

DETERMINATION OF THYMOL CONTENT IN DIFFERENT BRANDS OF AJWAIN WATER BY USING SPECTROPHOTOMETRIC METHOD AND TITRIMETRIC METHOD**DETERMINATION OF THYMOL
CONTENT IN DIFFERENT BRANDS OF
AJWAIN WATER BY USING
SPECTROPHOTOMETRIC METHOD
AND TITRIMETRIC METHOD**

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ABSTRACT:

Thymol is obtained from the plant *Thymus vulgaris* or *Trachyspermum ammi* seeds belongs to the family Apiaceae. A simple, sensitive spectrophotometric method and titrimetric method was used for the estimation of thymol content in different brands of Ajwain water. The spectrophotometric method was done by using Acetonitrile and water as solvent. The maximum absorbance was found to be at ($\lambda_{\max}$) 275 nm. The different brands of Ajwain water from market was collected and it was determined for the concentration of thymol.

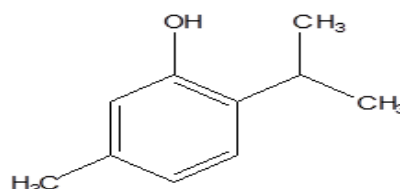
INTRODUCTION:

Thymol is a phenol derivate obtained from the plant *Thymus vulgaris* and *Trachyspermum Ammi* Mill fruit belongs to the family Apiaceae. It was discovered by Neumann in 1719. It was purified in 1853 by M. Lallemand, and it is named as Thymol. it

is an herbaceous plant native to India and the middle East. Ajwain seeds are rich in minerals, fiber, vitamins. Ajwain is also known as carum seed, carum ajowan or bishop's weed. [1]

Ajwain essential oil is a rich source of bioactive compounds and thus is used as a fragrance and flavoring agent for food and beverages. Thymol is antifungal and antibacterial agent. Thymol is used in topical preparation for the treatment of acne and hemorrhoids. Thymol is used as an antiseptic in mouth washes.

The principal constituents of Ajwain contains volatile oil present in the seeds is responsible for providing a flavor owing to the presence of thymol. The seeds are an aromatic volatile essential oil and a crystalline substance. It also contains cumene and terpene-'thymene'. The Ajwain fruits yields 2-4% of essential oil, and thymol as major ingredient i.e., 35-60%. The thymol gets easily crystallized from the oil on cooling. [1]

DRUG PROFILE: [2]**Structure of Thymol:**

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Molecular formula: C₁₀H₁₄O

Molecular weight: 150.2 g/mol.

Chemical name: 2-isopropyl-5-methyl phenol

Appearance: colorless crystals

Density: 0.96 g/cm³ or 960 kg/m³

Category: Pharmaceutical aid (antimicrobial preservative, antiseptic)

Description: colorless crystals; odour characteristic.

Solubility: Strongly soluble in Organic solvents, slightly soluble in glycerol and water.

Storage: Store in a well closed container. Protect from sun light.

Contraindications:

Thymol is contraindicated in conditions like pregnancy, Breast feeding, Hypertensive patients, kidney malfunctioning and Liver malfunctioning.

Side effects:

Cardiac arrhythmias, CNS depression, acidosis, cyanosis.

Over dosage of thymol includes Coma, Dizziness, Headache.

OBJECTIVE OF THE STUDY:

The main objective of this study is to determine the amount of thymol present in different brands of Ajwain water quantitatively by using Spectrophotometric method and Titrimetric method.

Comparison of the obtained results of different brands of Ajwain water.

EXPERIMENTAL METHODS:

Selection of solvent:

solvents in which all the components of Ajwain water formulation are soluble and stable and solvent must not show significant absorption at the wavelength of thymol and it does not interact with solute, should give maximum absorbance of thymol are selected.

Selection of wavelength:

The wavelength at which the maximum absorbance peak of thymol is shown will be selected as wavelength.

Sample analysis:

Analysis of various concentrations of sample by scanning at its fixed wavelength.

Calculations:

Calculation of thymol content using obtained absorbance values.

Spectrophotometric method:

Selection of solvent:

The solvent was selected based on the solubility of the drug. It was soluble in Acetonitrile and water in the ratio of 50:50.

Selection of wavelength:

- Spectrophotometric method was used for the determination of thymol in ajwain water by using solvent Acetonitrile: water in the ratio 50:50.

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- The absorbance was checked at 200-400nm and the maximum absorbance was found at 275nm.

Preparation of the sample for calibration curve:

- 10 mg of standard Thymol was dissolved in 10 ml of solvent (Acetonitrile: water) (50:50) 1000µg/ml.
- Transfer 1 ml of the above solution into 10ml of volumetric flask and make up the volume to 10 ml (100µg/ml).
- Different concentrations were prepared (10, 20, 30, 40, 50 µg/ml).
- The absorbance was checked for different concentrations at 275nm using acetonitrile: water as blank.
- The linearity was calculated.

