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FIRST EVER ETHNOBOTANICAL RESEARCH NOTES ON DHULIA(*Elsholtzia stachyodes)* & SAKARA(*Perilla frutescens)* IN ODISHAN CONTEXT

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Abstract

Two species of the Mint family, supposed to be belonging to the Himalayan belt, have been identified as traditional crops cultivated by the locals of Kandhamal district in Odisha since long although no body paid due attention to them before Bikash Rath, Researcher & Technical Advisor to the NGO NIRMAN made systematic attempts to identify and document the same. Known as Dhulia and Sakara in the Kandha language, these two species, *Elsholtzia stachyodes* (Link) Raizada & H.O.Saxena and *Perilla frutescens* (L.) Britt. respectively, are grown locally only for their seeds while the aromatic leaves are ignored. Potentially rich in many health-protection properties such as anti-aging effects, alongwith several other advantages these crops can be developed for socio-ecological and socio-economic benefits of the local communities.

1. INTRODUCTION:

While working in the Kandhamal[3] district of Odisha(India), traditional farming of an unusual crop 'Dhulia' caught the attention of 'NIRMAN' during 2012-13, and thus began the interest to learn more about it. Bikash Rath (the author) was hired by the organization as a Consultant in 2016 for preparation of People's Biodiversity Registers (PBRs) in the said district, and when he saw Dhulia documented in the PBR of Sirtiguda Gram Panchayat, he started a systematic effort to collect more information on the species. The scientific name was the need of the hour, but this was not available. He consulted scientists of OUAT(Odisha University of Agriculture & Technology) showing the image, but the scientific identity of Dhulia could not be established. During this time, he also came to know about another related agricultural crop 'Sakara' which was equally unusual, and its identity was also not established. It seems that no one in Odisha had paid much attention to Dhulia (other name 'Mara' in Kutia Kandha language) and Sakara (other name 'Sakaranga' in Kutia language) before the author.

2. **MATERIALS & METHODS:**

The methodologies used were threefold: documentation of the enthnobotanical knowledge on Dhulia and Sakara (for which field visits were undertaken), review of literature & collection of secondary data from both field-level workers and community people, and collection of specimens & facilitation for their botanical identification.

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[2] A non-governmental organization working on ecological farming & sustainable agriculture, biodiversity conservation, community forest management, small scale fishery, and socio-economic & socio-legal empowerment.

[3] Literally meaning, the land of the Kandhas. The Kandhas have been one of the major dominant tribes of India, living in Odisha. The Kutia Kandha is a Particularly Vulnerable Tribe, a sub-community among the Kandhas.

With the help of the local workers of NIRMAN stationed at Tumudibandha, the author collected the flowering spikes/racemes of these two plants and sent them to botanists for scientific identification alongwith images. This was a public interest research without any commercial interest, and goodwill support & guidance was available from experts like Dr.Ramesh Chandra Mishra, Dr.K.Kartikeyan, and Dr.V.Sampath Kumar associated with institutions of repute such as the National Bureau of Plant Genetic Resources (NBPGR) and the Botanical Survey of India. Because of this earnest effort Sakara was first identified (informally of course) in November 2021. Its common English name is Beefsteak Plant or Perilla [scientific name: *Perilla frutescens* (L.) Britt.]. But it was very difficult to identify the Dhulia specimen because it could hardly retain the tiny flowers properly by the time they reached the outstation laboratory. A fresh attempt was therefore made in November 2022 with more care about collecting & sending the potential specimens, which finally succeeded in identifying it as the Spiked Mint Plant [scientific name: *Elsholtzia stachyodes* (Link) Raizada & H.O.Saxena]. The discovery was immediately announced by NIRMAN on Twitter & Linked-in, intimating also relevant authorities of the Odisha government.

