

EFFECTS OF CALCIAN CARBIDE ON LIVER, KINDLY AND NERVOUS SYSTEM IN ALBINO RATS

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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 (λ max) 275 nm. The different brands of Ajwain water from market was collected and it was determined for the concentration of thymol.

INTRODUCTION:

Fruits are nutritious in nature contains vitamins, minerals, fibers, flavonoids and anti-oxidants which helps in maintaining optimum health. To meet the demand and supply of fruits vendors use artificial ripening agents for early ripening.

It involves a sequence of the molecular, biochemical and physiological process which results in favorable changes in fruit color, texture, acidity, odor, volatiles and sugar content. These changes are obtaining from the following process. Artificial ripening agents such as calcium carbide (CaC_2), ethephon, potassium orthophosphate, putrescin, oxytocin, protoporphyrin, carbon monoxide, acetylene gas potassium sulfate are commonly used.

Table 2: List of artificial ripening agent and their toxic effects on human health ^(14,18-20,22).

Artificial ripening agent	Complications
Calcium carbide (CaC_2)	Peptic ulcer, hypoxia, dizziness, frequent thirst, mouth and nose irritation, weakness, permanent skin damage difficulty arises while swallowing, vomiting, skin ulcer, etc.,
Ethylene glycol ($\text{C}_2\text{H}_5\text{O}_2$)	Direct intake of ethylene glycol may lead to kidney failure
Ethylene (C_2H_4) and methyl jasmonate ($\text{C}_{13}\text{H}_{20}\text{O}_3$)	They produce less (or non-) -toxic effects on comparison to calcium carbide and ethylene glycol. But they are expensive

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Ethephon ($C_2H_6ClO_3P$)	No reported health hazards for limited concentration (1-50ppm based on fruits)
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Calcium carbide is widely used because it is easily available and less expensive. It is direct intake cause hypoxia in brain, hypoxia exposure may cause pulmonary edema and possess carcinogenic property. chronic exposure may cause ocular disorders peptic ulcer decreasing blood count and fetal damage in pregnant women. Most of countries ban calcium carbide in fruit ripening because of its potential health hazards.

Most of the studies reveals that despite of its banning, the artificial ripening with CaC_2 is still practiced in third world countries especially in India, Indonesia and Bangladesh. So this present work was to evaluate the toxicological effects of CaC_2 on liver, kidney and Nervous System in rats.

STUDY OBJECTIVE:

The study objective was to evaluate the toxic effect of calcium carbide and hepatic renal and nervous systems.

MATERIAL AND METHODS:

Procurement of the calcium carbide

The calcium carbide was procured from welding and fabrication shop in Kurnool. Calcium carbide was mixed in the feed according to the dose which was to be given.

Administration of the calcium carbide

The rat feed was powdered in mortar and pestle. The Calcium carbide was mixed in the powdered feed according to the dose which was to be given. By adding small quantity of water to this mixture, pellets are prepared. These prepared pellets are administered to the rats for 28 days.

Selection of the animals

Healthy albino Wistar rats of either sex were used throughout the study. The animals were kept in a polypropylene cage acclimatized to lab conditions of $(25 \pm 2)^\circ C$ with a 12h light/dark cycle for one week before experimentation. All rats were fed with standard pellet diet and water ad libitum. Animal studies were performed based upon the guidelines given by the Institutional Ethical Committee for animal care and use, Creative Educational Society College of Pharmacy, Kurnool, Andhra Pradesh, India. (DEC/IAEC/CESCOP/2017-19).

Experimental design

Groups	Treatment
Group I	Normal control
Group II	0.25 gm of CaC_2 Mixed with 20g of feed.

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	<i>ad libitum</i>
Group III	0.5 gm of CaC ₂ Mixed with 20g of feed. <i>ad libitum</i>
Group VI	1 gm of CaC ₂ Mixed with 20g of feed. <i>ad libitum</i>

Blood sample collection

On 0th Day, 14th Day, and 28th day the blood samples were collected from the rats via retro-orbital plexus in to gel tubes. The gel tubes were centrifuged at 3000rpm for about 15 minutes. Then the supernatant liquid, serum was collected. The serum is used for the determination of the following parameters

Assessment of toxic effect on liver & kidney

Serum parameters like SGOT, SGPT, Bilirubin, Creatinine and blood urea levels are estimated for toxic affects on hepatic and renal system.

