



# Standardisation of quality parameters in essential oil of holy basil (*Ocimum sanctum* L.) for industrial acceptability

Debasis Sahoo and Basudeba Kar\*

Centre for Biotechnology (CBT), School of Pharmaceutical Sciences (SPS),  
Siksha 'O' Anusandhan deemed to be University, Bhubaneswar, Odisha, India, 751003

## Abstract

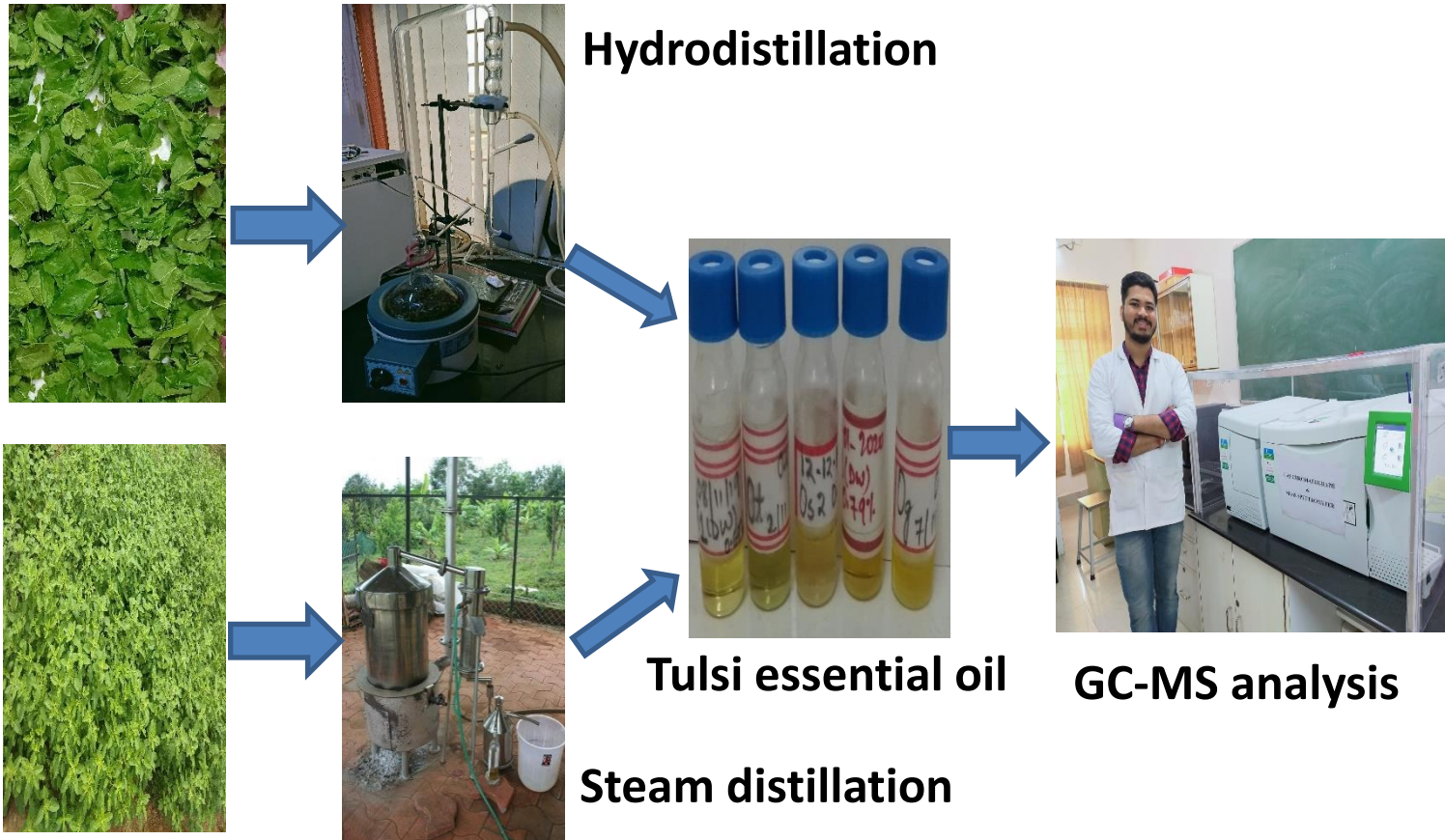
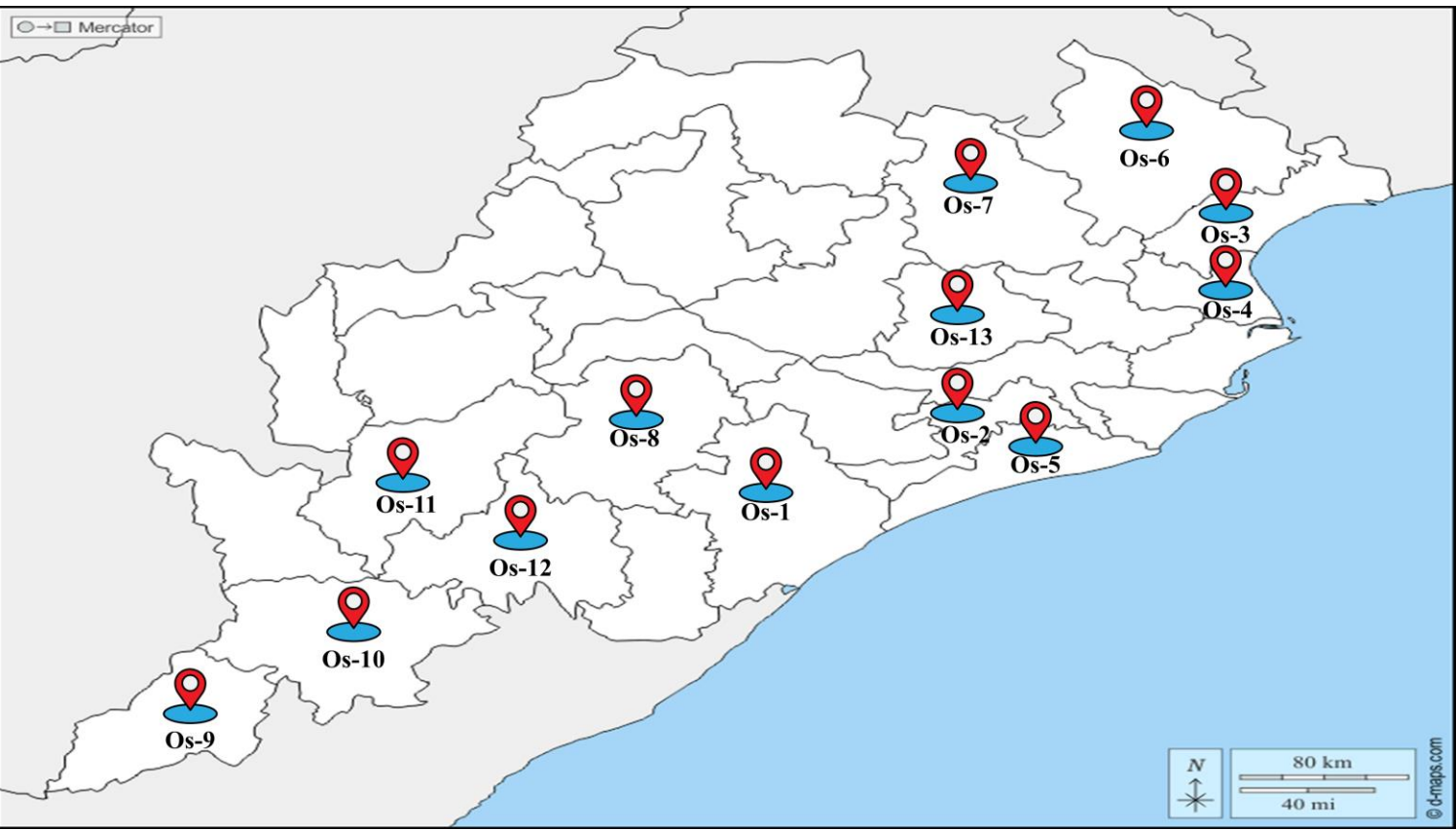
- ❖ Tulsi or Holy Basil is commonly known as the 'elixir of life', 'the queen of herbs', 'the incomparable one', etc.
- ❖ Due to its exuberant aroma and tremendous medicinal properties, its essential oil has set a high sensation in both pharma and aroma industries.
- ❖ The market of essential oil from medicinal and aromatic plants (MAPs) are highly agile and policy makers and researchers always advocate for their value addition to get higher economic returns.
- ❖ Therefore, standardizing concrete parameters associated with the quality of essential oil is need of the hour.

