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Comparing the *Ocimum sanctum* Glycerol in different drug and vehicle ratio by FTIR and UV- Visible spectrophotometer

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Abstract
Background: The research work preparing the Homoeopathic Medicated glycerol with the *Ocimum sentum*- Q, quality control done by UV- Visible spectrophotometer and FTIR.
Methodology: The glycerol were prepared with the help of Standard *Ocimum S* in Drug in the definite proportion of vehicle as (1:1), (1:4), (1:9) glycerol without heating. The sample were divided into three main categories like Standard sample, Prepared sample and vehicle control sample. While passing under UV- Visible spectrophotometer take (3- 4) ml samples in a sterile, clean cuvette from each groups and Placed one drop from each group over the lens of FTIR (Fourier transform infrared spectroscopy).
Results: The Maximum absorbance value of *Ocimum Sanctum* glycerol in (1:9) is 0.257 at 498.00 nm, *Ocimum Sanctum* glycerol in (1:4) is 0.264 at 608.00 nm, *Ocimum Santum* glycerol in (1:1) is 0.415 at 608.00 nm, *Ocimum Sanctum* Q is 0.618 at 607.00 nm. Whereas in FTIR revels the fragrant nitro bunch is an exemption (at different wavelength)
Conclusion: *Ocimum* sanctum L. the critical presence of fragrant nitro bunch is an exemption. Such utilization of FTIR and UV-VIS ought to give the open door to comprehend the polyphenolic designs and phytochemicals pieces of natural tests to enhance regular meds Homoeopathic medicated glycerol of *Ocimum sanctum* gives better results in Drug and Vehicle ratio i.e (1:4) as compared to Drug and vehicle ratio i.e (1:4) (1:9).

Keywords: *Ocimum sanctum*, Glycerol, UV- VIS, FTIR

Introduction
Glycerol (1,2,3-propanetriol or glycerine), a natural particle disengaged by warming fats within the sight of debris (to produce cleanser) as soon as 2800 BC [1], is a modern compound with many applications (Figure 1). Since the last part of the 1940s, and following the revelation of manufactured surfactants, glycerol has been created from epichlorohydrin acquired from propylene (and accordingly from fossil oil) as huge compound organizations determined a glycerol deficiency and started its manufactured production [2]. Today, nonetheless, glycerol plants are shutting and others are opening that utilization glycerol as an unrefined substance (counting for the development of epichlorohydrin itself) [3] as a consequence of the huge overflow of glycerol that is framed as a side-effect (10% in weight) in assembling biodiesel fuel by transesterification of seed oils with methanol. To delineate the pattern, the worldwide glycerol market was 800 000 tons in 2005 with 400 000 tons from biodiesel in contrast with 60 000 tons just in 2001 [4]. Over the course of the past 10 years, biodiesel has arisen as a reasonable fuel and as a fossil diesel added substance to supplant sulfur, whose content is dynamically brought down as indicated by more tight ecological regulation. Until the ongoing expansions in oil costs, high creation costs made biofuels unrewarding without government sponsorships. Nonetheless, the rising creation of biodiesel isn't misleadingly maintained and is anticipated to spread and increment, as biodiesel gives adequate benefits to justify subsidy [5]. Other than the conclusion of creation plants, industry responded to this present circumstance by beginning examination to track down new uses of glycerol as a minimal expense feedstock for utilitarian subsidiaries either for mass utilization, for example, added substances for concrete [6], or on the other hand as a forerunner of esteemed fine synthetic substances.

Ocimum sanctum

The restorative plants are generally utilized by the conventional clinical experts for relieving different illnesses in their everyday practice. In customary frameworks of medication, various parts (leaves, stem, blossom, root, seeds and, surprisingly, entire plant) of Ocimum sanctum Linn (known as Tulsi in Hindi), a little spice seen all through India, have been suggested for the treatment of bronchitis, bronchial asthma, intestinal sickness, loose bowels, diarrhea, skin illnesses, joint inflammation, excruciating eye sicknesses, ongoing fever, bug nibble and so forth. The Ocimum sanctum L. has additionally been recommended to have antifertility, anticancer, anti-diabetic, antifungal, antimicrobial, hepatoprotective, cardioprotective, antiemetic, antispasmodic, pain relieving, adaptogenic and diaphoretic activities [7].