3. RESULTS & DISCUSSIONS:

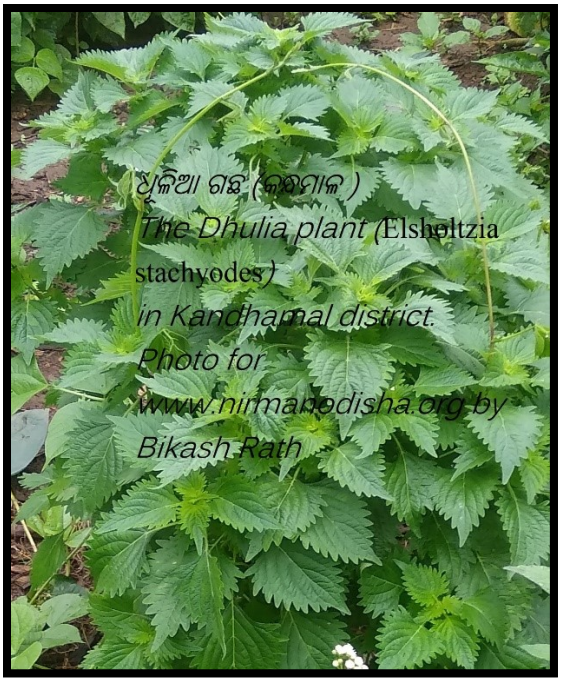
These two plants belong to the Mint family (Lamiaceae) and their leaves are aromatic. In northern- and north-eastern regions of India and other parts of the world, Perilla leaves are used to make *chutney*[4], which is not in vogue in Kandhamal where the leaves are not eaten. It is surprising that these two species, which are commonly found in the Himalayas, have been cultivated in the Kandhamal region since ancient times although, as Sada Majhi, a lead local tribal of Gachiri Gan village says, their cultivation has decreased chiefly due to restrictions on hill cultivation by the Forest Department. He further says that when suspected of being possessed by a 'duma' (ghost ?), the local custom was to tie a packet of Dhulia nutlets(seeds) around the hand or neck of the affected person; and that while consumption of such crops helped the people live a healthy life earlier, its discontinuation was creating many issues[5].

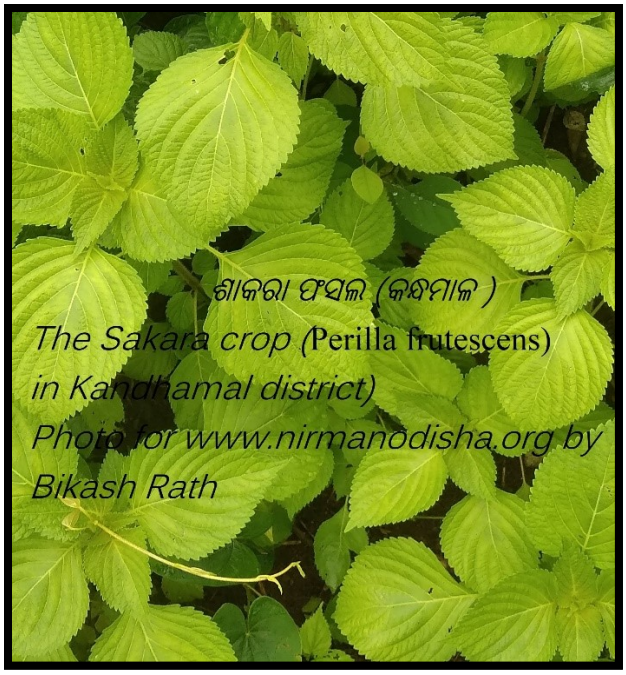
Saxena & Brahmam, who have not mentioned either of the above two species in their *Flora of Orissa*, however wanted further validation of the finding of *Elsholtzia densa* Benth. in the Larambha area of Sambalpur region of Odisha mentioning it as 'doubtful' "as this is a species of western subalpine Himalaya"(Vol. 3, p.1489)[6].

[4] Anonymous(undated). **Perilla.** https://www.flowersofindia.net/catalog/slides/Perilla.html

[5] Can it be correlated with the findings on the anti-aging properties and other pharmacological aspects of the species, in one way or the other?

[6] Saxena, H.O. and Bhrahmam, M. 1995. **The Flora of Orissa** (4 volumes). Regional Research Laboratory & Odisha Forest Development Corporation Limited, Bhubaneswar. Digitized by Srujanika, and available online at https://odiabibhaba.in/reference/reference-5/#%E0%AC%AA%E0%AD%8D%E0%AC%B0%E0%AC%95%E0%AD%83%E0%AC%A4%E0%AC%BF .





