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MEDICINAL AND AROMATIC PLANTS PROCESSING TECHNOLOGIES OF COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR) INSTITUTIONS

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Abstract- A number of CSIR institutions have developed technologies, processes and products based on medicinal and aromatic plants. Many of these technologies have successfully been adopted by industries. This paper provides information on some of the processing technologies developed by CSIR institutions on medicinal and aromatic plants.
Key words- CSIR institutions, medicinal plants, aromatic plants, processing technologies, products

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Introduction

The Council of Scientific and Industrial Research (CSIR) was constituted in 1942 by a resolution of the then Central Legislative Assembly. It is an autonomous body registered under the Registration of Societies Act of 1860. CSIR (www.csir.res.in) aims to provide industrial competitiveness, social welfare, strong Science and Technology base for strategic sectors and advancement of fundamental knowledge. The mission of CSIR is to provide scientific industrial Research and Development that maximizes the economic, environmental and societal benefits for the people of India. Over the years, CSIR has established 38 state of the art national laboratories (physical science: 5; chemical science: 7; engineering science: 13; information science: 2 and biological science: 11) in different parts of the county to carry out R and D on aspects covering agriculture, food, biology, leather, ecology, environment, earth science, electronics, instrumentation, chemicals, healthcare, housing, energy, mining, minerals, materials, aerospace science, rural development, human resource development, intellectual property rights, information dissemination, medicinal and aromatic plants etc. Among government funded scientific organizations, CSIR holds the maximum number of patents in force (more than 1770 foreign and 1540 Indian for the year 2008-09) and is in the forefront protecting the intellectual property rights including traditional knowledge of India.

Processing technologies developed by CSIR institutions for value addition of medicinal and aromatic plants:

1. National Institute of Science Communication and Information Resources (NISCAIR), New Delhi.

NISCAIR publishes books and journals covering the subject of medicinal and aromatic plants. Other activities of the organization are also given below:

- **Books on medicinal plants**

The Wealth of India Raw Materials; Glossary of Indian Medicinal Plants; The Treatise on Indian Medicinal Plants (6 volumes); Compendium of Indian Medicinal Plants (6 volumes); Status Report on Essential Bearing Plants in NAM Countries; Status Report on Cultivation of Medicinal Plants in NAM Countries; Plant Food Colors; Useful Plants of India.

- **Journals**

Indian Journal of Traditional Knowledge; Natural Product Radiance; Journal of Intellectual Property Rights; Indian Journal of Experimental Biology; Indian Journal of Chemistry; Indian Journal of Biotechnology; Journal of Scientific and Industrial Research.

- **Abstracting Journals**

Medicinal and Aromatic Plants Abstracts; Indian Science Abstracts.

- **CD-ROM**

Indian Patents; Indian Science Abstracts.

- **Projects**

Traditional Knowledge Digital Library (TKDL): A joint venture of CSIR and Department of AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy) inventorising traditional knowledge, formulations developed in India over several centuries in the above mentioned traditional systems of medicine. TKDL has over 200,000 traditional medicine formulations codified in 30 million pages in different languages.

- **Services**

Medicinal and Aromatic Plants Information Service.

2. Central Food Technological Research Institute (CFTRI), Mysore.

- **Plantation, spice and food products**

Preparation of annatto dye; Natural colours; Deterpenation of citrus oils; Monsooning of cherry coffee; Cocoa: bean curing, cocoa mass, cocoa butter, cocoa powder; Compounded asafoetida; Cardamom-fixation of green colour; Coriander dhal, supari; Encapsulated food flavors; Garlic powder; Dehydration/drying of ginger; Kokum: concentrate and powder; Mustard powder; Pepper: white, green and dehydrated green pepper; Drying (including dipsol formulation, fractionation) of red chillies; Spice oils: pepper, ginger, turmeric, cardamom; Spice oleoresins: pepper, ginger, turmeric, chillies; Tamarind: concentrate and powder; Turmeric: curing and polishing; Walnut processing; Product of phycocyanin from *Spirulina;* Rural-based biotechnological production of *Spirulina*; Technology for manufacturing plant growth hormones from agricultural wastes; Technology for manufacturing plastic pouches; Protein foods; Fruit/vegetable products; Beverage products; Convenience foods; Microbial and fermentation products; Cereal and pulse products; Microbial and fermentation products; Bakery products; Meat, fish and poultry products.

