Drying and Shade Effects on ‘Native’ Spearmint Oil Yields and Composition

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Introduction

Cultivar ‘Native’ spearmint (Mentha spicata L.) is one of the two most widely grown spearmints in the United States and in other countries. ‘Native’ spearmint is grown mainly for the production of essential oil, which is used in various industries such as pharmaceutical, consumer products including beverages and chewing gum, and eco-friendly pesticides.

Recent studies at the Sheridan Research and Extension Center (ShREC) demonstrated feasibility of spearmint as a cash crop for north-central Wyoming and perhaps beyond. The transportation and energy costs associated with commercial mint production can be reduced by drying the spearmint in windrows in the field for a few days after harvest and prior to the extraction of essential oils. This is a common practice in the traditional mint producing regions, including the Midwest and Northwest; however, it is not known how both the drying period and the drying of plants in full shade (vs. sun) would affect the oil content and composition of ‘Native’ spearmint.

Objectives

The goal is to develop a sustainable production system for spearmint in north-central Wyoming and possibly other areas of the state and beyond. Specific objectives were to evaluate the effects of drying in days after harvest as well as the effects of full shade and no shade (on the essential oil yield and on the essential oil composition).

Materials and Methods

A planting of ‘Native’ spearmint was established at ShREC in 2011 using certified virus-free material. Plants were grown in raised beds, with spacing of 1 foot in-row and between the rows, and irrigation was provided with drip-tape. The herbicide Terbacil at 1.78 lb/acre was applied pre-planting for weed control. This herbicide has been used traditionally for weed control in spearmint and peppermint plantations in the United States for several decades. Additional hand-weeding during the summer was necessary to keep plots weed-free.

Plants were treated and harvested in July 2012 at flowering stage (when the content and the composition of the essential oil are the most desirable). Representative fresh biomass samples were dried either in direct sun or full shade for the following days after harvest: 0 (extracted the same day), 1, 2, 3, 4, 7, and 11 days. Plant samples under shade were dried in a large, well-aerated barn.
The essential oil was extracted by steam distillation in 67.6-ounce steam distillation units using approximately 1 pound of fresh or 1/2 lb of dried spearmint biomass, all in three replicates. The extracted oils were analyzed by gas chromatography. Statistical analyses were performed to evaluate the effect of drying time and sun vs. shade on the oil content and the concentrations of beta-pinene, myrcene, limonene, eucalyptol, cis-sabinene hydrate, 4-terpineol, cis-dihydro carvone, cis-carveol, carvone, iso-dihydro carveol acetate, beta-bourbonene, beta-caryophyllene, alpha-humulene/trans-beta-far, and germacrene D in the oil.

**Results and Discussion**

Treatments (number of days of drying plus sun vs. shade) did not have significant effect on essential oil content. Therefore, drying of ‘Native’ spearmint under direct sun in Wyoming for up to 11 days after harvest can be used in an effort to reduce transportation and energy costs without affecting oil yields or composition. Occasional rain during the drying period would not affect oil content and composition.

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