Assessment of toxic effects on CNS

Various experimental models like Elevated Plus Mads, Morris Water Mads, Pole Climbing Apparatus were used for assessing effects on CNS.

Similarly, brain tissues were collated after study period for antioxidant, Acetylcholinesterase activity, Catalase estimation, Glutathione, Superoxide dismutase, Lipid peroxidation ⁽⁷⁴⁻⁷⁸⁾

RESULTS:

Selection of wavelength:

Fig.1: UV Spectrum of Tymol

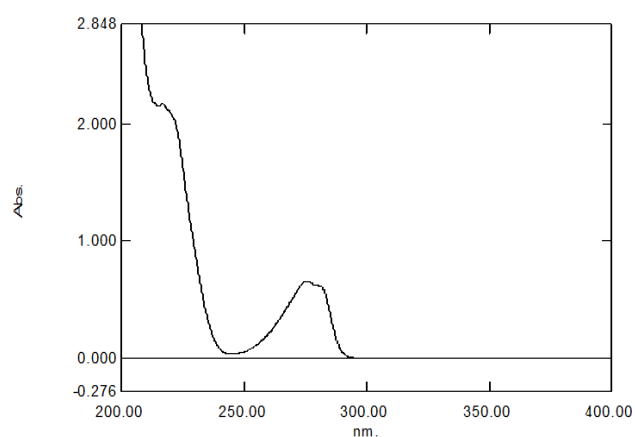
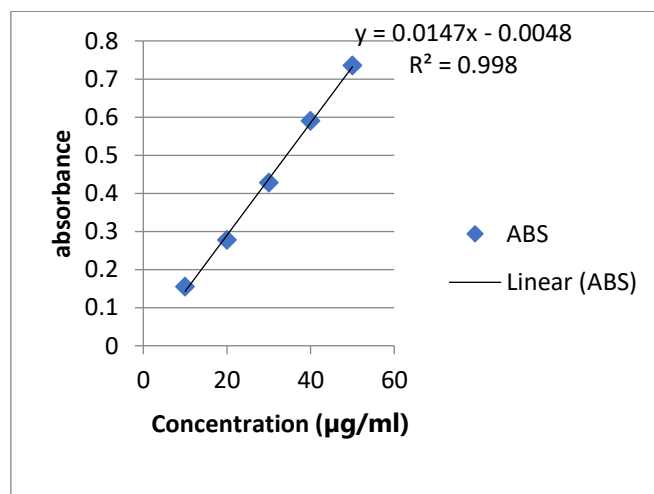


Table-1: Calibration curve of standard Thymol

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

Fig-2: Calibration curve



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Fig-3: Overlay spectra of thymol

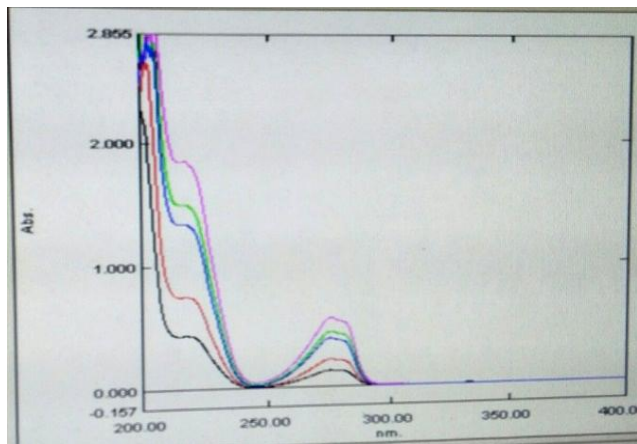


Table-2: Volume of solution consumed b- titrimetric method

Brands of Ajwain water	Volume of bromine solution consumed(ml)				Amount of thymol found
	I	II	III	Average volume	
Dwibhas hi'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

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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Source of Support: Nil. Conflicts of Interest: None