Materials & Methodology

Type of study: Analytical study

Site of study: CR4D (Centre of Research for development Parul University).

Duration: 2 Week

Tools: UV-VIS (spectroscopy) and FTIR (Fourier Transform infrared spectroscopy)

Materials

Beaker (100 ml capacity), pipette 10 ml capacity, Glass rod, measuring cylinder (100 ml capacity).

Medicinal products

Ocimum sanctum- Q was purchased from GMP Certified Pharmaceutical Pvt. Ltd. (SBL), Glycerine Purchase from Chemdyes Corporation Laboratory chemicals, Industrial chemicals, solvents, metallurfy chemicals, food preservatives, filter papers, safety Goods.

Vehicle: Glycerol

Preparation

Through this research work preparing glycerol with the help of *Ocimum sanctum*- Q in definite ratio like (1:1), (1:4) and (1:9). Afterwards divide the whole preparation into three main categories like; Standard sample, Main sample, Control sample.

Standard sample: *Ocimum sanctum*- Q

Main sample

Ocimum sanctum glycerol (1:1).
Ocium sanctum glycerol (1:4).
Ocimum sanctum glycerol (1:9).

Control sample: Glycerine

Steps to follow

Sterilization: Cleansing of all the equipment's by strong alcohol with drying by Hot air oven for 15 minutes.

Measurement

Take appropriate amount of Medicine and vehicle with pipette (10 ml capacity) in the clean, dry beaker. Like; Medicine.

- ***Thuja occidentalis* glycerol in (1:1)**

Ocimum sanctum Q- 5 ml
Glycerol- 5 ml

- ***Thuja occidentalis* glycerol in (1:4)**

Ocimum sanctum Q- 5 ml
Glycerol- 20 ml.

- ***Thuja occidentalis* glycerol in (1:9)**

Ocimum sanctum Q- 2 ml
Glycerol-18 ml

Mixing

Apply gentle mixing the given formulation by glass rod until and unless if homogeneous mixture formed.

Filling

The prepared formulation of Homoeopathic medicated glycerol should be filled in the hard glass bottle. Which should be clean, sterile and non-coloured bottles.

Storage

The given formulation should be preserved into the hard glass bottle, which should be away from dampness, sunlight, strong smelling bottles and cool, dark place.

Labelling

Paste the label on the bottom of hard glass bottle as;

a. Name of formulation
b. Name of Medicine with quantity
c. Name of vehicle with quantity
d. Drug and vehicle ratio
e. Manufacture Date
f. Manufacturer By
g. Indications
h. Storage

Analysis

The prepared formulation of *Ocimum sanctum* glycerol in all ratio were categorized into three main groups. Such as; Standard group, Main sample group and Control group. Around (3-4) ml of samples from each group were placed in the sterile, dry cuvette in UV- VIS Chamber.

Results

The Maximum absorbance value of *Ocimum Sanctum* glycerol in (1:9) is 0.257 at 498.00 nm, *Ocimum Sanctum* glycerol in (1:4) is 0.264 at 608.00 nm, *Ocimum Santcum* glycerol in (1:1) is 0.415 at 608.00 nm, *Ocimum Sanctum* Q is 0.618 at 607.00 nm. Whereas in FTIR.

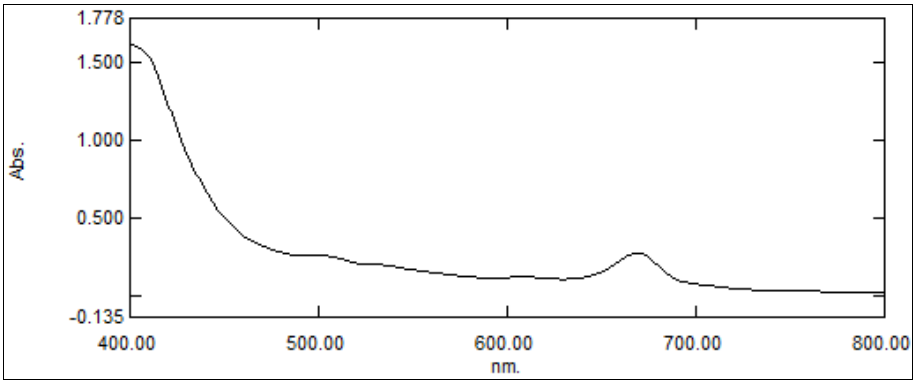

Fig 1: Absorbance of *Ocimum sanctum* glycerol (1:9)

