITES permit includes only (i) source of procurement (collected from wild/bred in captivity/artificially propagated), LPC number, and (ii) country in which the specimen was taken from wild/bred in captivity/artificially propagated[7]. The word 'cultivated' is missing in this Performa therefore cultivators/traders have to rely on joint field verification. Repeated verification may be discouraging for export-oriented cultivation of threatened or CITES species. It has been suggested that including the word 'cultivated' in the Performa of WCCB devised for obtaining export permit will be practical. Also, if the Government of Uttarakhand assigns HRDI for issuing LPC, it will encourage export-oriented cultivation of CITES and other threatened MAPs. Export of cultivated MAPs is certainly valuable for conservation and rural economy. However, export of MAPs requires scientific rigour[9] and also rigour in maintaining the practice for decades and working within the existing policies.

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