Comparison of Seed Nutmeg Oleoresin Extraction (Myrictica Houtt fragrans) Origin of North Maluku and Maceration Method Using Combined Distillation–Maceration

Muhammad Assagaf[A], {Pudji Hastuti, Chusnul Hidayat, Supriyadi}[B], Sri Yuliani[C]

[A]North Maluku Assesment Institute for Agricultural Technology (IAAT) .
Jl. Kusu, Sofifi, City Tidore Islands
[B]Faculty of Agricultural Technology, Gadjah Mada University in Yogyakarta.
Jl. Flora, Bulaksumur, Yogyakarta 55281
[C]Center for Post-Harvest, Jl. Students' Army, Cimanggu. Bogor
email: assagaf_met@yahoo.com

Abstract

The purpose of this study was to compare the composition of oleoresin nutmeg (*Myristica fragrans* Houtt) made directly by maceration and distillation combined - maceration. nutmeg oleoresin yield amounted to 15.17 (% db) obtained by direct maceration and oleoresin extraction method combined distillation and maceration obtained yield of 20.08 (% db). While the essential oil yield itself from the water-steam distillation of the results obtained at 6.61 (% db). Ethanol extract of oleoresin analysis using GCMS method identified a total of 39 kinds of compounds with the composition of major components is methyleugenol (33.40%), myristicine (10.90%), cis-methyl isoeugenol (9.09%), elemicin (8:33%), and isocoumarin (5.61 %). For nutmeg essential oil contained 31 components of the compound, where the components are located in large numbers was sabinene (34.97%), β-phellandrene (19.9%), methyleugenol (7:55%), myristicine (5:29%) and elimicine (3:21 %). As for the essential oil is mixed with the oleoresin from the pulp remaining distillation contained 58 components that make up the compound of the oleoresin with a mixture of main components, namely: sabinene (12:38%) myristicine (10.88%), elemicin (8.93%), isocoumarin 6:26 (%), myristic acid (5.96%), and α-pinene (4.73%).

Key words : essential oil, oleoresin, maceration, maceration-distillation, GC-MS

INTRODUCTION

Nutmeg (Myristica fragrans Houtt) as a spice widely used in various fields of food, medicine and cosmetics in the form of extracts of essential oils and oleoresin. The use in these areas would require a good quality extract of nutmeg. Quality extracts influenced by extraction techniques, refinement of materials, type of solvent, extraction time, solvent concentration, the ratio material with a solvent, solvent evaporation process, purification and drying (Bombaderlli, 1991 and Vijesekera, 1991).

Nutmeg extract the chemical content in the form of volatile oil and oleoresin have been widely utilized in various fields such as food as a flavor agent in the manufacture of milk-based drinks (eggnog), meat-based foods, as well as in health and beauty such as aromatherapy, perfume, toothpaste as well as in traditional medicine. From some of the results of the study reported that the nutmeg in the form of volatile oil and oleoresin have antibacterial properties as (Stankovic, et al., 2006), natural antioxidants (Dorman, et al., 1995; Baratta et al., 1998; Lis-Balchin, 1998; Tomaino et al., 2005; Jukić et al., 2006; and Suhaj. 2006) anti-fungal / fungal (Rahman, et al., 1999) and as an ingredient in medicine.

METHOD

Seed Nutmeg (Myristica fragrance Houtt) Nutmeg seeds used in this study is nutmeg (Myristica fragrance Houtt) aged 7-9 months, the harvest month of February 2009, came from the village of Torano and Marikurubu North Maluku, entering in the quality of group A with the number of seeds 180/kg. The chemical composition of the nutmeg seed is: it contains 18.66% moisture content, ash content 1.67%, 34.63% fat content, protein content 6.96%, and 38, 07% carbohydrate content.