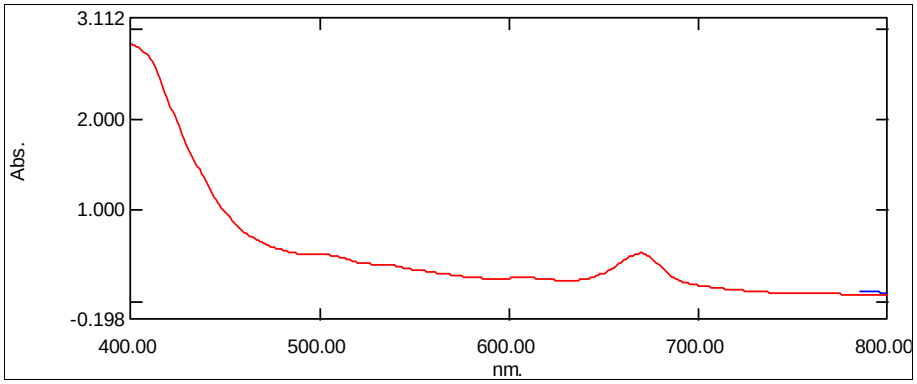

Fig 2: Absorbance of *Ocimum sanctum* glycerol (1:4)

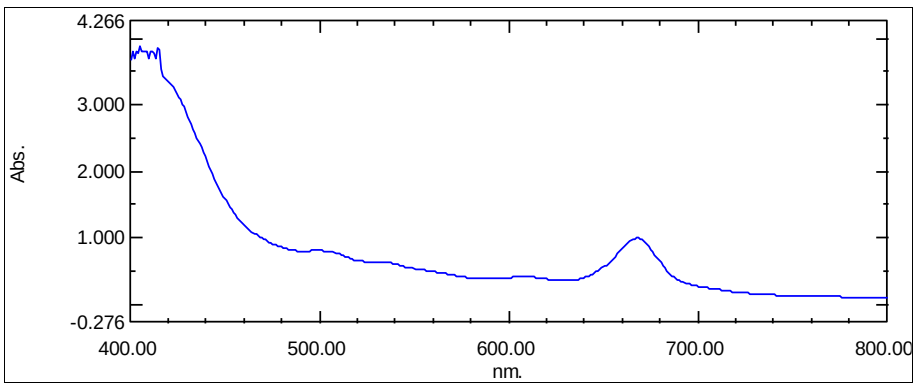

Fig 3: Absorbance of *Ocimum sanctum* glycerol (1:1)

