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High Tunnel Greek Oregano Production in 2008

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Abstract

This report on Greek Oregano's potential as an Iowa niche crop was originally published in the 2008 Annual Progress Reports for the Horticulture Research Station (ISRF 0008-36).

Keywords

Horticulture, Niche crops

Disciplines

Agribusiness | Agriculture | Horticulture

Greek Oregano – A Niche Crop for Iowa?

Horticulture and Armstrong Farms Annual Reports 2008

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Introduction

This 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 over 8,000 pounds 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 an oil that contains a minimum of 65 percent carvacrol and 3 percent 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 to 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 the field on May 27.

The high tunnel cultural system consisted of SRM-olive plastic mulch (wavelength selective) at the Horticulture Station and bare soil at Armstrong. Both sites were trickle irrigated. Field production at both sites included SMR olive mulch and trickle irrigation. Transplants were staggered in twin rows, 12 inches apart and in-row spacing of 12 inches 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 inches long and dried at 100 degrees 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 to 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 Station. High tunnels at both locations hastened growth to allow four harvests as compared to two and three from the field plots at the Horticulture Station and Armstrong, respectively. Yields from the high tunnels were an average 29 percent 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 farm (Table 2). Also, the amount of volatile oil from the stems was significantly lower than that extracted from the leaves. Further investigation will determine if there is a significant 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	Pounds/Acre	
	Fresh Weight	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

¹HT = high tunnel; estimate based on 12, 30 foot x 96 foot high tunnels/acre.

²Twin-rows on a single row of plastic 1 foot apart.

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

Location	Source	GC-MS Essential Oil	GC Ratio		ASTA	Essential
		Combined carvacrol/thymol	<u>Carvacrol:Thymol</u>		Oil Volume	Oil %
		Peak Area %	Carvacrol %	Thymol %	(ml/40 g)	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 Station - field	Leaves	76.19	92.81	7.19	1.42	70.71
Horticulture Station - 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

¹Identity of carvacrol confirmed by GS-MS and industry standards

²HT = high tunnel