Nutmeg Seed Oleoresin Extraction with Direct Maceration method

A total of 40 grams of nutmeg powder at 4 ° C results digrinding pass 20 mesh sieve inserted into a 250 ml erlenmeyer containing 200 ml of solvent 96% ethanol, samples were put into a water bath shaker. at a temperature of 54oC for 4 hours with 120 rpm shake speed. Filtration using Whatman filter paper no. 1 (ekstraks1), the extract was cooled at 4 ° C for one hour to separate the fat nutmeg. Oleoresin concentration used rotary vacuum evaporator (IKA Werke RV 06 ML) at a temperature of 40oC and a pressure of 172 mbar. The extraction process was repeated once again on the same sample of nutmeg as the procedure above and obtained extract 2. The results have been weighed for the determination of the solvent evaporated oleoresin yield.

Nutmeg oleoresin extraction with a combined distillation method – Maceration

A total of 1.5 kg flour nutmeg pass 20 mesh sieve size included in the boiling kettle that has been equipped with condenser and flask clavenger, with the amount of water added as much as 6 liters. Incoming cooling water temperature is set at 4-7oC. steaming time for 4 hours starting from the first droplet. Essential oil obtained by the remaining water is removed with a filter that is passed on has been given sodium sulfate anhydrous. Nutmeg powder residue remaining in the distillation and subsequent extraction was dried by maceration to obtain oleoresin. Nutmeg essential oil yield was weighed for determination of distillation.

Characterization Component Compounds by Gas Chromatography oleoresin Composer - Mass Spectrometry (GC-MS).

Testing components constituent compounds of essential oils and oleoresin using GC-MS Shimadzu GCMS-QP2010S (Shimadzu Corporation, Kyoto, Japan) Shimadzu GCMS-QP2010S (Shimadzu Corporation, Kyoto, Japan) equipped with a capillary Column Model Number: 19091S Agilent HP-5ms-433 5% Phenyl methyl siloxane (diameter of 250 μm, length 30 m, and 0:25 μm film thickness) and FID detector is used. GC conditions: initial temperature 60 ° C raised to 250 ° C (4 ° C / minute) and then at a temperature of 250 ° C maintained for 20 minutes, with helium carrier gas flow rate 20ml/min. Compounds were identified by comparing retention index and mass spectra compared to those in the Wiley library database and the NIST library (Adams, 2004).

RESULTS

Yield

The high yield of oleoresin (20.08% bk) obtained from the combined methods of distillation and maceration due to volatile oil has been partially drawn at the time of distillation in this volatile compounds with boiling points at temperatures over 90^{o}C, while some essential oils are composed by compounds are volatile and non volatile than oloeresin the extracted during the process of maceration with the temperature 54 ^{o}C.

Profile oleoresin compounds obtained from the maceration

Oleoresin extract of ethanol by direct maceration there are 39 components of the main components are methyleugenol (percent relative area of 33.40%), myristicine (10.90%), cis-methyl isoeugenol (9:09%), elemicin (8:33%), and isocoumarin (5.61%).

Profile oleoresin compounds obtained from the combination of distillation – maceration methods

Components of Essential Oil Compounds Composer distilled. The components of the chemical constituent of essential oil of nutmeg seed based on the results of analysis using GCMS method there are 31 components, where components are located in large numbers was sabinene (34.97%), β - phellandrene (9:19%), methyleugenol (7:55%), myristicine (5:29%) and elimicine (3:21%).

CONCLUSION

Oleoresin extracted by maceration method can directly yield of 15.17% obtained with the components making up a total of 39 kinds of compounds with the five main components namely; methyleugenol (33.40%), myristicine (10.9%), cis-methyl isoeugenol (9:09%), elemicin (8:33%), and isocoumarin (5.61%). For the essential oil obtained by distillation yield of 6.61%. For nutmeg essential oil contained 31 components of the compound, where the components are located in large numbers was sabinene (34.97%), β-phellandrene (9:19%), methyleugenol (7:55%), myristicine (5:29%) and elimicine (3:21 %). As for the essential oils are mixed with the oleoresin of the remaining distillation residue contained 58 components that make up a compound of the oleoresin with a mixture of main components, namely: sabinene (12:38%) myristicine (10.88%), elemicin (8.93%), isocoumarin 6:26 (%), myristic acid (5.96%), and α-pinene (4.73%).

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