Dhulia (left) and Sakara (right) plants. Photo by Bikash Rath.

Nutlets of Dhulia resemble tea dust, and as they fall on the ground on slight trigger when mature, hence farmers have to take special care to harvest the same before they are lost to the farm field. Sakara nutlets, that are a little bigger in size, look like small mustard seeds; and on dry frying can make pops that can be used to make laddus after treating with sugar or jaggery.

While extensive research on *Elsholtzia stachyodes* is still awaited, plants of the genus *Elsholtzia* have been found to have many medicinal properties (such as anti-aging effects; anti-viral and anti-bacterial properties, etc.)[7]. On the other hand, data on *Perilla* seems a bit abundant; and studies have confirmed antioxidant, antimicrobial, anti-allergic, antidepressant, anti-inflammatory, anticancer, and neuroprotection capacity of the plant[8]. However, it is a question of what(which part), how(process & dose), and when (right time of consumption); because toxicity studies need to validate the use & dose, given the fact that, for instance, although the leaves of Perilla are consumed elsewhere by humans, they have been found toxic to the cattle & other ruminants[9]. Thus, the use of potential Dhulia and Sakara plant

[7] Guo Z, Liu Z, Wang X, Liu W, Jiang R, Cheng R, She G. 2012. **Elsholtzia: Phytochemistry and Biological Activities**. Chem Cent J. 2012 Dec 5;6(1):147. doi: 10.1186/1752-153X-6-147. PMID: 23216850; PMCID: PMC3536681. Online access at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3536681/#:~:text=Elsholtzia%20is%20a%20genus%20containing,and%20European%20countries%20for%20centuries.

[8] Ahmed HM. 2018. **Ethnomedicinal, Phytochemical and Pharmacological Investigations of Perilla frutescens (L.) Britt**. *Molecules*. 2018 Dec 28;24(1):102. doi: 10.3390/molecules24010102. PMID: 30597896; PMCID: PMC6337106. Online access at https://pubmed.ncbi.nlm.nih.gov/30597896/ .

[9] Quoted in Wikipedia(2022).***Perilla frutescens***. https://en.wikipedia.org/wiki/Perilla_frutescens

parts such as leaves and/or seeds in green/herbal tea, drug making, production of essential oil, and other value added products awaits further scientific clarity.

Flowering stages of Dhulia (left) and Sakara (right)

Discussions conducted by the author with Mrs. Rajmadhu Majhi and other villagers and local workers of NIRMAN at the Kutia Kandha village Dupi near Belghar in September 2021 revealed that both Dhulia and Sakara seeds are sown (separately) in the fields (separately) before/by the onset of monsoon, and the crop is harvested in about three to four months. The Dhulia crop is said to be naturally free from pests & diseases whereas the Sakara crop is attacked by pests, although the crop is not damaged. Livestock and wild animals do not eat these two crops. Locals do not apply any fertilizers or pesticides. Mature stalks are cut and the seeds are beaten out. It is said that the yield of seeds/nutlets for Sakara is about two to three times that of Dhulia which yields about two quintals per acre. Dhulia is most revered than Sakara, and although both are used like spices, they are also used as rice- or millet substitutes by the poor.

Nutlets of Dhulia (left) and Sakara (right). Photo by Bikash Rath.

Roasted Dhulia and Sakara nutlets are manually hulled, after which they are added to rice (or millet rice) or wet-fried with vegetables. Sakara seeds are dry-fried a little for hulling, but a traditional method of roasting the fine nutlets of Dhulia has been to treat the same on a plate with few pieces of burning charcoal, as informed by Mrs.Bishakha Mallik of Madlakuna village(Belghar). She also cautioned that Dhulia is suitable for eating in summer, and that it is not recommended for winter as (because of its

cooling effect on the body) it may cause chapped lips[10]. She finds the gruel of Dhulia combining well with cooked pumpkin for a tasty recipe.

