

## Is *Berberis asiatica* a good substitute for *Berberis aristata* in preparation of hepatoprotective drugs?

Liver is considered to be one of the most vital organs that functions as a centre of metabolism of nutrients such as carbohydrates, proteins, lipids and excretion of waste metabolites. Additionally, it also handles the metabolism and excretion of drugs and other xenobiotics from the body, thereby providing protection against foreign substances by detoxifying and eliminating them. The bile secreted by the liver plays an important role in digestion. Hepatic disease (liver disease) affects the cells, tissues, structures or functions of the liver. Liver has a wide range of functions, including detoxification, protein synthesis and production of biochemicals necessary for digestion and synthesis as well as breakdown of small and complex molecules, many of which are necessary for normal vital functions. Herbal drugs are more widely used than allopathic drugs as hepatoprotectives because they are inexpensive, have better cultural acceptability and better compatibility with the human body and minimal side effects. Several Indian medicinal plants have been extensively used in the Indian traditional system of medicine for the management of liver disorders. The

use of natural remedies for the treatment of liver diseases has a long history and medicinal plants and their derivatives are still used all over the world in one form or the other for this purpose. In the Indian system of medicine, many plants are used either alone or in combination as a hepatoprotective drug<sup>1</sup>. Commercially available formulations include Liv-52, Livergen, Livokin, Octogen, Stimuliv, Tefroliv, etc.<sup>2</sup>. Among species of the genus *Berberis*, *B. aristata*, a rare species in nature, is well known for its use in liver tonics. It is widely distributed throughout India under the name 'Daruharidra' and is also reported in Ayurveda pharmacopoeia of Indian herbal drug industry. *B. aristata* is used in hepatoprotective drugs due to the presence of berberine alkaloid. Of the commercially available drugs in the Indian drug market, Liv-52 which contains *B. aristata* has entered the *Limca Book of Records: Business Edition* (2013) as the highest selling herbal drug in India for management of liver disorder<sup>3</sup>. The chief constituent of the root and stem bark of *B. aristata* is an alkaloid berberine, which is responsible for hepatoprotective activ-

ity<sup>4</sup>. Other species of the genus *Berberis*, i.e. *B. asiatica*, *B. lycium*, *B. jeaschkeana* and *B. pseudobelata* are also a source of berberine alkaloid<sup>5</sup>. *B. asiatica* contains more berberine compared to *B. aristata*<sup>6</sup>. Also, *B. asiatica* growing in lower altitude and large girth size class plants have more berberine content compared to species growing in higher altitudes and lower girth size class plants<sup>6</sup>. A focused research approach to document and evaluate *B. asiatica* as a substitute for *B. aristata* in the preparation of hepatoprotective drugs with more clinical trials is required. In the Himalayan region the survival of *B. aristata* is at risk due to its continuous exploitation. Therefore, *B. asiatica* (Figure 1) can be used as a substitute for *B. aristata* due to its higher berberine content. For the survival of *B. aristata* in nature, identification of elite sources for their efficient propagation and multiplication through conventional as well as biotechnological approaches for conservation is needed.



Figure 1. a, *Berberis* spp. 'Daruharidra', b, Stem bark; c, Roots.

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HARISH C. ANDOLA<sup>1,\*</sup>  
VIJAY K. PUROHIT<sup>2</sup>

<sup>1</sup>Centre for Aromatic Plants,  
Selaqui,  
Dehradun 248 197, India

<sup>2</sup>High Altitude Plant Physiology  
Research Centre,  
H.N.B. Garhwal University  
(A Central University),  
Srinagar-Garhwal 246 174, India

\*e-mail: andolah@rediffmail.com