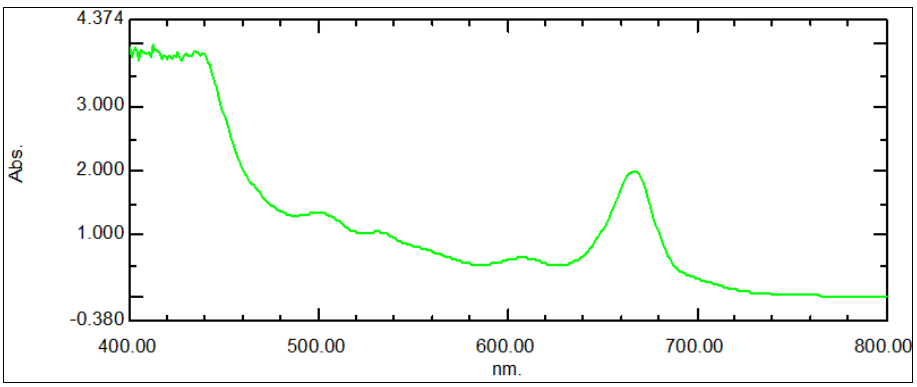

Fig 4: Absorbance of *Ocimum sanctum* Q

FTIR of *Ocimum sanctum*

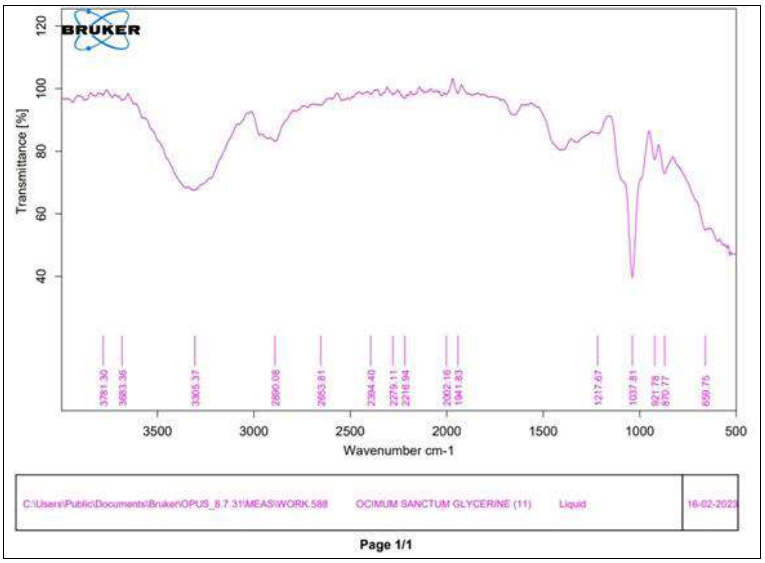

Fig 5: FTIR of *Ocimum sanctum* Glycerol (1:1)

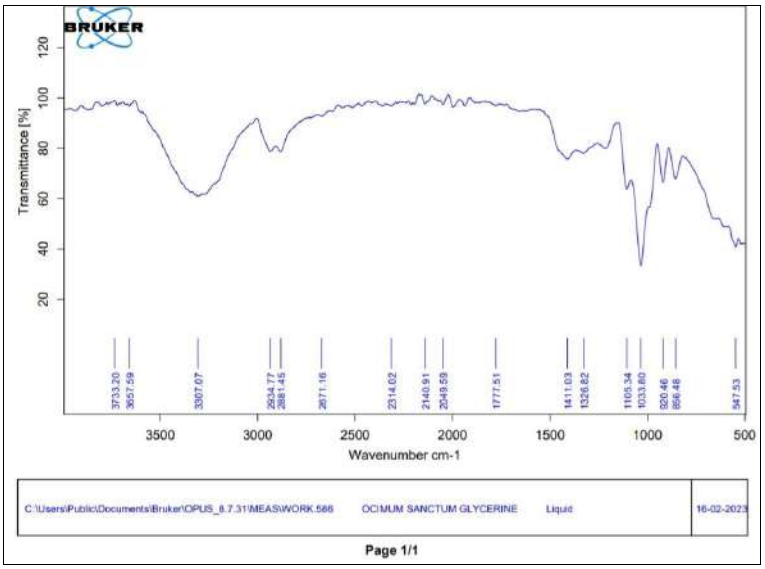

Fig 6: FTIR of *Ocimum sanctum* Glycerol (1:9)

