

## Pharmacognostic, phytochemical, and chromatographic fingerprinting of three probable species accepted as *Kakoli* – a member of *Astavarga*

Balkrishna Achrya<sup>a</sup>, Rajesh Mishra<sup>a,b</sup>, Pallavi Thakur<sup>a</sup>, Shivam Singh<sup>a,\*</sup>, Swami Narsingh<sup>a</sup> & Anurag Varshney<sup>a</sup>

<sup>a</sup>Patanjali Research Institute, Patanjali Research Foundation Trust, Haridwar 249 405, India

<sup>b</sup>Department of Dravyaguna, Patanjali Bharatiya Ayurvedigyan evum Anusandhan Sansthan, Patanjali Yogpeeth, Haridwar 249 405, India

\*E-mail: shevamsingh@gmail.com

Received 06 July 2021; revised 20 April 2022; accepted 11 June 2024

### Supplementary Data

#### Supplementary Table S1 — Sanskrit and Vernacular Names of *Kakoli*

##### Sanskrit Names

*Arkapuspikā, Caṇā, Dhīrā, Dhvāmkṣākṣī, Dhvāmkṣikā, Dhvāmkṣikā, Dhvāmkṣoḍī, Dhvāmkṣolī, Dhvāmkṣolkā, Jīvanīyā, Jīvinī, Kabaḍī, Kabarī, Kākī, Kākolī, Kākoṣṇī, Kālikā Kāṇā, Karṇikā, Kavalī, Kāyasthā, Kāyasthikā, Kokilā, Kṣīrā, Kṣīranī, Kṣīraśuklikā, Madhurā, Madhurākhyā, Madhyamā, Medurā, Payasvinī, Payasyā, Sankṣobhī, Śītapākī, Śītapākī, Śuklā, Śuklakṣīrā, Śūrā, Svādumāmsī, Tapasvinī, Vakulī, Vāyasā, Vāyasolī, Vāyasolikā, Vāyasthā, Vāyasulikā, Veśyā, Vīrā, Viṣāṇikā*

##### Vernacular Names

Cinnamon stick, Hardy Ginger, Purple Roscoe, Purple Roscoe Lily, Roscoe's Lily, Roscoe's Purple Lily (English); Xiangya shen cen (Chinese)

#### Supplementary Table S2 — Views of Modern Scholars in the Identification of *Kakoli* – Proposed Botanical Identity of *Kakoli* (1969-2018)

S. No.	Author(s)	Name of Publication	Year	Proposed Botanical Source of <i>Kakoli</i>
1	Dr. Krishna Chandra Chunekar	<i>Vanaspati Anusandhāna Darśik</i>	1969	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> ); <i>Roscoe alpina</i>
2	Thakur Balwant Singh and K. C. Chunekar	Glossary of Vegetable Drugs in <i>Brihatrayi</i>	1972	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> )
3	Dr. Mayaram Uniyal	Medicinal Flora of Garhwal Himalayas; Medicinal Plants and Minerals of Uttarakhand, Himalayas	1989, 1997	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> ); <i>Roscoe alpina</i>
4	Vaidyaratnam P. S. Warriar	Indian Medicinal Plants	1994	<i>Fritillaria roylei</i>
5	Dr. Guru Prasad Sharma	<i>Dhanvantri Nighaṇṭu</i>	1998	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> )
6	N.S. Chauhan	Medicinal and aromatic plants of Himachal Pradesh	1999	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> ); <i>Roscoe alpina</i> ; <i>Fritillaria roylei</i> (Syn. <i>Fritillaria cirrhosa</i> )
7	Dr. S. D. Kamat	Studies on Medicinal Plants and Drugs in <i>Dhanvantri Nighaṇṭu</i>	2002	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> )
8	Pande, P. C., Tiwari, L., & Pande, H. C.	Folk-Medicine and Aromatic Plants of Uttaranchal	2006	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> ); <i>Roscoe alpina</i> ; <i>Fritillaria roylei</i> (Syn. <i>Fritillaria cirrhosa</i> )
9	Singh, A. P.	<i>Ashtavarga - rare medicinal plants</i>	2006	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> ) and <i>Fritillaria roylei</i>
10	Mehrotra <i>et al.</i>	Ayurvedic rasayana therapy and rejuvenation (Kayakalp)	2006	<i>Lilium polyphyllum</i>
11	Negi <i>et al.</i>	Medicinal & aromatic plants	2007	<i>Fritillaria roylei</i>
12	Singh <i>et al.</i>	Medicinal orchids: an overview	2009	<i>Roscoe procera</i> (Syn. <i>Roscoe purpurea</i> )

... Contd.