3. Central Drug Research Institute (CDRI), Lucknow.

- **New technologies**

Artemether; L-Ephedrine hydrochloride; Clofazimine; Paracetamol; D-2-Aminobutanol; Dextropropoxyphene hydrochloride; N-Methylpiperazine; 5,6-dimethyl benzimidazole

- **New drugs**

Centchroman (contraceptive); Centbucridine (local anesthetic); arteether (anti-malarial); Bulaquin (anti-malarial); gugulipid (hypolipidaemic); standardized Herbal Remedy (memory enhancer); Isaptent (abortion); Centpropazine (anti-depressant); Consap (spermicidal cream); Picroliv (hepato-protective); CDRI-99/373 (anti-osteoporosis, anti-resorptive agent).

4. Institute of Himalayan Bioresource Technology (IHBT), Palampur.

- **Agro and processing technologies**

*Stevia (*2 accessions); Scented rose (*Rosa damascena*: Jwala, Himrose); *Tagetes minuta* (high oil and constituents); Rose-scented geranium; *Valeriana jatamansi* (Himbala, 4% valepotriates); *Euphorbia prostata*; *Salvia sclarea* (Sclareol production from absolute); *Curcuma aromatica* (Himhaldi); Spiked ginger lily (*Hedychium spicatum*, Himkachari 0.75% oil); Supply of seeds/ propagules of medicinal, aromatic and horticultural plants.

- **Products and technologies**

Tea wines and concentrates; Theaflavin (anti-oxidant); Vanillin from vanilla beans; Vinyl guaicol (flavoring agent); Herbal toothpicks; Himalyan delight (perfume); Viral diagnostic kits; Geprot-ed™ for biotechnology; Herbostill™ (mini distillation unit); Steri-flow™ (mini laminar flow cabinet); Tea withering machine; Natural colours; Genes and corresponding enzymes; Gulkand; Rose oil and rose water (3 grades); Beta aescin from *Aesculus indica*; Stevioside from *Stevia*.

5. Indian Institute of Chemical Biology (IICB), Kolkata.

- **Technologies, processes and products**

Prostalyn (herbal formulation remedy for prostate problem); Herbal composition for treating asthma; Herbal products for controlling gastric ulcer; *Murraya koenigii* extracts for treating asthma; Herbal composition for treating chronic myeloid leukemia; Anti-leishmanial activity of betel leaf extract; Herbal molecule as potential anti-leukemic drug; Herbal extract and lupinoside as potential anti-diabetic type- II drug from *Pueraria tuberosa*; An anti-leukemic composition comprising withaferina-A; Process for the isolation of a carbohydrate fraction from *Feronia limonia* possessing anti-tumor activity; Process for the isolation of active principle from *Azadirachta indica* useful for controlling gastric hyperacidity and gastric ulceration; Process for isolation of fraction consisting (-) frullanolide from *Sphaeranthus indicus* possessing antifungal, antibacterial and anti-protozoal activities; Anti-peptic ulcer activity of *Woodfordia fruticosa* flower extract; Anti-leishmanial activity of *Centella asiatica* leaf extract; Anti-leukaemic activity of withanolide -D; Development of vaginal contraceptive with clove oil; *Pueraria tuberosa* extract and lupinoside and its analogues as anti-diabetic Type- II drugs; *Piper betel* and *Murraya koenigii* formulation for blocking 5-lipoxygenase activity; Leishmanicidal activity of night jasmine leaf extract; Methanolic extract of *Piper betel* leaves for the treatment of human malignancies.

