



Rosemary Essence Storage Study

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ABSTRACT

At Sensus, essences are generally stored refrigerated with the exception of a few. This study was performed to determine the affects of storage under different temperatures on the essence quality. After 4 weeks of storage, sensory analysis judged the ambient samples unacceptable and the GC-MS analysis confirmed some aroma active compounds decreased dramatically over time under different conditions.

INTRODUCTION

Well over 100 constituents have been identified in rosemary. The composition of Sensus rosemary essence has 2 compounds of considerable concentration followed by several compounds at lower concentration levels and then by many at much lower concentration levels. These 2 are eucalyptol and camphor. In order to determine the affects of storage under different conditions, samples were stored ambient, refrigerated, and frozen and then analyzed both analytically and organoleptically.

MATERIALS AND METHODS

A Gerstel MultiPurposeSampler (MPS-2) (Baltimore, MD) was used with a 2-cm 3-phase (divinylbenene, Carboxen, Polydimethylsiloxane) for sample preparation. A 10-min incubation followed by a 40-min exposure was used to capture the volatiles on the fiber for injection into the GC. The sample was stirred using a 3x12mm stirbar in the 20mL vial. The fiber was desorbed for 5-min in the GC injector for 5 min. An Agilent 7890A gas chromatograph (Palo Alto, CA) was used for the analysis. Analysis was performed in the splitless mode with a helium flow rate of 1.25mL/min through a 60mx0.25mmx0.25µm RTX-5ms column. The initial oven temperature was 50°C immediately followed by a 4°C/min temperature ramp to 170°C which was followed by a 100°C/min ramp to 250°C and held for 5min in order to ensure no sample to sample contamination. The transfer line to the Leco TruTOF MS (St. Joseph, MN) was held at 240°C. Data was collected for 30-250 *m/z* at an acquisition rate of 10 spectra per sec. Identification was based on a combination of MS library matching along with reported retention indices. The samples were then prepared for analysis by pipetting 50µL into 4.9mL of water along with 50µL of internal standard (phenol-D6, 100 ppm).

Rosemary essence was stored in 2oz Oberk glass bottles with a nitrogen headspace and sampled at 1 and 4 weeks.

Sensory analysis was conducted by assigning the frozen sample a value of 9 and comparing the ambient and refrigerated samples to it at 0.2% in water.

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RESULTS AND DISCUSSION

Figure 1 is a graph of the sensory results for the different storage conditions. It is clear that even after only 4 weeks, there was a considerable decrease in sensory response. Figure 2 is the entire chromatogram. Figure 3 is an earlier portion of the chromatogram showing α -pinene and camphene which shows a dramatic decrease in both compounds. Figure 4 is mainly of eucalyptol, which is obviously overloaded on both the GC and MS, but indicates no dramatic difference between the storage conditions. Figure 5 shows γ -terpinene at a higher concentration for the frozen sample. Figure 6 is unremarkable in that all the compounds show no difference due to storage. Lastly, Figure 7 is the sesquiterpene region which shows dramatic decreases in most sesquiterpene regions for non-frozen samples.

Figure 1. Sensory results for rosemary storage

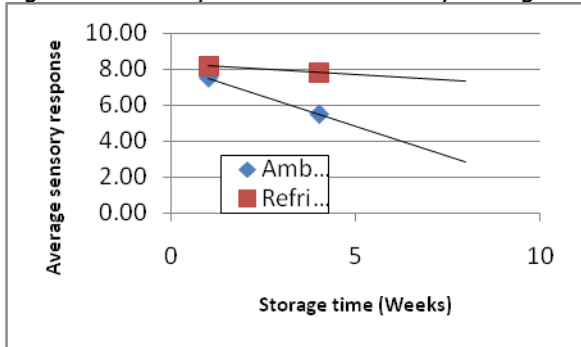


Figure 2. Entire Chromatogram

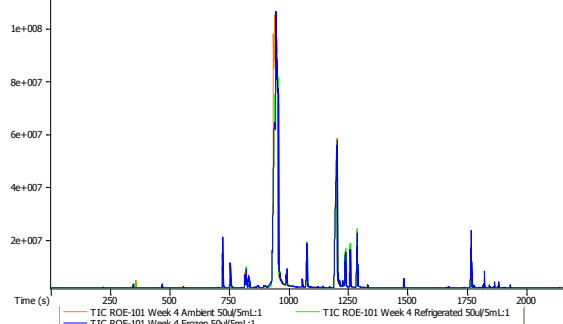


Figure 3. α -pinene and camphene

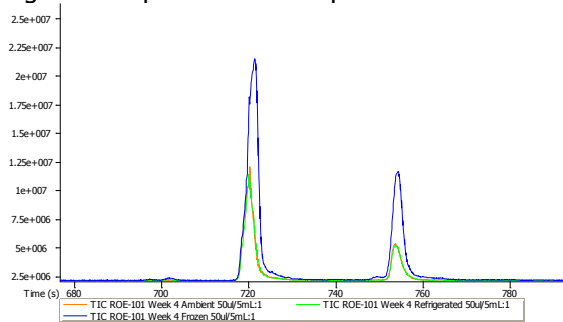


Figure 4. Eucalyptol and γ -terpinene

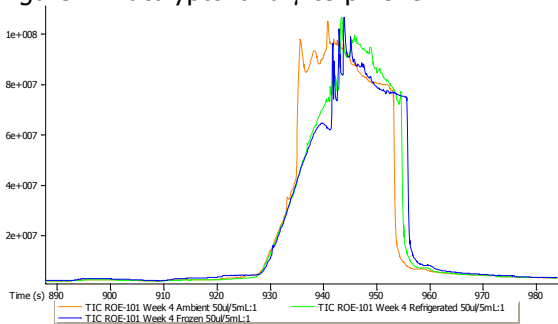


Figure 5. γ -terpinene, terpinolene, and linalool acetate

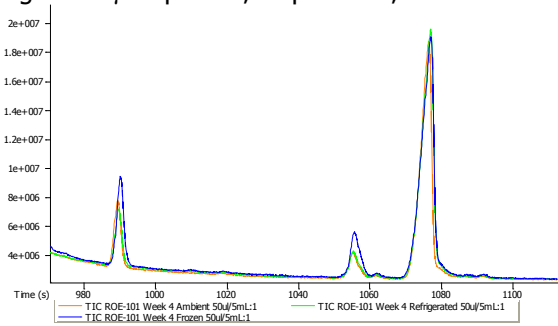


Figure 6. Camphor, ocimol/borneol, 4-terpineol, α -terpineol

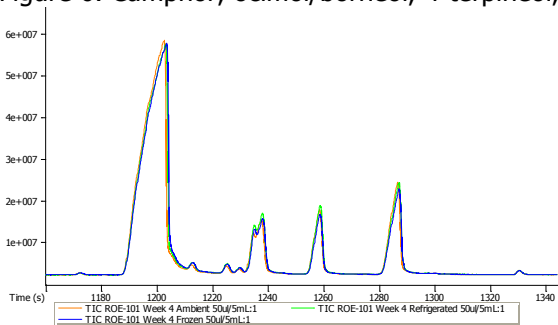


Figure 7. Sesquiterpene region (caryophyllene is largest peak)

