

GC-MS profiling, assessment of antioxidant, anti-bacterial activity of the essential oil of  
*Cestrum nocturnum* and Formulation & Evaluation of Herbal ToothpasteNishtha<sup>1\*</sup> & Narayan Singh<sup>2</sup><sup>1</sup>Department of Biosciences, Chandigarh University, Gharuan, Mohali, Punjab, India-140413<sup>2</sup>Department of Botany, Sri Sai University, Palampur, Himachal Pradesh, India-176081

## INTRODUCTION &amp; AIM

The whole plant of *Cestrum nocturnum* is widely used in traditional medicine to cure pain, burns, red gums, swelling, infections, etc., according to phytochemical analysis of the crude methanolic extract. It belongs to the Solanaceae family and is commonly known as “night blooming jasmine” or “Raat ki Rani” (Shaista & Amrita., 2016). It is an evergreen woody shrub with slender branches and multi-branch heavily foliated. It is grown in sub-tropical regions and requires moist soil and sandy soil. It also produces essential aromatic oil which is used in aroma therapy to reduce anxiety and stress. Sharif *et al.*, 2010 studied that the analysis of the *In-vitro* antioxidant activity and chemical make-up of *Cestrum nocturnum* L. essential oil and numerous organic derivatives was the goal of this work. Essential oils possess various medicinal aspects and same has been investigated in the current research work. The main objective of the research was to extract essential oil (EO) from this plant and analyze its various properties from a medicinal point of view. GC-MS profiling, assessment of antioxidant, anti-bacterial activity of the essential oil of *Cestrum nocturnum* and Formulation & Evaluation of Herbal Toothpaste were conducted for beneficial aspects as a novel plant.

## METHOD

The essential oil was extracted through hydrodistillation process using Clevenger's apparatus (Ferhat *et al.*, 2006).

## Biological activities of Essential oil

- DPPH radical scavenging profile (Sharif M *et al.*, 2010).
- Anti-bacterial activity Rokade *et al.*, (2018) against *Proteus mirabilis*, *Shigella flexneri*, *Klebsiella pneumoniae*, and *Clostridium botulinum*. Gentamycin (Positive control).

## Preparation and Evaluation of Herbal toothpaste

The natural ingredient Eos, *Cestrum nocturnum* leaves, flax seed gel, edible gum, and a trace amount of synthetic substances like calcium carbonate, and SLS detergent were combined to formulate the herbal toothpaste.

Anti-bacterial activity of herbal toothpaste (Kirby Bauer disc diffusion method) against *Porphyromonas gingivalis*

pH. Determination- Deshmukh *et al.*, 2017,

Moisture Content-(AOAC) : Gautam *et al.*, 2020,

Stability: Narayanasamy *et al.*, 2023

Anti-microbial susceptibility test: Deshmukh *et al.*, 2017)

## CONCLUSION

EOs of *Cestrum nocturnum* has the most efficient phytoactive component which has shown anti-bacterial activity against harmful microbes. The study came to the conclusion that herbal toothpaste is safer with fewer adverse effects than synthetic preparation and is more acceptable in dental research. The toothpaste's formulation has antimicrobial activity against pathogens and is capable of maintaining oral and dental hygiene.

## FUTURE WORK / REFERENCES

Essential oils from the plant promise a good perspective future. The development of herbal toothpaste offers significant potential for the study of natural cures and public dental health in the future.

## RESULTS &amp; DISCUSSION

Table 1: Chemical Composition of essential oil obtained from *Cestrum nocturnum*.

Component <sup>a</sup>	RI <sup>b</sup> <sub>cal</sub>	RI <sup>b</sup> <sub>lit</sub>	Percentage <sup>c</sup>
Benzacetaldehyde	1048	1042	0.61
p-Cresol	1079	1076	1.13
Linalool	1100	1100	2.63
cis-β-terpineol	1153	1144	0.35
Benzyl acetate	1164	1162	11.61
Umbellulone	1171	1171	0.32
Terpinen-4-ol	1183	1180	0.21
α-Terpineol	1196	1192	31.52
γ-terpineol	1201	1199	9.78
Benzene, (2,2-dimethoxyethyl)-	1216		1.44
Hydroxycitronellal	1287	1288	2.66
α-Terpinyl acetate	1348	1352	2.45
1-(2-Vinyl-Phenyl)-Ethanone	1359		0.53
E-Caryophyllene	1422	1422	0.41
Benzoic acid, 2-hydroxy-, 3-methylbutyl ester	1536	1542	0.39
Diethyl Phthalate	1587	1585	31.88
Cinnamaldehyde, α-pentyl-	1646	1645	1.24
Benzyl Benzoate	1782	1785	0.29
Total Identified Components			97.48
Oxygenated monoterpenes			49.92
Sesquiterpenes hydrocarbons			0.41
Other hydrocarbons			47.15

