

COURSE REPORT

Essential Oils Production

August 1–2, 2024
Eunápolis, Bahia, Brazil

A field course organized by:

- The Environmental Leadership & Training Initiative (ELTI), Yale School of the Environment
- Instituto de Pesquisas Ecológicas (Institute for Ecological Research [IPÊ])
- Projeto de Desenvolvimento Socioambiental para Agricultura Familiar do Núcleo de Estudos em Agroecologia e Produção Orgânica Pau-Brasil, Universidade Federal do Sul da Bahia (Socio-Environmental Development for Family Farming Project [DSAF] at the Pau-Brasil Center of Studies in Agroecology and Organic Production [NEA-PB], Federal University of Southern Bahia [UFSB])
- Instituto Fotossíntese (Photosynthesis Institute)



Photosynthesis Institute

Course participants in the garden area of the Photosynthesis Institute, working with the *Varronia curassavica* plant.

Background: The landscape of southern Bahia encompasses vast areas of eucalyptus plantations, livestock pasture, fruit and vegetable farms, coffee and cocoa plantations, and a variety of agroforestry systems interspersed with remnant patches of native forest. In this area, numerous rural communities have been established through the subdivision of large estates, including through agrarian reform, land purchases with rural land credit, and purchase agreements with forestry companies. These communities have been encouraged by both conservation organizations and universities to adopt management practices that

ELTI is an initiative of:

Yale SCHOOL OF THE ENVIRONMENT
The Forest School



Melaleuca harvest practice.



Participants during the Melaleuca harvest practice on Mr. Prado and Ms. Souza's property.

integrate biodiversity as a strategy for both environmental and financial sustainability. Crop intensification, incorporation of high-profit crops, community processing, and integration into local production chains are strategies aimed at increasing income and diversifying food production for family consumption. The anticipated positive environmental outcomes resulting from the proliferation of these practices include enhanced structural connectivity, improved soil quality, restoration of Legal Reserves, reduced pesticide use, and preservation of regenerating forest fragments capable of providing numerous other environmental services.

The production of essential oils represents one significant opportunity for diversification and increased incomes for family farmers and traditional populations in southern Bahia who adopt agroecological practices. Some farmers from the Nova Vitória Rural Association already produce *Melaleuca alternifolia*, an exotic plant with no invasive potential, while some producers from the Miramar Rural Association sustainably manage *Varronia curassavica* (commonly known as maria preta or erva baleeira), a native plant used locally. Both plants are recognized for their medicinal properties, so their essential oils are highly valued. *Melaleuca alternifolia* oil (tea tree oil), which is well known for its antifungal and antibacterial properties, is also widely used in organic agriculture to combat various plant fungi and diseases.

The Socio-Environmental Development for Family Farming Project (DSAF) at the Pau-Brasil Center of Studies in Agroecology and Organic Production (NEA-PB) at the Federal University of Southern Bahia (UFSB) has been working since 2019 to promote sustainability and income generation for family farmers through the commercial use of native plants. With strong expertise in agroforestry systems, research, and rural



Photosynthesis Institute

Theoretical session led by Gabriela Narezi on the second day.



Photosynthesis Institute

Course participants harvest Varronia curassavica.



Photosynthesis Institute

Course participants complete the Melaleuca harvest.

extension, the project team has already established meaningful engagement with rural settlements and associations, creating a connection to local communities and facilitating the reach to target audiences. The partnership with ELTI-Institute for Ecological Research (IPÊ) adds a strategic dimension to the initiative by combining DSAF's technical foundation with ELTI-IPÊ's expertise in organizing high-quality training courses and workshops and its mission to strengthen environmental leadership in the southern Bahia training landscape. This collaboration enhances the dissemination and implementation of sustainable practices and fosters environmental and social transformation in the region.

Course objectives: The course objectives were to provide family farmers with a comprehensive and practical understanding of essential oil production, including harvesting and commercialization. This initiative seeks to enhance the value of the farmers' production, promote environmental sustainability, and improve farmers' socioeconomic conditions, enabling them to integrate competitively into the essential oils market.

Course content: The course was divided into six modules that included introductory lectures, field-based demonstrations, and group exercises facilitated by ELTI affiliates and partners.

Module 1: Introduction to Essential Oils: Importance and uses of essential oils.