## Introduction

- *Ocimum sanctum* L., is one of the highly respected plant in India and thus popular as 'holy basil'.
- Its essential oil has myriad therapeutic activities and thus has a high demand in pharma industry.
- But in order to be a good essential oil, the quality of the oil matters a lot and it needs to be standardized by using scientific approach.
- So after reviewing the literatures and practically performing quality testing of tulsi essential oil extracted from different accessions, we have introduced quality parameters for industrial acceptability of tulsi essential oil.
- In verge of a better essential oil, a quality standard is proposed based on scientific theories, which needs to be passed by a batch of tulsi essential oil.

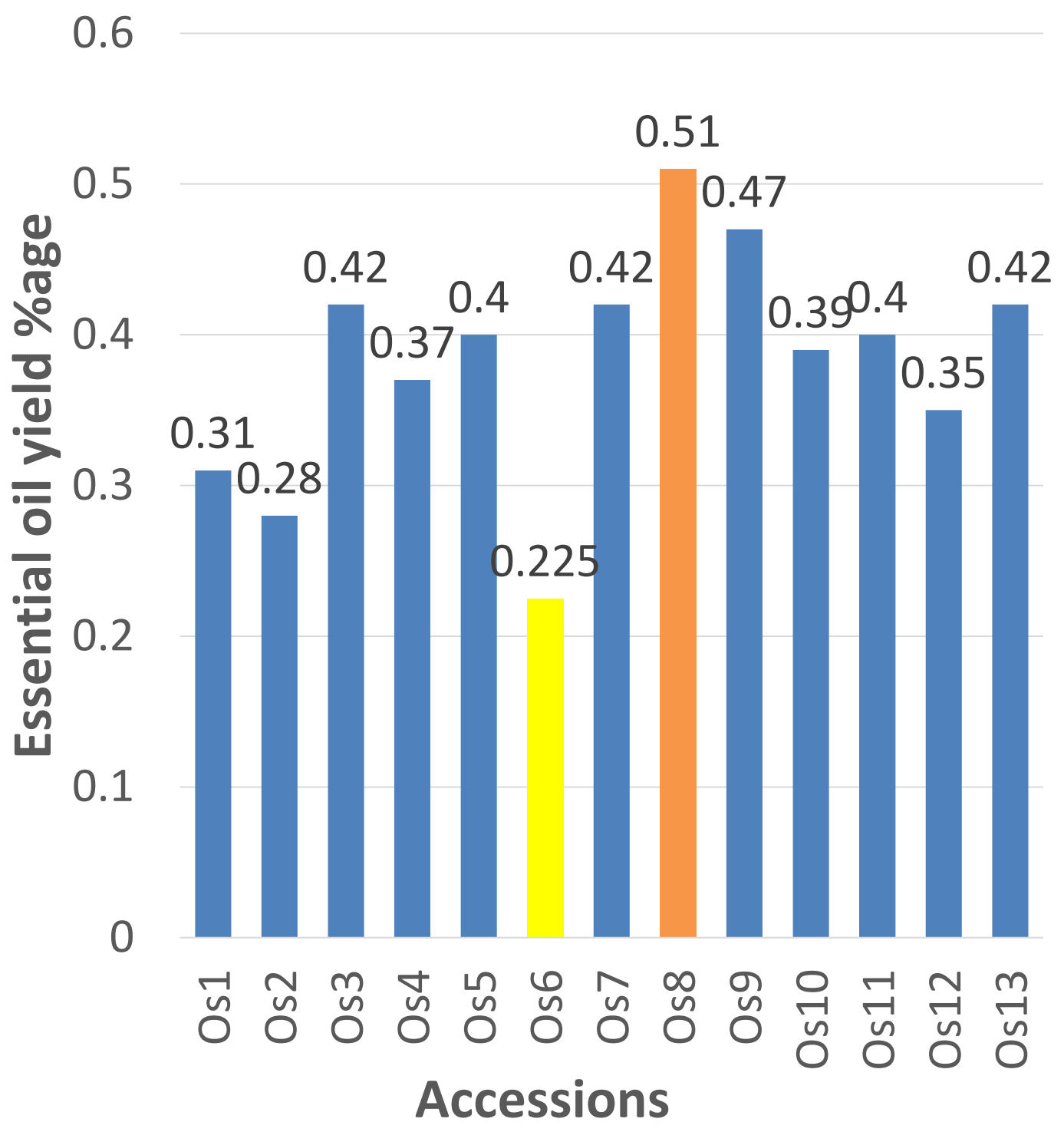
## Materials and methods

### Sample Collection



## Results & Discussion

### Essential oil yield of *O. sanctum* accessions



### Parameters for quality analysis of tulsi essential oil

#### Physical Parameters:-

Colour- Pale yellow

Odour- Clove like aroma

Appearance- Liquid in nature

Refractive Index- 1.490-1.535 @20°C

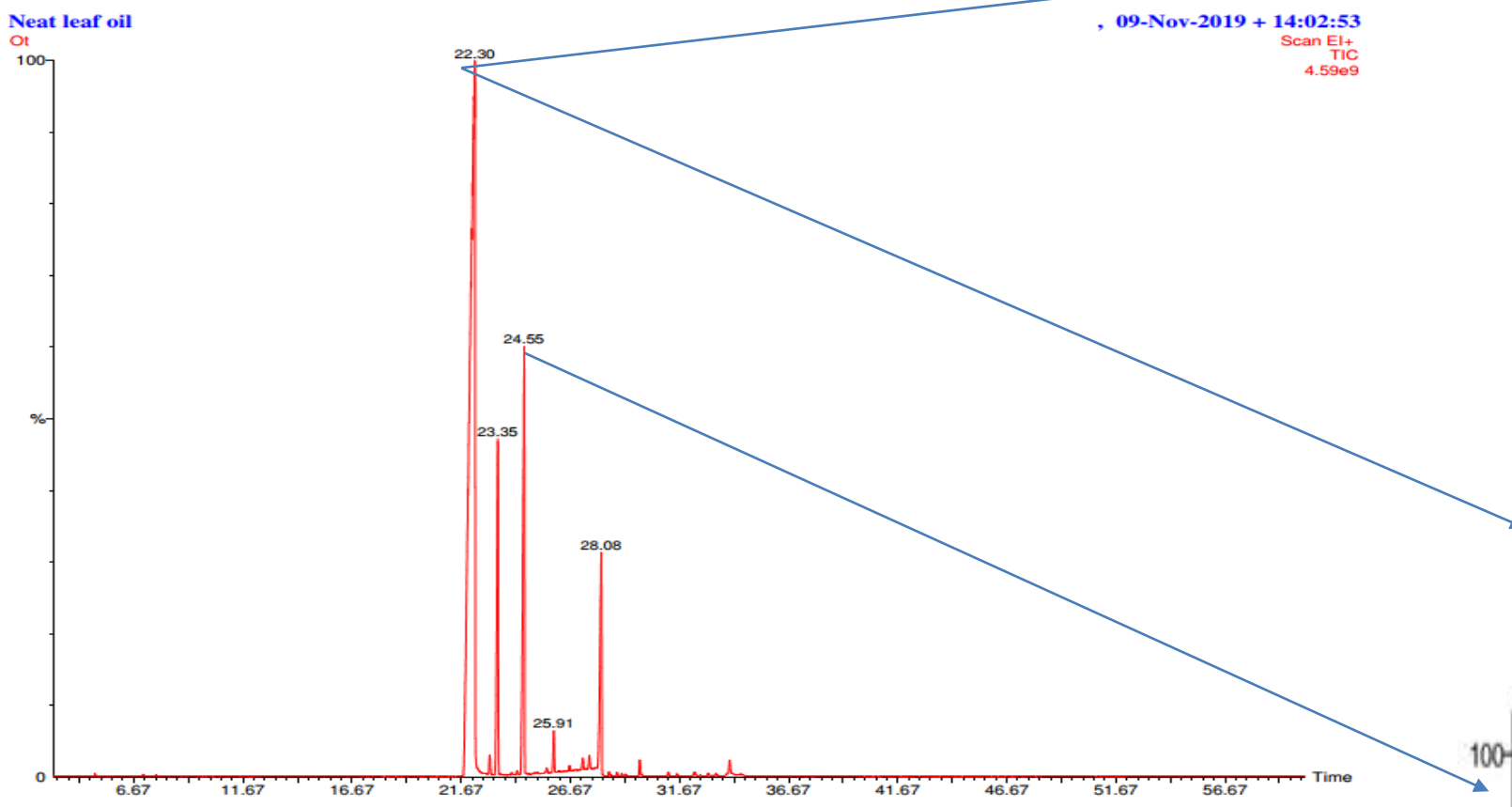
Specific gravity- 0.995-1.065 g/ml @20°C