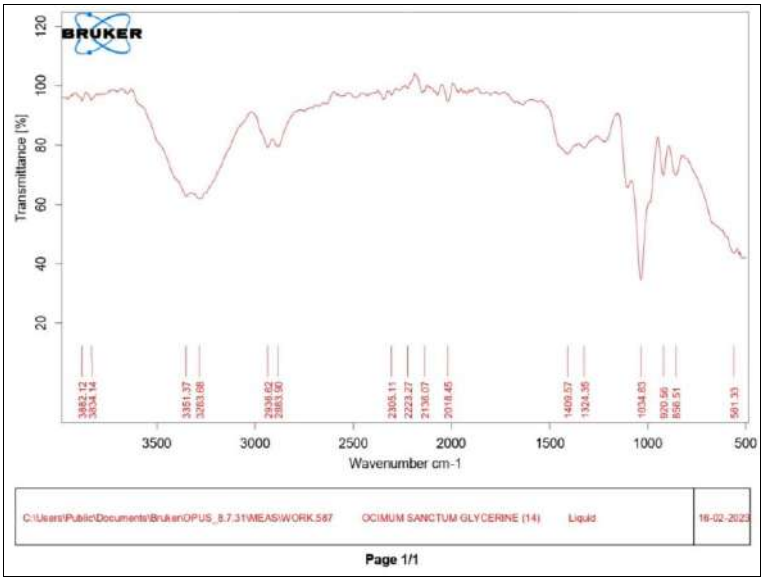

Fig 6: FTIR of *Ocimum sanctum* Glycerol (1:4)

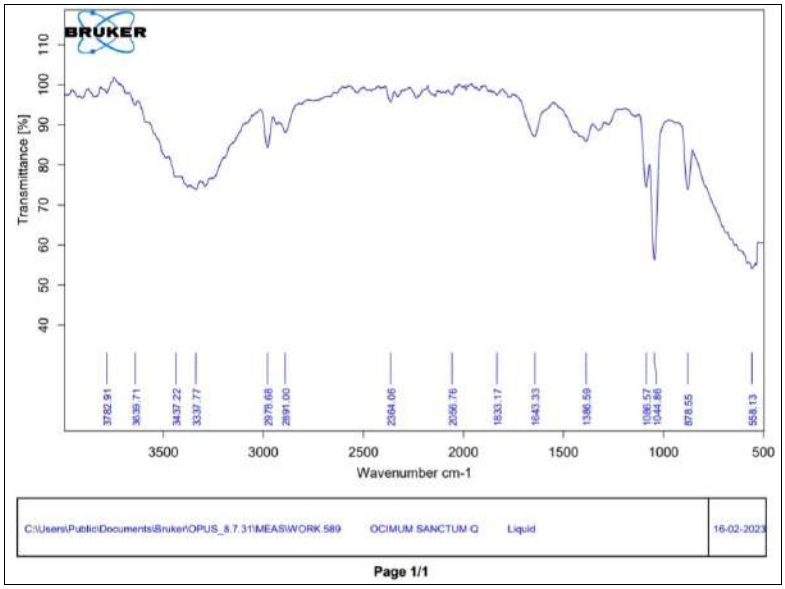

Fig 7: FTIR of *Ocimum sanctum* Q

Table 1: Maximum Transmission of *Ocimum sanctum* Q (1:1)

FTIR peak positions (cm–1)	Tentative assignment
3305.37	O–H and N–H stretching
2890.08	asymmetric C–H stretching of CH3 of alkane group
2653.81	asymmetric C–H stretching of CH2 of alkane group
2851	symmetric C–H stretching in CH2 of the alkane group
1731	C=O stretching of aromatic ester
1622	C=O stretching vibration of derivative amide
1544	N O asymmetric stretching of NO_2 aromatic group
1319	N O symmetric stretching of NO_2 aromatic group
1217.67	C–O stretching in the aromatic acetate
1037.81	C–O stretching vibration of primary alcohols
921.78	C–O stretching vibration of secondary alcohols
659.75	bending vibration mode of O–N–O of the NO_2 group

Table 2: Maximum Transmission of *Ocimum sanctum* Q (1:4)

FTIR peak positions (cm^{-1})	Tentative assignment
3351.37	O–H and N–H stretching
3283.68	asymmetric C–H stretching of CH3 of alkane group
2936.26	asymmetric C–H stretching of CH2 of alkane group
2883.90	symmetric C–H stretching in CH2 of the alkane group
1731	C=O stretching of aromatic ester
1622	C=O stretching vibration of derivative amide
1544	N O asymmetric stretching of NO_2 aromatic group
1319	N O symmetric stretching of NO_2 aromatic group
1264	C–O stretching in the aromatic acetate
1066	C–O stretching vibration of primary alcohols
1034.83	C–O stretching vibration of secondary alcohols
856.51	bending vibration mode of O–N–O of the NO_2 group

