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ESTIMATION OF EUGENOL CONTENT IN MARKETED TULSI DROP PREPARATIONS BY SIMPLE UV SPECTROPHOTOMETRIC METHOD

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Abstract: Tulsi drop preparations containing extracts of various *Ocimum* species are available in the market. These are extensively used for their immunomodulatory properties. Eugenol is one of the active biomarkers of *Ocimum* species. In the current study content of eugenol in three marketed Tulsi drop preparations was determined using a simple UV spectrophotometric method. The linear regression equation y = 0.0235x + 0.0065 was used to determine the amount of eugenol at 282 nm. Different Tulsi drop preparations were found to have variable content of eugenol.

Index Terms **- Eugenol, UV-visible spectrophotometry, Tulsi drops, Immunomodulators.**

I. INTRODUCTION

Medicinal herbs have been used for thousands of years to heal sores, relieve pain, cure diseases and preserve overall health, stretching back to the start of human civilization. The property of herbal medicine is determined by its chemical phytoconstituents, some of which serves as markers[1]. A marker compound is a chemically defined constituent of herbal drug with or without therapeutic activity. It serves as reference for standardizing test materials and therefore be used for the quality assurance of finished product. Marker based standardization involves identification and quantification of marker phytoconstituent. Modern analytical methods such as high-performance thin layer chromatography (HPTLC), high performance liquid chromatography (HPLC), gas chromatography (GC) and hyphenated techniques such as liquid chromatography-mass spectroscopy (LC-MS), liquid chromatography-nuclear magnetic resonance spectroscopy (LC-NMR) and gas chromatography-mass spectroscopy (GC-MS) are reported to be employed in process of herbal drug standardization.

Eugenol ($C_{10}H_{12}O_2$) (1-hydroxy-2-methoxy-4-allylbenzene) is one of the bioactive marker, which is a phenolic chemical compound with an allyl chain substituted guaiacol that belongs to the phenylpropanoids family [fig.1]. It is a natural immunomodulator with a wide range of pharmacological activities, including anti-inflammatory, antiviral, analgesic, antioxidant, anaesthetic, antimicrobial, neuroprotective, anti-stress, anti-tubercular, anti-mutagenic, hypoglycemic and hypolipidemic actions[2-4]. Immunomodulators alter the immune system's reaction by increasing or decreasing serum antibody production. Eugenol is chief chemical constituent of *Ocimum* species, commonly known as Tulsi, which is often referred to as an Elixir of Life for

its healing powers[5]. It belongs to family *Lamiaceae* and has been used within Ayurveda for more than 3000 years.

Various Tulsi preparations are commonly available in the market amongst which Tulsi drops are popular for their immunomodulatory properties. Standardization of Tulsi preparations with Eugenol as a marker by HPTLC, HPLC and UV methods are reported in the literature [6-7]. The current research work has discussed estimation of Eugenol content in various marketed preparations using simple UV spectrophotometric method.

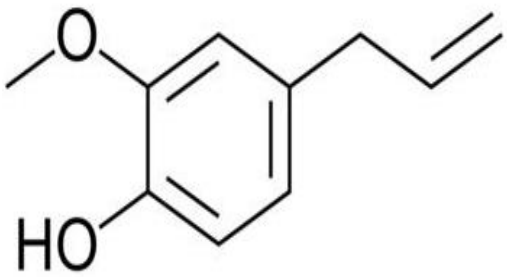

Fig. 1: Eugenol Chemical Structure

II. MATERIALS AND METHOD

The spectroscopic analysis was carried out using a UV spectrophotometer (Shimadzu UV 1800) in the range of 200-400 nm with 10 mm matched quartz cell. Standard Eugenol was purchased from S.D. Fine Chem Limited and methanol of analytical reagent (AR) grade was purchased from Research-Lab Fine Chem Industries, Mumbai, India.

A standard stock solution of 1000 µg mL^{-1} was prepared by accurately weighing 10 mg of Eugenol standard in a 10 mL volumetric flask and further diluting upto the mark with AR grade methanol. This stock solution was appropriately diluted to generate working standard solutions in the range of 5 to 30 µg mL^{-1}. Eugenol solution having concentration of 10 µg mL^{-1} was scanned in the range of 200-400 nm to determine its wavelength maxima further to be employed in UV spectrophotometric analysis. Absorbance value for all working standard solutions were recorded at selected wavelength and calibration curve was obtained by plotting concentration on X axis and absorbance on Y axis. Slope (m), intercept (c) and coefficient of correlation (R^2) were calculated for the linear equation ($y = mx + c$) by regression using methanol as a blank solution. Linear relationship was found to be in the concentration range of 5-30 µg mL^{-1} with $R^2 = 0.9961$ for Eugenol.

Tulsi drop preparations A, B and C were purchased from a pharmacy shop. 0.1 mL of each Tulsi drop preparation was appropriately diluted to generate test solution. Absorbance values for all the test solutions were recorded at selected wavelength and were used to determine Eugenol content in the three Tulsi drop preparation using linear equation obtained.

III. RESULTS

Wavelength of maximum absorption for Eugenol was found to be 282 nm. The linear regression ($y = 0.0235x + 0.0065$) equation was used to determine the amount of Eugenol present in selected Tulsi drop preparations. Eugenol content in Tulsi drop preparation A, B and C was found to be 0.243 % w/v, 0.639 % w/v and 3.058 % w/v respectively.

IV. CONCLUSION

The immunomodulatory effect of commercially available Tulsi drop preparations is well-known. These preparations contain various species of *Ocimum.* Eugenol is one of the active biomarkers of *Ocimum* species and is present in these preparations. The concentration of Eugenol in these preparations was estimated using a simple UV spectrophotometric technique. Eugenol was found in varying amounts in all of the formulations.

V. DECLARATIONS

- **ACKNOWLEDGEMENTS**
  Declared none.

- **CONFLICT OF INTEREST**
  The authors declare no conflict of interest, financial or otherwise.

VI. REFERENCE

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