Solubility- Soluble in alcohols and fixed oils, insoluble in water.

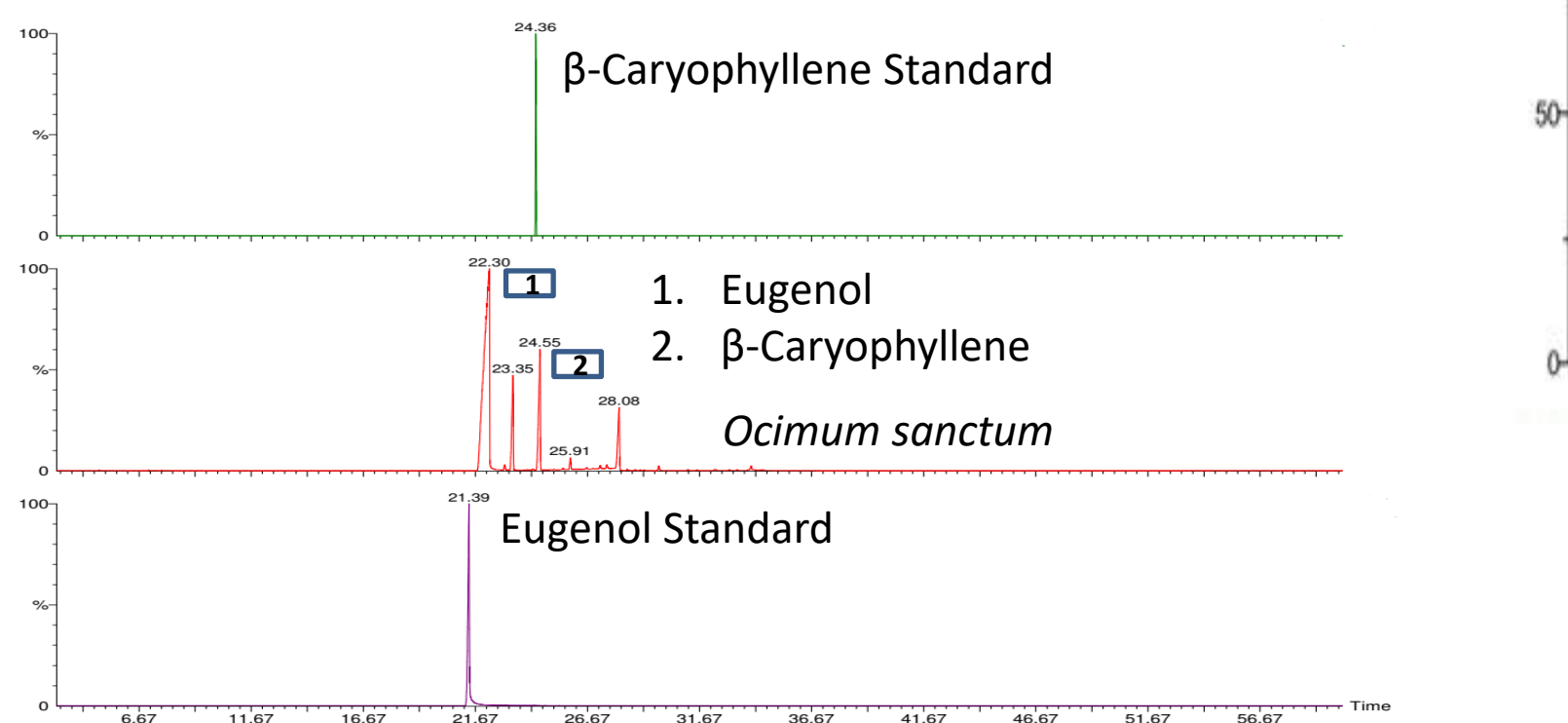
#### Chemical Parameters:-

GC-MS analysis- Eugenol ≥ 60%

### Chromatogram Of *Ocimum sanctum*

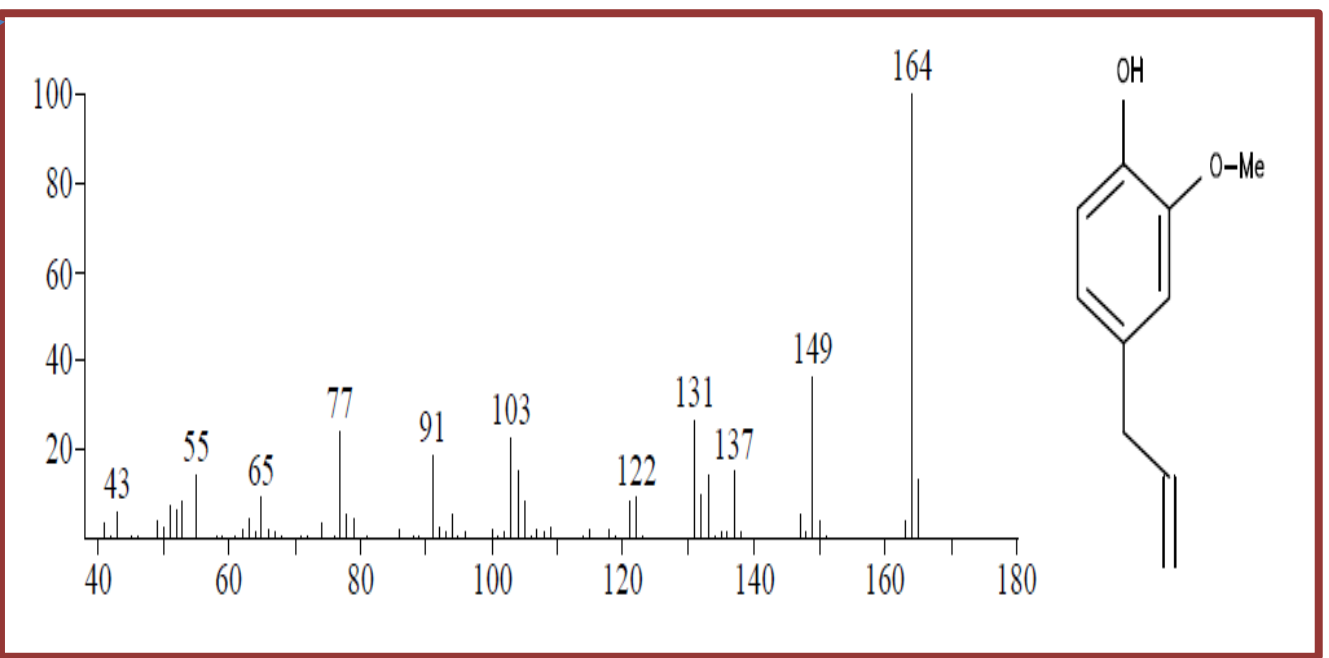


### Comparison between standard and analyte

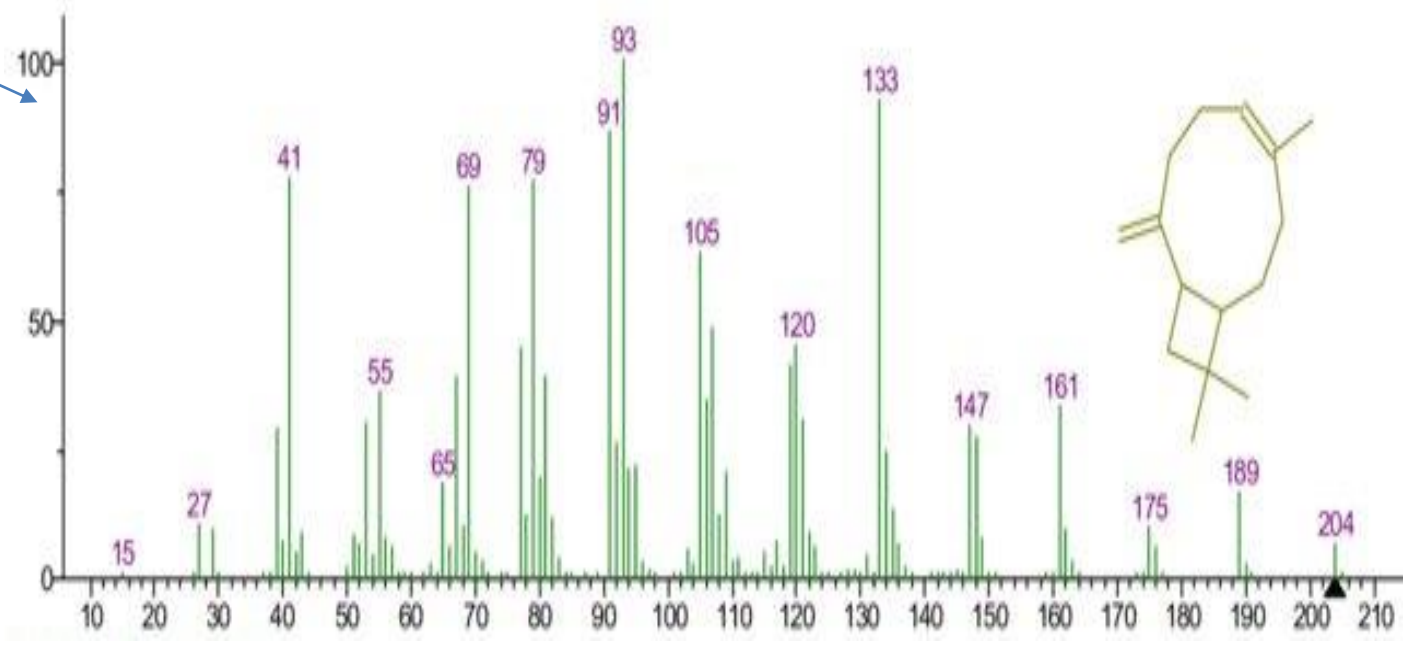


### Top three major constituents of *O. sanctum* essential oil identified from GC-MS analysis

Major Compounds	RI <sub>a</sub> (Cal.)	RI <sub>b</sub> (Adam's)	Os1	Os2	Os3	Os4	Os5	Os6	Os7	Os8	Os9	Os10	Os11	Os12	Os13
Area %age															
Eugenol	1355	1356	45.34	67.55	48.78	41.54	50.56	40.25	49.37	67.73	57.89	63.90	48.56	52.45	61.67
β-elemene	1386	1385	12.67	8.59	12.07	11.34	9.05	12.98	11.67	8.59	14.07	12.38	15.69	12.07	9.63