Table 3: Maximum Transmission of *Ocimum sanctum* Q (1:9)

FTIR peak positions (cm^{-1})	Tentative assignment
3307.07	O–H and N–H stretching
2934.77	asymmetric C–H stretching of CH3 of alkane group
2881.45	asymmetric C–H stretching of CH2 of alkane group
2671.16	symmetric C–H stretching in CH2 of the alkane group
1777.51	C=O stretching of aromatic ester
1622	C=O stretching vibration of derivative amide
1544	N O asymmetric stretching of NO_2 aromatic group
1319	N O symmetric stretching of NO_2 aromatic group
1326.82	C–O stretching in the aromatic acetate
1105.34	C–O stretching vibration of primary alcohols
1033.80	C–O stretching vibration of secondary alcohols
783	bending vibration mode of O–N–O of the NO_2 group

Table 4: Maximum Transmission of *Ocimum sanctum* Q

FTIR peak positions (cm–1)	Tentative assignment
3437.22	O–H and N–H stretching
2978.68	asymmetric C–H stretching of CH3 of alkane group
2891.00	asymmetric C–H stretching of CH2 of alkane group
2851	symmetric C–H stretching in CH2 of the alkane group
1643.33	C=O stretching of aromatic ester
1622	C=O stretching vibration of derivative amide
1544	N O asymmetric stretching of NO_2 aromatic group
1319	N O symmetric stretching of NO_2 aromatic group
1264	C–O stretching in the aromatic acetate
1066	C–O stretching vibration of primary alcohols
1032	C–O stretching vibration of secondary alcohols
878.55	bending vibration mode of O–N–O of the NO_2 group

Conflict of Interest
No such

Conclusion
Homoeopathic medicated glycerol *of Ocimum sanctum* gives better results in Drug and Vehicle ratio i.e (1:4) as compared to Drug and vehicle ratio i.e (1:4) (1:9).

Acknowledgement
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References
1. Hunt JA. Pharm. J. 1999;263:985.
2. See the recent report from Frost & Sullivan: "R&D Creating New Avenues for Glycerol" (Aug 4, 2006), available online at https://www.frost.com/prod/servlet/market-insight-top.pag?docid = 77264824.
3. The US agribusiness company Archer Daniels Midland recently announced plans to make propylene glycol from glycerol instead of propylene oxide. Dow Chemical closed its glycerol plant in Texas early this year when Procter & Gamble Chemicals shut down a natural glycerol refinery in England. See: a) M. McCoy, Chem. Eng. News 2006, 84(6), 7; b) M. McCoy, Chem. Eng. News. 2006;84(2):32.
4. As of July 2006, pure glycerol was sold at 600–800 E/ton while crude glycerol of high quality obtained by biodiesel production was sold at 600–700 E/ton with glycerol currently priced at around 850 USD/ton. At prices approaching 770 USD/ton, glycerol becomes a significant platform chemical. If, as anticipated, biodiesel production grows to 3.23 million tons worldwide, an extra 323 000 tons of glycerol would reach the market thus rendering glycerol a readily available commodity.
5. Biodiesel yields a net energy balance ratio of 1.93 (i.e. 93% more energy produced than the energy invested in its production, whereas ethanol yields only 25% more energy): J. Hill, E. Nelson, D. Tilman, S. Polasky, D. Tiffany, Proc. Natl. Acad. Sci. USA. 2006;103:11, 206.
6. Crude glycerol from biodiesel production is an excellent additive for concrete, enhancing its resistance to compression and grinding and lowering its setting time. Mechanical tests carried out on "clinker" (the cement precursor which is mixed with gypsum to yield the concrete) samples doped with crude glycerol show, in all cases, that raw glycerol imparts better mechanical and chemical properties compared to those samples doped with commercial additives, including pure glycerol. Tests on an industrial scale using trucks of crude glycerol confirmed the results on the laboratory scale, and commercialization of cement added with biodiesel glycerol started in late 2006. M. Rossi, M. Pagliaro.
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