

PARC's Innovations in Medicinal and Aromatic Plants (MAPs)



NARC Kalonji grown at Ahmedabad Farms, Ludan, Vehari



Extraction of essential oils



Growth inhibition of *Penicillium* spp. by basil essential oil

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Challenge

- Medicinal plants are being used in traditional system of medical practice since pre-historic times.
- Most of the medicinal plants in the country are collected from wild and marketed. Lack of optimized cultivation practice is creating gaps in production and quality management.
- Huge export and domestic market potential for MAPs exists but due to low quality produce and lack of cultivation technology, rather import has been opted to meet the demands.
- Mostly, crude whole plant preparations are used for treating the human and animals. Purified extracts containing active ingredients have not been formulated yet due to lack of technology for downstream processing.
- Resistance build-up against allopathic medicines and their side effects have forced to search for new antimicrobial substances from various sources including medicinal plants.

Interventions

- In late 1980s, PARC pioneered the systematic work on the collection, evaluation, conservation, value addition and sustainable use of medicinal plants in the country.
- Since 2000, research on seed collection and cultivation practices of MAPs is being carried out to formulate their production technologies.
- During 2007-12, facilities were established at NARC for the extraction and analysis of essential oil from basil, rosemary, lavender, oregano, thyme, geranium and other medicinally important aromatic plants.
- Since 2011, essential oils extracted from MAPs are being tested for their antimicrobial potential against pathogens.

Outcomes

- More than 80 germplasm accessions of MAPs have been acquired/collected from inland and overseas sources.
- Elite lines of various MAPs including mint, lavender, basil and chamomile etc., have been identified.
- The first ever Kalonji variety “**NARC Kalonji**” was developed and approved.
- Procedures for extraction of essential oils from mint, basil, lavender, rosemary, thyme, oregano, plectranthus, geranium, rose and lemon grass germplasm have been optimized.
- These essential oils were analyzed for chemical constituents using GC/MS and HPLC.
- Essential oils of Catnip, basil and mint inhibited the growth of fungi (*Aspergillusflavus*, *A. niger*, *Pythium*spp, *Alternaria alternate* and *Penicillium*spp).
- Essential oils from mint and basil have shown promise for the control of seed born fungal disease.
- Herbal tea of lemon-mint and thyme have been developed and marketed through PATCO.

Way forward

- Characterization of different alkaloids and flavonoids in MAPs
- Germplasm characterization, variety development, crop production technology, adaptation studies and scale-up studies
- Value addition to MAPs including the development of Kalonji honey, bioherbicide, biopesticide and antimicrobial formulations