β-caryophyllene	1416	1417	19.63	12.08	17.67	14.08	13.69	17.03	9.90	12.07	15.69	14.68	16.55	13.49	11.97



### Spectrum of Eugenol



### Spectrum of β-Caryophyllene

## Conclusion

- Tulsi essential oil yield varies from 0.225- 0.51% in fresh weight basis and sample Os8 was found to be the highest oil yielding accession with Eugenol as the major constituent.
- As per the result, it may be concluded that, in order to be a quality essential oil, the percentage of eugenol should be ≥ 60% in a standardised GC method.
- In this same manner, quality parameters can be standardised in near future for all essential oils, in order to provide a concrete and reliable information for farmer's suitability as well as industrial acceptability towards a transparent environment.

## Acknowledgement

The authors are thankful to Centre for Biotechnology, Siksha 'O' Anusandhan deemed to be University for providing infrastructure and support. Further, we acknowledge DST (SEED/TITE/2018/22) for providing financial support.

## References

- ❑ Adams, R.P., 2007. Identification of essential oil components by gas chromatography/mass spectrometry (Vol. 456, pp. 544-545). Carol Stream: Allured publishing corporation.
- ❑ Saroj, T. and Krishna, A., 2017. A comparison of chemical composition and yield of essential oils from shoot system parts of *Ocimum sanctum* found in semi-arid region of Uttar Pradesh. *Agrotechnology*, 6(1000172.10), p.4172.