6. Indian Institute of Integrative Medicine (IIIM) (formerly Regional Research Laboratory), Jammu.

- **Technologies, processes and products**

Piperine (bio-enhancer) and more potent molecules; Oral care rinse products; Hepato-protective herbal product; *Hypericum perforatum* and *Tinospora cordifolia* standardized extracts; *Rhizobium* biofertilizers and other plant growth promoting bio-inoculants; Bio-control agents for plant disease management; Industrial enzymes viz. glucose oxidase, dehydrogenases, amylases, lipases and esterases; Bioreactor cultivation of *Swertia chirata*; Chemo-profiling of 40 medicinal and aromatic plants through GLC/ HPLC/ HPTLC; An anti-osteoporosis compound from *Boerhaavia diffusa*; Herbal drug for the treatment of liver disorders and as prophylactic treatment against viral diseases such as common cold and fever; Standardization and testing of herbal drugs; Indian herbal pharmacopoeia;

- **Agro and processing technologies**

Cultivars/chemotypes of *Ocimum*, Ashwagandha, Lemongrass, *Cymbopogon nardus* var. *confertiflorus*, *Mentha longifolia*, *Picro-*

rhiza kurroa, *Podophyllum hexandrum*, *Swertia chirata* etc.; Agro-technology for *Echinacea angustifolia*, Clarysage, *Hypericum perforatum*, *Valeriana*, hops, Clocimum and many other plants; Micro propagation of medicinal and aromatic plants.

7. National Institute of Interdisciplinary Science and Technology (NIIST) (formerly Regional Research Laboratory), Thiruvananthapuram.

- **Integrated processing of spices (fresh and dry) with the following products**

Oil and oleoresin from ginger; Oil, oleoresin and piperine from pepper; Colour and capsaicin fraction from red chillies and oleoresin from fresh and dry chillies; Oleoresin and curcumin from turmeric; Micro encapsulated flavours and oleoresins.

- **Technologies under development**

Extraction and separation of phyto-chemicals from plants for healthcare applications: carotenes, tocopherol/ tocotrienols, sterols, oryzanol, ferulic acid, phospholipids, high purity wax fractions; Supercritical fluid extraction of phytochemicals, formulations for healthcare applications; Separation of active principles from spices and herbals for nutraceutical and functional food supplements; Natural and nature identical bio-active molecules from bio-resources for healthcare applications.

8. North East Institute of Science and Technology (NEIST) (formerly Regional Research Laboratory), Jorhat.

- **Technologies, processes and products**

Agrotechnologies for important medicinal and aromatic plants (Citronella, Lemongrass, Palmarosa, Medicinal yam, *Plumbago zeylanica* etc.); High yielding varieties of medicinal and aromatic plants (BLI-Arun of Lemongrass); Tissue culture protocols for medicinal and aromatic plants; Isolation and characterization of insecticidal compounds of plant origin; Arteether; Liquid deodorant and cleaner; Herbal room freshener; Caffeine from tea-waste; Diosgenin from *Dioscorea* tuber; 16-DPA from diosgenin; Pesticides (Phosphamidon, Quinalphos, Chlorfenvinphos).

9. Institute of Minerals and Materials Technology (IMMT) (formerly Regional Research Laboratory), Bhubaneswar.

- **Agrotechnologies**

Cultivation of aromatic, medicinal and other economic plants (Palmarosa, Lemongrass, Citronella, Patchouli, *Ocimum*, Cinnamon, Screw pine, Ambrette, *Cola nitida*, Vetiver, *Catharanthus roseus*, Rubber, Simarouba and fast growing tree species.

- **Natural Products**

Strychnine and brucine from seeds of *Strychnos nux-vomica*; Solasodine from Berries of *Solanum khasianum*; Development of dyes of various colors for fabric colouring.

