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Sami-Sabinsa Group's successful transfer of technology to boost demand for *C. forskohlii* in healthcare applications

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Sami-Sabinsa Group's successful transfer of technology from the trial to the commercial field will further boost demand for *C. forskohlii* in healthcare applications. Sami-Sabinsa Group Limited (formerly Sami Labs Ltd) is a leading producer of nutraceuticals, cosmeceuticals, standardized herbal extracts, fine chemicals, specialty chemicals, probiotics and enzymes.

C. forskohlii is a popular traditional medicine in India. Traditional herbal healers have been using this herb to treat heart diseases, respiratory disorders, insomnia, asthma, bronchitis, intestinal disorders, burning sensation, constipation, and skin diseases. In the northern parts of India, the paste of fresh roots of the plant is used by local people for topical application on tumours and boils. In south India, the decoction of roots is used as a tonic by the Kota tribals in Tamil Nadu. The roots of the plant have a long history of food use in India, in the form of a pickle.

According to Dr. Muhammed Majeed, Founder and Chairman, Sami-Sabinsa Group Limited, "*Coleus forskohlii* is the only source of Forskolin, a naturally occurring labdane diterpenoids. Forskolin is found in almost all parts of this plant, but the plant's tuberous roots are its major source. Through the extraction process, roots of *C. forskohlii* are processed and standardized for different concentrations of Forskolin depending on application requirements."

Dr. Muhammed Majeed also highlighted the potential of *C. forskohlii* and contribution towards 'Make in India' Initiative. 'Forskolin', extracted from the roots, is the active phytochemical in *C. forskohlii*. It has a huge demand in the global markets. India is the leading exporter of Forskolin worldwide. In the year 2021-22, India exported worth USD 11 million and Sami-Sabinsa Group has a large share in this export pie. In addition to providing farmers with an alternate livelihood, the program is a big success towards the Country's 'Make in India' drive as it adds to natural nutraceutical exports from India."

To encourage farmers to grow alternative crops and reduce industries dependency on the wild, the National Medicinal Plants Board (NMPB) has included *C. forskohlii* under the list of prioritized plants and a subsidy of 30% is given to the growers. This also ensures the availability of raw materials for the industry's needs.

"Roots of *C. forskohlii* are procured from farmers at a Mutually Agreed Price that is initially agreed upon between parties. This arrangement has insulated the farmers from price volatility. Even more significant are the returns. Farmers can make a profit margin of Rs. 80,000 on an acre of land after investing a total of Rs. 40,000 per acre towards input cost and other expenditures," informed Dr Arvind Saklani, Vice President, Agribiotechnology, Sami –Sabinsa Group Ltd.

The herb has received a lot of attention from medical researchers, over the past 30 years, as the plant is the only significant source of forskolin, a bioactive compound with diverse pharmacological benefits. Researchers claim that Forskolin appears to work in a way similar to certain types of conventional asthma drugs, by boosting the levels of a compound called cyclic AMP.

This helps relax the muscles around the bronchial tubes to make breathing easier. Forskolin, is reported as an antioxidant, anti-inflammatory and antithrombotic and useful in the treatment of obesity, diabetes, heart diseases, cancer, asthma, glaucoma and hypertension.

Forskolin-enriched extracts from the roots are being utilized by Sami-Sabinsa group for various applications including weight management support, lean body mass, sports nutrition and in cosmetic applications.

"Given the big demand for *C. forskohlii* in healthcare applications, this medicinal herb is a suited candidature as an alternative crop promising the farmers the market for their produce and returns on investments. The program will also encourage other agro and herb-based companies to work with the farming community for their raw material needs and reduce their dependence on imports. Companies by bringing in more wild species to planned cultivation will support the Indian Governments initiatives of protecting the rare and endangered species in India," Dr Arvind Saklani further explained.

The commercial cultivation of *C. forskohlii* was ensured through contract farming arrangement and this was established as an industry model. The initiative is also a step towards bringing down the industry's dependence on the wild for raw material and bringing in more medicinally important species towards 'planned cultivation' and supports the Central Governments Wildlife Conservation Programmes.

Traditional agriculture in many parts of the country has witnessed a sea change in the past few decades. The dynamism in the sector and diversification of the crops are due to various factors, like climate change, low margins with traditional crops, decreased per capita landholding, the availability of government schemes and subsidies, minimum support prices for selected crops, the introduction of novel technologies, competitiveness, emerging markets for new products, and export opportunities.

Cultivation, being the most powerful tool for conservation, is the best way to reduce the burden on the wild bioresources. Contract farming arrangements between the farmers and industry for the commercial cultivation is an appropriate mechanism that benefits all the related stakeholders. The contract farming venture pioneered by Sami-Sabinsa Group over three decades ago in the medicinal plant sector has been proved to be an unparalleled success. The venture has helped the company establish backward and forward integration between the growers and the consumers and ensured supply of the desired quality and quantity of raw materials. On the other side, it has also directly benefited the farmers with the assured market and promising returns for their produce along with supply of quality planting material and technical knowhow for the new / alternative crops.

Coleus forskohlii (Willd.) Briq. (family- Lamiaceae) is a small herb. It is distributed in tropical parts of Uttar Pradesh, Sikkim, Gujarat, Western Ghats and Bihar and ascends up to 2500 metre in Western Himalayas. The roots of this species are used as a popular traditional medicine. Back in the 1990s, in order to develop high-quality planting materials for cultivation, Sami-Sabinsa Group conducted extensive scientific research and development on the herb *C. forskohlii*. For the research, samples of *C. forskohlii* were collected from its natural habitats, including in the Indo-Nepal border, and the samples were screened for desired features like rhizome yield, forskolin content, and disease and pest resistance. Based on sample results, through tissue culture technique, elite genotypes of *C. forskohlii* that have a higher percentage of survival & other desired traits including chemical content and biomass were developed. The elite genotypes were subjected to extensive field trials by the company before bringing it to a commercial scale. The company approached various small farmer groups in different districts of Tamil Nadu and educated them on the benefits and profits of this alternative crop *C. forskohlii*.

The agri-produce used in manufacturing extracts are exported to markets that has stringent market regulations and hence the quality of produce must meet the international requirements. To ensure quality farmers are trained to follow Good Agricultural and Collection Practices (GACP) in cultivation, harvesting and post-harvest management of the crop. The program was initiated with just a few hundred farmers in the districts of Salem and Tiruvannamalai in Tamil Nadu. Encouraged by its sweeping success, the company emulated the model in other districts in Tamil Nadu. Today, the program has created alternate avenue of livelihood to thousands of beneficiary farmers across nine districts of Tamil Nadu including Tiruvannamalai, Kallakurichi, Salem, Erode, Vellore, Villupuram, Perambalur, Namakkal and Dharmapuri. The absence of intermediaries in this venture ensured to pass on better margins directly to the farmers. This year, Sami-Sabinsa Group alone has cultivated *C. forskohlii* on an agricultural area of about 2,500 acres in Tamil Nadu involving 2000 farmers.

Talking about cultivation practices, Benny Daniel, Manager, Agriculture, Sami-Sabinsa explained, "*C. forskohlii* is a six-month crop that is planted through terminal cuttings of about 8 cm to 10 cm length during September and mid-November and harvested between March and June. The crop grows well on sandy loam to medium soils and requires a temperature of 25 to 40 degrees and a soil pH range of 6.0 to 8.0. Moderate rainfall between 800 to 1300 mm is required for a good yield."