The seeds are stored in earthen pots for sowing or eating, but while Dhulia remains intact for many years, Sakara seeds lose their flavor when kept for a long time (say, after a year). Dhulia seeds can also be wet-grinded for use like the mustard paste. And it tastes better when cooked with spices etc. Unlike Dhulia, Sakara seeds emit some fragrance when cooked; and are said to be tastier also.

4. ECONOMIC PROSPECTS:

There is reportedly no cash trading on Dhulia or Sakara in the Kandhamal district. The grains are also not usually sold in the weekly markets. Surplus grains are rather bartered with other villagers (who do not cultivate this crop) for about 3-kg rice against 1-kg Dhulia or Sakara seeds. A good bargaining may fetch 4-kg rice.

However, Perilla seeds are marketed online at indiamart.com in the name of Bhangjeera seeds(Hindi) @Rs.150 per 100 grams[11]. The company quotes competent authorities to claim that the Bhangjeera seed oil is much healthier than the cod lever oil being rich in polyunsaturated fatty acids like Omega-3 that are beneficial to prevent cardiovascular disorders, cancer, inflammatory, and rheumatoid arthritis etc.. It also provides a recipe to prepare a tasty chutney from these seeds. This suggests there is a good scope of marketing the Sakara seeds, and if scientifically validated for commercial purpose, Dhulia seeds too can have a good marketing scope including export. In fact, the cooling capacity of Dhulia seeds (as claimed locally), and the pest resistance power of the plant have the potential for their commercial promotion. At the same time, both Dhulia and Sakara can be considered as feasible crops in forest fringe areas where wild animals damage the crops.

5. CONCLUSION:

This paper is the first ever attempt to highlight Dhulia and Sakara that have been two obscure plants of a hinterland of Odisha. Its objective is to create a base for systematic scientific studies on these two crops, and as such the information provided here are not exhaustive. Even field level taxonomical studies may be required for further validation (like, if there are varieties of the species).

This paper is being e-published on the occasion of Burlanga Jatra, an annual community-based biodiversity festival organized by NIRMAN in the Kutia country to promote the conservation of biodiversity[12]. While NIRMAN-promoted Kandhamal Farmers' Producers' Company Limited (KFPCL) is planning to promote the conservation & expansion of both Dhulia and Sakara crops, academic institutions and government departments/agencies can play a huge role in meeting this goal.

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[10] This however could not be confirmed independently.

[11] https://www.indiamart.com/proddetail/bhangjeera-perilla-frutescens-100gms-24047958348.html

[12] To be organized on 22nd November 2022

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For further reading:

1. SAMPATH KUMAR, V. and B. D. SHARMA. (1996) 2001. **A note on the status of Elsholtzia stachyodes var. major (Lamiaceae)**. *Bull. Bot. Surv. India* 38: 1–4. Online access at https://nelumbo-bsi.org/index.php/nlmbo/article/view/74299/57792 .
2. SRIPAHCO, T., KHRUENGSAI, S., CHAROENSUP, R. *et al*. 2022. **Chemical composition, antioxidant, and antimicrobial activity of Elsholtzia beddomei C. B. Clarke ex Hook. f. essential oil**. *Sci Rep* 12, 2225 (2022). https://doi.org/10.1038/s41598-022-06358-6
3. SANDHYARANI DEVI KHOMDRAM, JEKENDRA SINGH SALAM AND POTSANGBAM KUMAR SINGH, 2011. **Estimation of Nutritive Indices in Eight Lamiaceae Plants of Manipur.** *American Journal of Food Technology*, 6: 924-931. https://scialert.net/fulltext/?doi=ajft.2011.924.931
4. BONGCHEEWIN, B.; CHANTARANOTHAI, P.; PATON, A. 2015. **Elsholtzia (Lamiaceae) in Thailand**. Blumea - Biodiversity, Evolution and Biogeography of Plants, Volume 59, Number 3, 2015, pp. 209-214(6). https://www.ingentaconnect.com/content/nhn/blumea/2015/00000059/00000003/art00008#
5. LONGVAH, T. AND DEOSTHALE, Y.G. 1999. **Chemical and Nutritional studies on Hanshi (Perilla frutescens), a Traditional Oilseed from Northeast India** (abstract). https://aocs.onlinelibrary.wiley.com/doi/abs/10.1007/BF02662172