

Essential Oil Production on Small Farms: A Florida Example

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There has been a significant increase in demand for essential oils and aromatic plants during the past 25 years. This trend is expected to continue, especially in U.S. markets, where sales of essential oils have risen from \$465 million in 1993 to \$820 million in 2003 and botanical extracts from \$268 million to \$1120 million. As an example in Florida, many growers are now marketing fresh aromatic herbs such as basil, rosemary, and cilantro. Often, seasonal overproduction leaves crops in the fields unsold. These unused crops can be harvested, dried, and distilled to produce essential oils as value-added, sustainable products such as insecticides, raw material for food and fragrance industries, and components of body care products. This would provide a novel market for existing fresh herb production and an alternate income stream for these producers.

There is an increasing market for specialty herbs for fresh market sale; these are often picked as young plants or only a portion of the plant is used. Rather than leaving unused crops in the field to over-mature or disking the crop back in, such overproduction can be harvested and dried for distillation and bottling of essential oils to provide increased income and create new jobs with little extra cost. Small scale farmers often are looking for a way of increasing earnings and exploring new value-added products or crops that are environmentally friendly and sustainable. Essential oil producing herbs such as ginger, basil, bay laurel, dill, cilantro, oregano, parsley, and rosemary are grown in Florida for 'fresh to market' during the winter. Seasonal slow markets and over-production of these herbs may result in a loss of at least some of the crop. Excess production could be harvested and distilled to produce essential oils and hydrosols that can be stored and moved through the essential oil market to complement fresh herb production. Essential oils may be used for value-added products such as body care products, infused cooking oils, and natural food flavorings. There is also a need for essential oils as pest control products for insect resistance, especially in organic products. Spent biomass from distillation may be used to improve soil organic content, and/or produce biofuel. Using crops that would normally go to waste as an additional product and source of income supports small farmers and increases sustainability of their farms; and production of value-added products may create jobs in low income rural areas. Other potential benefits from growing new aromatic/essential oil crops include lower carbon footprint through reduced imports, potential for intercropping economically valuable crops for pest control, and potential to utilize otherwise neglected areas of marginal farmlands. Aromatic herbs may have good potential for growing in alkaline or sandy soils, and for intercropping in citrus groves, landscape nurseries, and other wide row crops such as sweet corn and beans, increasing productivity and reducing need for pest management.

Distillation of the plant material provides a method for maintaining earnings from a crop that is not time-sensitive like many tender herbs. Often extra planted material can be

dried for use after a few days or even up to weeks later. For example basil leaves and inflorescences may be dried for up to 11 days before distillation. Because of this flexibility of harvesting, growers of aromatic herbs are able to make use of extra production that would otherwise go to waste, reducing pressure in field, packinghouse, and in the market. Cost for planting, fertilizing and maintenance of the crop would also be spread out over an additional, value-added product.

Although some aromatic herbs are being grown already there is a need to develop cultivation and distillation methods appropriate for new species, new end-products, and novel marketing strategies. Distillation of plants for essential oils is an ancient technique and yet each plant may be unique in method (hydro vs steam) and timing requiring research into location- and crop-appropriate methods of distillation. Simple distillations in small stills can provide preliminary data on yield and quality of oils that can be utilized to optimize distillation times for larger quantities of plant material and to estimate production of both essential oil and hydrosol (the aqueous portion of a distillation). In addition, distillation of essential oils is slightly different for each plant, requiring equipment and experience, and essential oils must have certification through GC/MS that they conform to standards for that particular oil.

Incorporating essential oil production into farming practices has the potential to benefit all growers of aromatic herbs and plants. Many such growers are small farmers with limited resources. Adding essential oil production to already existing operations allows growers to make waste into a new value-added commodity with the potential for increased earnings, a new industry, and increased local jobs in depressed agricultural areas. When scientists and educators are involved, outreach and field demonstrations may identify more small farmers interested in a use for marginal or unproductive lands or as a new crop and assistance can be provided with distillation methods. Local communities may be able to establish related value-added product industries such as soaps, natural pesticides, flavored cooking oils, body care and spa products.

Table 1. List of potential aromatic herbs for essential oil production and possible future products

Specialty Crops With Potential for Essential Oil Production		
Aromatic Plant	Potential products within two years	Possible future uses
Basil, various	Essential oil, hydrosol, fresh herbs	Large scale production of essential oil, isolation of fragrance or flavor compounds. Breeding for specific aromatic profiles. Natural pesticides?
Bay Laurel	Essential oil, hydrosol, fresh or dried herbs	Same as basil, May protect other nearby

		plants.
Coriander/Cilantro	Fresh herb, dried seed, essential oil, hydrosol	Large scale production of essential oil, isolation of fragrance or flavor compounds, possible breeding for specific aromatic profiles. May attract beneficial insects to farms.
Dill	Fresh herb, essential oil, dried seed	Flavoring. Attracts parasitic wasps.
Ginger	Fresh and dried roots, essential oil from fresh roots	Flavoring, may help control insect pests and protect house plants.
Lemongrass	Fresh herb, essential oil, hydrosol	Large scale production of essential oil and/or isolated fragrance or flavor compounds. Breeding for specific aromatic compounds or profiles. Popular as a natural pesticide.
Oregano	Fresh herb, dried herb, essential oil, hydrosol	Large scale production, isolation of fragrance or flavor compound
Palmarosa	Essential oil, hydrosol	Large scale production, isolation of fragrance or flavor compounds. Repels ticks and mosquitoes.
Parsley	Fresh herb, dried herb, essential oil, hydrosol	Large scale production, isolation of fragrance or flavor compounds
Patchouli	Essential oil, hydrosol	Same plus solvent-extracted fragrance compound. Can act as an all-purpose insect repellent.
Perilla/Shiso	Fresh herb, essential oil	Flavor or fragrance, chemicals in the seeds eliminate rootknot nematode and deter insect attack.
Rosemary	Fresh herb, essential oil, hydrosol	Flavoring or fragrance. It can be used for an effective repellent in

		conjunction with other oils.
Vetiver	Essential oil	Fragrance, oil may repel Formosan subterranean termite, used for soil stabilization, water cleansing