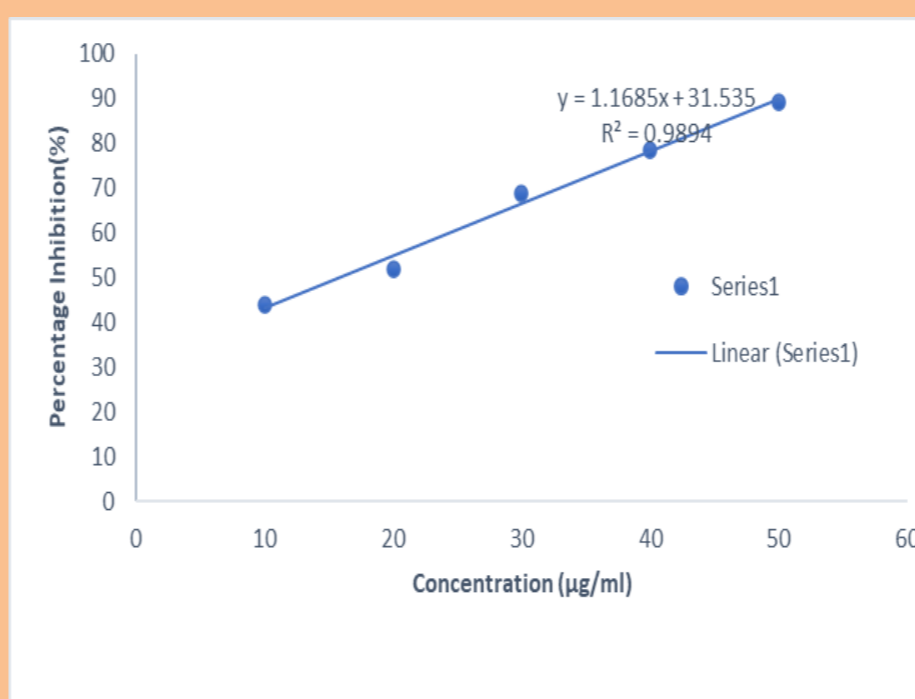
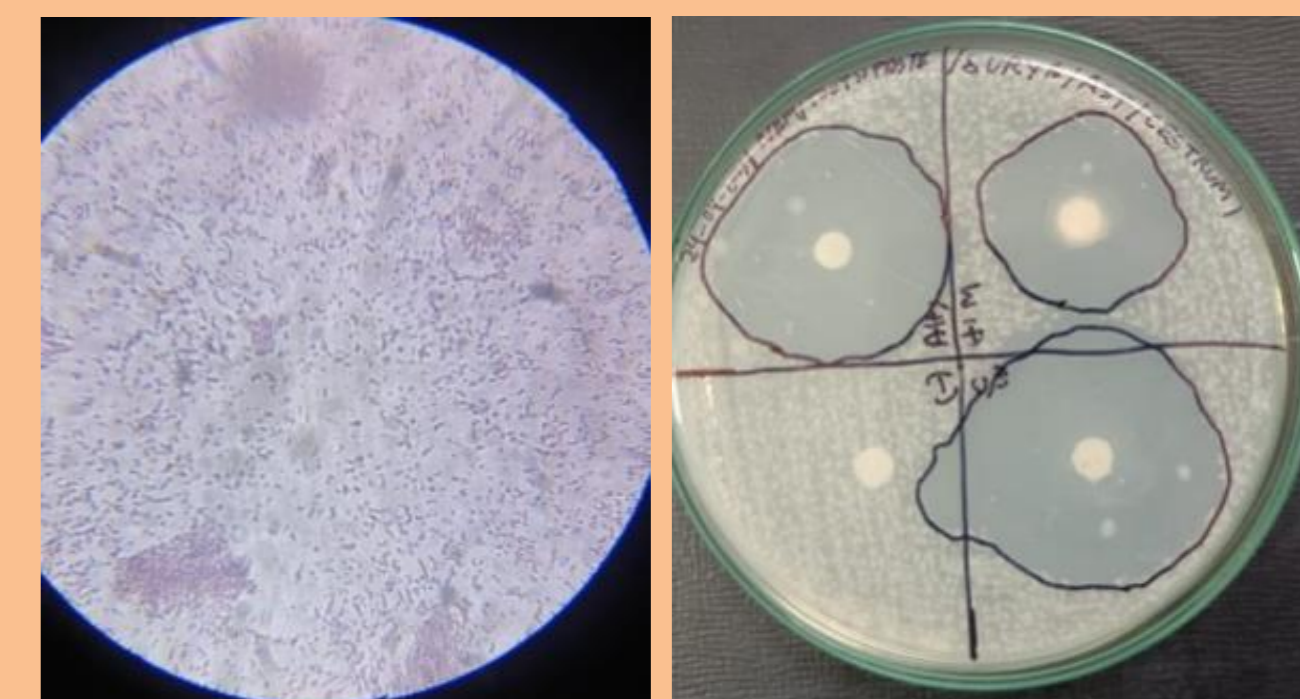
Figure 1. DPPH scavenging activity of Extracted essential oil of *Cestrum nocturnum*

Figure 2. Petri plates showing Zone of inhibition.