- **Herbal drugs**

Standards for 100 single and compound herbal drugs; Optimization of manufacturing process for 18 Ayurvedic formulations; HPTLC/ HPLC quality evaluation methods for well known herbal drugs; Monographs and Pharmacopoeia.

10. National Botanical Research Institute (NBRI), Lucknow

Products

Luvstick-herbal lipstick; Lip balm; NBIRA-fermented drink; NBIRA-SOFT; Herbal gulal; Instant glow face pack for teenagers; Anti-ageing cream for wrinkle-free, younger looking healthy skin; Anti-inflammatory and anti psoriatic cream; Anti-ageing face pack for normal skin; Facial scrubs; Anti-ageing face pack for oily skin; Instant glow face pack for acne-prone skin; Anti-bacterial, anti-inflammatory toothpicks for healthier gums; Hair tonics and shampoos for controlling hair fall and graying; Anti-oxidant, anti-septic swabs; After-shave lotion; Face and body wash; Mouth wash; Dental care and cure product from neem extract; 150 single herbal drugs and 18 herbal formulations have been standardized following WHO guidelines.

High yielding varieties of Opium and grain amaranth; Cultivation package of *Rosa damascena* and rose water extraction; Extraction and standardization of neem active principles.

11. Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow.

- **Agro and processing technologies**

High yielding varieties of medicinal and aromatic plants; Agrotechnologies for medicinal and aromatic plants; Distillation and rectification technologies for aromatic plants; Aroma chemicals extraction technologies; Extraction technologies for medicinal plants; Books, Periodicals publication; Services to farmers, entrepreneurs and industry on all aspects of medicinal and aromatic plants.

- **Technologies, processes, products**

Bio-enhancers: lysergol (*Ipomoea muricata*), glycyrrizin (*Glycyrrhiza glabra*), niaziridin; Antifungals; Anti-bacterials: oenostacin (*Oenothera biennis*), thymol (*Trachysermum ammi*); Anti-cancer: docetaxel (taxotere) (*Taxus wallichiana*), camptothecin (*Mappia foetida*); Hepato-protective: silymarin (*Silybum marianum*), Cliv-92 (*Cleome viscosa*); Andrographolides (*Andrographis paniculata*).

- **Herbal products**

Cracknil (anti-crack cream); Mosrep (mosquito repellant agarbatties); Mospray (mosquito repellant spray); Mosaway (mosquito repellant cream); Mosex (mosquito repellant lotion); Mosnobite (mosquito repellant vaporizer); Pain chhoo (pain balm for headache & sprain); Swabee (surface disinfectant); Hankool (hand disinfectant); Skinpro (antifungal cream); Myconil (antifungal cream); Herbal tooth powder (for plaque & gingivitis); Kleenzie (Hand & face wash with *Aloe vera*); Rose water; Essential oil kit (Organic); CIM-Phalse (nutraceutical); Herbisoft and Geranium Active (Shampoos); CIM-Poshak; Haloe skin.

Conclusion

Technologies, processes and products based on natural raw materials like medicinal and aromatic plants developed by 11 CSIR institutions are listed. This is not an exhaustive and complete list of the CSIR institutions. Interested persons are advised to contact respective directors or the technology and business development cell of the institute to get complete details and procedures for technology transfer.

The R and D efforts of CSIR institutes continues with renewed vigour in the light of the global interest on medicinal and aromatic plants based technologies and products. CSIR endeavors to develop cutting edge technologies to make India a global leader.

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References

[1] *www.niscair.res.in*.
[2] *www.cftri.com*.
[3] *www.cdriindia.org*.
[4] *www.ihbt.res.in*.
[5] *www.iicb.res.in*.
[6] *www.rrljammu.org*.
[7] *www.niist.res.in*.
[8] *www.rrljorhat.res.in*.
[9] *www.immt.res.in*.
[10] *www.nbri-lko.org*.
[11] *www.cimap.res.in*.