Supplementary Table S2 — Views of Modern Scholars in the Identification of *Kakoli* – Proposed Botanical Identity of *Kakoli* (1969-2018)

S. No.	Author(s)	Name of Publication	Year	Proposed Botanical Source of <i>Kakoli</i>
13	Sharma <i>et al.</i>	Conservation of Phyto-diversity of Parvati Valley in North western Himalayas of Himachal Pradesh- India	2010	<i>Roscoea purpurea</i> ; <i>Roscoea capitata</i>
14	Sharma, T. P., & Sharma, S.	Medicinal plants of Sikkim	2010	<i>Fritillaria cirrhosa</i>
15	Acharya P.V. Sharma	An Introduction to the <i>Dravyagūṇa</i>	2010	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
16	Chauhan <i>et al.</i>	Morpho-biochemical variability and selection strategies for the germplasm of <i>Fritillaria roylei</i> Hook (Liliaceae) an endangered medicinal herb of western Himalaya	2011	<i>Fritillaria roylei</i>
17	Rath <i>et al.</i>	Pharmacognostical & phytochemical studies of <i>Roscea procera</i> (Kakoli) and <i>Lilium polyphyllum</i> (Ksheerkakoli) in comparison with market samples		<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
18	Acharya Balkrishan	Secrets of <i>Aṣṭavarga</i> Plants & Astavarga plants-threatened medicinal herbs of the North West Himalaya	2012	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
19	Wagh <i>et al.</i>	Medicinal plants used in preparation of polyherbal ayurvedic formulation Chyawanprash	2013	<i>Lilium polyphyllum</i>
20	Ghosh <i>et al.</i>	Comparative estimation and chemical standardization of new and old sample of chyawanprash	2013	<i>Lilium polyphyllum</i>
21	Sharma <i>et al.</i>	Quality of life changes in knee osteoarthritis ( <i>janusandhigata vata</i> ) with matrabasti	2013	<i>Fritillaria roylei</i>
22	Prof. K.C. Chuneekar	<i>Bhāvaprakāśa Nighaṅṭu</i>	2013	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
23	P.V. Sharma and Guruprasad Sharma	<i>Kaideva Nighantu</i>	2013	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
24	Wiersema, J. H., & Leon B.	World economic plants	2013	<i>Fritillaria cirrhosa</i>
25	Kumar, M., Khare, A., & Shukla, C. P.	Medicinal plants aspects & prospects	2014	<i>Fritillaria roylei</i> , <i>Roscoea alpina</i>
26	Sagar <i>et al.</i>	Adulteration and substitution in endangered, ASU herbal medicinal plants in India, their legal status, scientific screening of phytochemical constituents	2014	<i>Roscoea purpurea</i>
27	Gopal <i>et al.</i>	Study of antioxidant property of the rhizome extract of <i>Roscoea purpurea</i> Sm. ( <i>Kakoli</i> ) and its use in green synthesis of Gold nanoparticles	2014	<i>Roscoea purpurea</i>
28	Rawat <i>et al.</i>	Assessment of nutritional and antioxidant potential of selected vitality strengthening Himalayan medicinal plants	2014	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
29	Miyazaki <i>et al.</i>	Chemical constituents from the aerial parts and rhizomes of <i>Roscoea purpurea</i>		<i>Roscoea purpurea</i>
30	Raj <i>et al.</i>	Review on the concept of immuno-modulation in Ayurveda with special emphasis on <i>prakara yoga</i>	2014	<i>Roscoea purpurea</i>
31	Ingalhalli, R., Rathod H., Desai H.	A Short Review on <i>Astavarga</i> Plants- Losing Their Existence	2015	<i>Roscoea purpurea</i>
32	Acharya Balkrishna	<i>Chandra Nighaṅṭu</i>	2015	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
33	Acharya Balkrishna	<i>Madanapāla Nighaṅṭu</i> , <i>Hridayāṭīpaka Nighaṅṭu</i>	2016	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
34	Rashtriya Ayurveda Vidyapeeth	Medicinal Plants Used in Ayurveda	1998, 2016	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
35	Acharya Balkrishna	<i>Raja Nighantu</i> , <i>Sodhala Nighantu</i>	2016	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )
36	R. K. Mishra <i>et al.</i>	Phytochemical, Botanical and Biological Paradigm of <i>Astavarga</i> Plants- the Ayurvedic Rejuvenators	2018	<i>Roscoea procera</i> (Syn. <i>Roscoea purpurea</i> )