Table 2- Zone of inhibition of essential oil of *Cestrum nocturnum*

Sample	Concentration (µg/ml)	Zone of Inhibition (mm)				
		<i>Proteus mirabilis</i>	<i>Shigella flexneri</i>	<i>Klebsiella pneumoniae</i>	<i>Clostridium botulinum</i>	Gentamycin (30µg/ml)
Essential oil	6.25	5.2 ± 0.10	6.9 ± 0.2	7.2 ± 0.13	9.5 ± 0.17	35 ± 0.2
	12.5	10.0 ± 0.20	10.0 ± 0.15	12.5 ± 0.14	15.2 ± 0.12	40 ± 0.1
	25	16.1 ± 0.12	15.4 ± 0.23	17.0 ± 0.21	21.2 ± 0.2	32 ± 0.2
	50	19.8 ± 0.25	17.6 ± 0.16	20.5 ± 0.15	28.6 ± 0.2	33 ± 0.14
	100	24.3 ± 0.15	30.8 ± 0.2	33.9 ± 0.25	38.1 ± 0.15	41 ± 0.1



Figure 3. Formulated herbal toothpaste

Table 4. Stability check at various temperatures

Parameters	Observation at 4°C	Observation at 25-30°C	Observation at 65°C
Weight	0.62	1.58	0.35
Color	Dark green	Avocado green	Brownish green
Texture	Slightly hard	Rough	Dried
Microbial load	Nil	nil	Ni
fragrance	Blueberry	blueberry	blueberry

Table 3. Stability check at various temperatures

S. no	Parameter	Observation
1	pH	7.22
2	Moisture content	96%
3	Homogeneity	Uniform
4	Spreadability	7cm
5	Foamability	10cm
6	Abrasiveness	Good
7	Extrudability	85.05

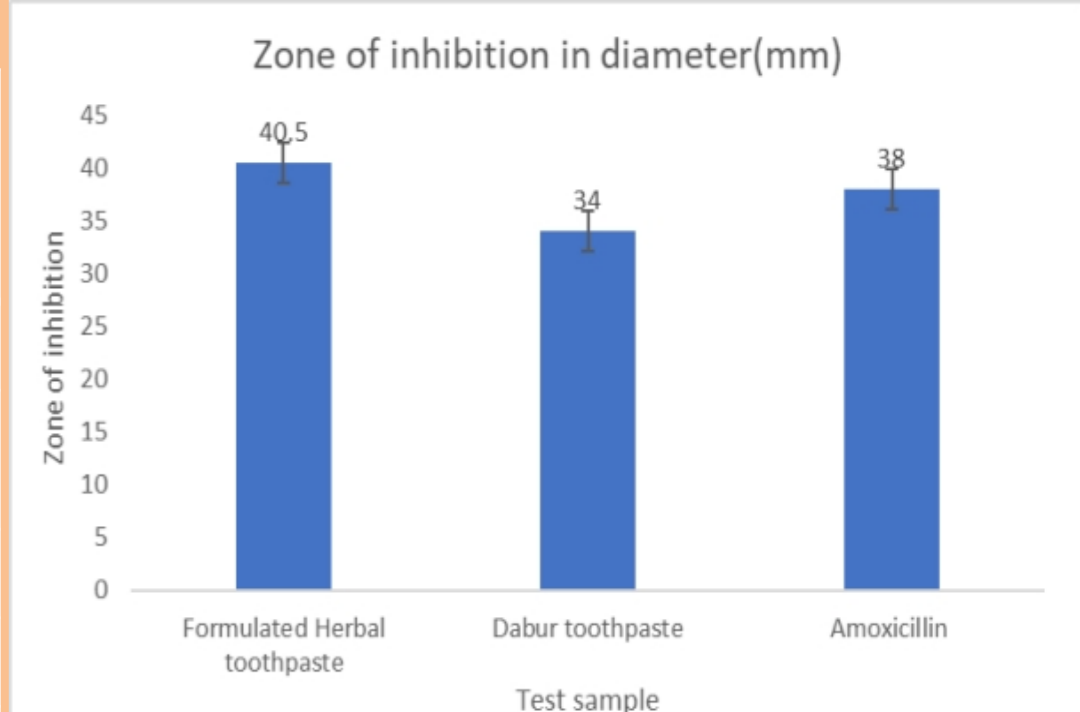


Figure 4. Graphical representation of zone of inhibition for formulated toothpaste