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Greek Oregano—A Niche Crop for Iowa?

Linda L. Naeve
Iowa State University, lnaeve@iastate.edu

Raymond S. Hansen
Iowa State University, hansenr@iastate.edu

Lester A. Wilson
Iowa State University, lawilson@iastate.edu

Sabina Quint
Iowa State University

Leah B. Riesselman
Iowa State University, lriessel@iastate.edu

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Abstract
The project was the result of a discussion with an Iowa-based company specializing in allnatural health care products for livestock and companion animals. They are interested in finding local sources of oregano oil because they currently import more than 8,000 lb annually from a European supplier. Greek oregano oil is used in animal care products and other pharmaceuticalsfor its carvacrol content, which has shown to have antimicrobial properties. Their product specifications require oil that contains a minimum of 65% carvacrol and 3% thymol.

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Linda Naeve, Ext. program specialist
Ray Hansen, interim director
Value-Added Agriculture
Lester Wilson, professor
Food Science and Human Nutrition Department
Sabina Quint, research technician
Horticulture Research Farm
Leah Riesselman, agriculture specialist
Armstrong Research Farm

Introduction

The project was the result of a discussion with an Iowa-based company specializing in all-natural health care products for livestock and companion animals. They are interested in finding local sources of oregano oil because they currently import more than 8,000 lb annually from a European supplier. Greek oregano oil is used in animal care products and other pharmaceuticals for its carvacrol content, which has shown to have antimicrobial properties. Their product specifications require oil that contains a minimum of 65% carvacrol and 3% thymol.

The objectives of this study were to determine if Iowa-grown Greek oregano will yield quality oil for the pharmaceutical industry, determine if there is an advantage to growing oregano in high tunnels compared with field production, and determine whether Greek oregano has potential to be a viable niche opportunity for Iowa growers.

Materials and Methods

Greek oregano, *Origanum vulgare* subsp. *hirtum,* transplants were grown from seed in the greenhouse for 10 to 12 weeks prior to setting them out. Transplants were planted in the Armstrong high tunnel on April 18 and in the field on May 12 and in the Horticulture Station high tunnel on May 12 and in the field on May 27.

The high tunnel cultural system consisted of SRM-olive plastic mulch (wavelength selective) at the Horticulture Research Station and bare soil at the Armstrong Farm. Both sites were trickle irrigated. Field production at both sites included SMR olive mulch and trickle irrigation. Transplants were staggered in twin rows, 12 in. apart and in-row spacing of 12 in. on a single plastic row bed. Irrigation scheduling was via tensiometers. There were no insect or disease problems in the field and high tunnel.

Flower buds were removed prior to bloom. Leaves and stems were harvested when the stems were approximately 6 to 8 in. long and dried at 100^{o}F for 1 to 2 days until crisp. Dried material was stored in air-tight containers at room temperature in a dark location.

The dried oregano was analyzed at Dr. Wilson's Food Quality Laboratory at Iowa State University. Grinding and distillation were conducted using the standard operating procedures from the American Spice Trade Association. Gas chromatography (GC) – mass spectroscopy (MS) were used to verify the composition of the oil. Experimental data was then compared with results from tests conducted on commercial oregano and pure carvacrol.

Results and Discussion

The favorable environment in the high tunnel allowed for an earlier harvest than the field plot at the Horticulture Research Station. High tunnels at both locations hastened growth to allow four harvests compared with two and three from the field plots at the Horticulture Station and Armstrong Farm, respectively. Yields from the high tunnels were an average 29% higher than the field plots (Table 1). Greek oregano is a perennial crop and higher yields could be expected in subsequent years.

Oregano from both the Armstrong field and high tunnel contained more carvacrol in the essential oil than that harvested at the Horticulture Station (Table 2). Also, the amount of volatile oil from the stems was statistically lower than that extracted from the leaves. Further investigation will determine if there is a statistical difference in the amount of volatile oils extracted between the locations and high tunnel versus field treatments. Although preliminary studies showed Iowa-grown Greek oregano contained desirable carvacrol and thymol concentrations for the pharmaceutical industry, further cost analyses need to be developed to determine if it is an economical niche crop for Iowa. Future research projects could look at the potential for increasing yields through intensive planting and other cultural strategies.

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Table 1. Greek oregano yields from first year after planting.

Location	lb/acre fresh weight	lb/acre dry weight
Horticulture Station –HT[1,2]	7,084	2,505
Horticulture Station – field[2]	5,678	1,968
Armstrong – HT[1]	7,581	2,450
Armstrong – field[2]	4,775	968

[1]HT = high tunnel; estimate based on 12, 30 ft × 96 ft high tunnels/acre.
[2]Twin-rows on a single row of plastic 1 ft apart.

Table 2. Carvacrol analysis of oregano leaves and stems.[1]

Location	Source	GC-MS Essential oil combined carvacrol/thymol peak area %	GC ratio carvacrol:thymol Carvacrol %	GC ratio carvacrol:thymol Thymol %	ASTA oil volume (ml/40 g)	Essential oil % carvacrol
Armstrong - field	Leaves	91.93	94.50	5.50	1.50	86.87
Armstrong – HT[2]	Leaves	88.60	97.39	2.61	1.40	86.29
Horticulture - field	Leaves	76.19	92.81	7.19	1.42	70.71
Horticulture - HT	Leaves	79.36	98.07	1.93	1.50	77.83
Armstrong - field	Stems	n/a	n/a	n/a	0.38	n/a
Armstrong - HT	Stems	n/a	n/a	n/a	0.36	n/a

[1]Identity of carvacrol confirmed by GS-MS and industry standards.
[2]HT = high tunnel.