Module 2: Essential Oil Extraction: Botanical characteristics of *Melaleuca alternifolia* and *Varronia curassavica*.

Module 3: Methods, Equipment, and Techniques Used in Extraction.

Module 4: Step-by-Step Steam Distillation Process and Practical Demonstrations.

Module 5: Quality Control.

Module 6: Commercial and Legal Aspects.



Participants unpack and examine *Melaleuca* branches for the distillation process.



Hands-on practice during the essential oil distillation practice.

Course format: The course took place over two days, combining practical fieldwork and theoretical sessions to provide participants with hands-on experience and foundational knowledge of essential oil production. The first day involved fieldwork and harvesting activities conducted in Eunápolis, Bahia, while the second day was held at the Sosígenes Costa Campus of UFSB in Porto Seguro, Bahia, focusing on theoretical sessions and practical demonstrations.

Course content

Day 1

The first day of the course was dedicated to hands-on fieldwork and harvesting activities at the Nova Vitória and Miramar Rural Associations in Eunápolis, Bahia. Under the guidance of instructors Ryu Okada (Photosynthesis Institute), Isabela Oliveira Leite (Photosynthesis Institute/DSAF project), Lucas Peranovich (Photosynthesis Institute/DSAF project) and João Pedro Lenz (Photosynthesis Institute/DSAF project), participants were introduced to the practical aspects of harvesting *Melaleuca alternifolia* and *Varronia curassavica*. The instructors demonstrated the necessary care in harvesting, including proper techniques for handling, packaging, storage, and transportation of plant material. This field-based experience provided participants with a solid foundation in the initial stages of essential oil production, emphasizing the importance of maintaining plant quality throughout the process.



Course participants study leaf structures.



Participants distill essential oil.



Lucas Peranivichi shows the extracted *Melaleuca* essential oil.

Day 2

The second day of the course took place at the Sosígenes Costa Campus of UFSB, where the focus was theoretical discussions in the morning and practical demonstrations in the afternoon. Gabriela Narezi (professor, UFSB and coordinator, DSAF project) began the day with an introduction to essential oils, highlighting their importance and diverse uses. This was followed by a detailed session led by Florisvalda da Silva Santos (professor, UFSB) on the botanical characteristics of *Melaleuca alternifolia* and *Varronia curassavica* that included practical observations of foliar structures using a magnifying lens facilitated by Santos, Narezi, and Leite. Narezi and Okada then covered methods, equipment, and technical processes used in essential oil extraction, offering insights into the tools and techniques essential for efficient production.

In the afternoon, Okada and Peranovich led a step-by-step practical demonstration of the steam distillation process, guiding participants through each stage of the procedure. Okada addressed quality control, explaining the techniques needed to ensure the purity and efficacy of the extracted oils. Finally, Okada gave an overview of the commercial and legal aspects of essential oil production, discussing market dynamics and regulatory considerations for trade. The course concluded with a final session for questions and an open discussion, providing participants with the opportunity to request clarifications and share insights. Afterward, participants completed a course evaluation to provide feedback on their experience.



Course participants visit the Photosynthesis Institute's essential oils distillery on the UFSB campus.

Participants: The course had a total of 23 participants. Among them were eight farmers from the Nova Vitória Rural Association, six from the Miramar Rural Association, and two from other rural communities (Itaporanga and Rio do Sul). Also participating were an agronomist and researcher from the Participatory Certification Network of Organic Products of the Forest Peoples, a technician from the Landless Workers' Movement Productive Backyards Project, and six students/researchers from UFSB.

Maria Otávia Crepaldi (Brazil coordinator, ELTI), Mabel Ludka (Brazil assistant, ELTI), Narezi, and Okada planned and organized the course. Ludka contributed to promotional materials for the course, while the Photosynthesis Institute team was responsible for promoting it within the rural associations, handling registrations, and managing local logistics. Sabrina Weber (Brazil administrative assistant, ELTI) provided administrative and additional logistical support. Narezi, Okada, Leite, Lenz, Peranovich, and Santos were the course instructors.

Outcomes and follow-up: The 23 participants rated the overall course experience and educational content as 4.8 out of 5. The DSAF project team will continue working with the two associations on the essential oils initiative, depending on budgetary constraints.

For more information, email Maria Otávia Crepaldi at mariaotavia.crepaldi@yale.edu.

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