Titrimetric MethodAssay Procedure as per I.P: [3]

Weigh 0.1gm of thymol, transfer into iodine flask and dissolve in 25 ml of 1 M sodium hydroxide. ADD 20 ml of hot dilute hydrochloric acid and immediately titrate with 0.05bromine to within 1 to 2 ml of the calculated end point. Warm the solution to about 75°, add 0.1 ml of methyl orange solution and shake vigorously. If the solution is red colour continue the titration dropwise and with shaking until the red colour is discharged. Repeat the alternate addition of 0.05M BROMINE and ethyl orange

solution until the red colour is discharged after the addition of methyl orange solution.

Preparation of solutions:

Preparation of 0.05M Bromine solution:

- 3gm of potassium bromate and 15 gm of potassium bromide was dissolved in sufficient water to produce 1000 ml.
- Preparation of 0.1 M Sodium Thiosulphate solution:
 - 100ml of water was taken in a volumetric flask and add 25gm of sodium thiosulphate with stirring and add 0.2gm of sodium carbonate. Add 700ml of water and make up the volume to 1000ml.
- Preparation of Starch solution (0.5%):
 - 0.25gm of soluble starch was weighed and add it to 50ml of near boiling water in a 100ml conical flask. Stir it to dissolve and cool down before using.
- 3.2.3 Standardization of bromine:
 - 25 ml of bromine solution was pipetted out into a flask and dilute with 120 ml of water.
 - 5ml of HCl was added and shake it gently and add 5 ml of potassium iodide solution and allow it to stand for 5 min.
 - Titrated the liberated iodine with 0.1 M Sodium thiosulphate using 3 ml of starch solution as indicator.

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- 1ml of 0.1 M Sodium thiosulphate is equivalent to 0.01598 gm of Bromine.

RESULTS:

Selection of wavelength:

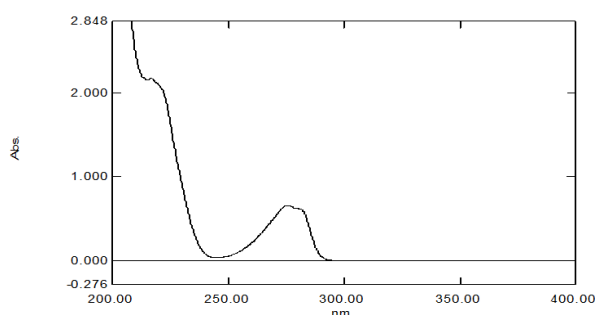


Fig.1: UV Spectrum of Thymol

Table-1: Calibration curve of standard Thymol

Concentration (mg/ml)	Aborbance
10	0.155
20	0.278
30	0.428
40	0.590
50	0.736

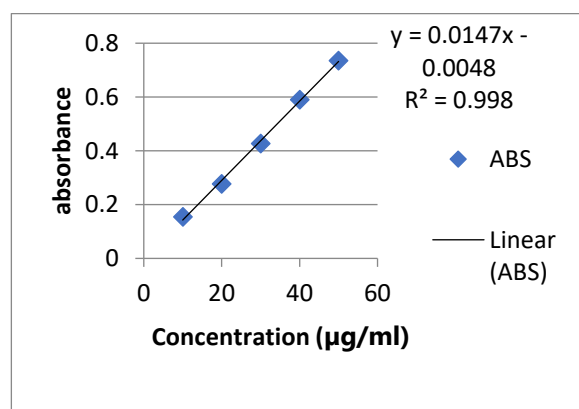


Fig-2: Calibration curve

Fig-3: Overlay spectra of thymol

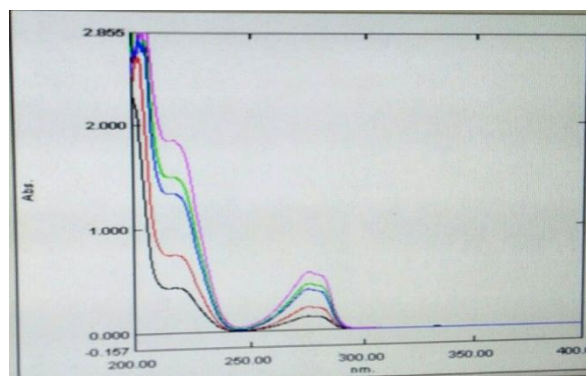


Table-2: Volume of solution consumed by titrimetric method

Brands of Ajwain water	Volume of bromine solution consumed(ml)				Amount of thymol found
	I	II	III	Average volume	
Dwibhashi's brand	17	16.5	16.7	16.73	55.1
Hathun's brand	11.8	12	12.1	11.9	39.2
Bison brand	13.1	12.9	13	13	42.9

Table-3: Comparison of brands

Different brands	UV Spectrophotometric (mg/ml)	Titrimetric method (mg/ml)
Dwibhashi's brand	62.71	55.1
Hathun's brand	38.5	39.2
Bison brand	46.42	42.9

DETERMINATION OF THYMOL CONTENT IN DIFFERENT BRANDS OF AJWAIN WATER BY USING SPECTROPHOTOMETRIC METHOD AND TITRIMETRIC METHOD**CONCLUSION:**

The concentration of thymol content in different brands of marketed Ajwain water was determined to know whether the required concentration is suitable for the consumption of people. Different analytical methods are used for the determination of pharmaceutical active ingredient in different brands for the purpose of community use.

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