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## Compare formulation of glycerol prepared by *Hypericum perforatum-Q* and *Azadirachta indica-Q* by FTIR and UV-visible spectrophotometer

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 Chakraborty and Tejaskumar bhatt**

### Abstract

**Background:** Through this research work comparing the formulation prepared with the homoeopathic medicine *Hypericum perforatum-Q* and *Azadirachta indica-Q* separately under the quality assesment done by UV- visible spectrophotometer and FTIR (Fourier Transform Infrared Spectroscopy).

**Methodology:** For the preparation of formulation take a glycerol as a common vehicle for the preparation of both the homoeopathic mother tincture i.e *Hypericum perforatum-Q* and *Azadirachta indica-Q* in the drug and vehicle ratio of (1:9). Afterwards passing this samples under UV- Visible spectrophotometer and FTIR (Fourier transform infrared spectroscopy) for qualitative analysis of dug substances in such formulations.

**Results:** Analysis done by UV- Visible spectrophotometer suggest absorbance value of *Azadirachta indica-Q* is 0.989  $\lambda_{max}$  at 602.00 nm, *Azadirachta indica* glycerol is 0.997  $\lambda_{max}$  at 419 nm, *Hypericum perforatum-Q* is 0.996  $\lambda_{max}$  at 651.00 nm, *Hypericum perforatum* glycerol is 0.994  $\lambda_{max}$  at 457 nm, whereas analysis under FTIR (Fourier transform infrared spectroscopy) suggest maximum transmission of *Azadirachta indica-Q* is at 1044.58  $cm^{-1}$ , *Azadirachta indica* glycerol is at 1033.29  $cm^{-1}$ , *Hypericum perforatum-Q* at 1044.76  $cm^{-1}$ , *Hypericum perforatum* glycerol is at 1033.50  $cm^{-1}$ .

**Keywords:** Glycerol, azadirachta Q, hypericum Q, UV- VIS, FTIR

### Introduction

Glycerol (1, 2, 3-propanetriol or glycerine), a natural atom disconnected by warming fats within the sight of debris (to produce cleanser) as soon as 2800 BC, [1] is a modern compound with several applications (Figure 1). Since the last part of the 1940s, and following the revelation of engineered surfactants, glycerol has been created from epichlorohydrin got from propylene (and in this manner from fossil oil) as enormous compound organizations estimated a glycerol deficiency and started its engineered production [2]. Today, be that as it may, 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 by and large continuously brought down as indicated by more tight ecological regulation. Until the ongoing expansions in oil costs, high creation costs made biofuels unbeneficial without government endowments. Be that as it may, 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 exploration to track down new uses of glycerol as a minimal expense feedstock for useful 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.

### *Azadirachta Indica*

Neem (*Azadirachta indica* A. Juss) is maybe the most valuable customary therapeutic plant in

India. Each part of the neem tree has some restorative property and is consequently monetarily exploitable. During the last five many years, aside from the science of the neem compounds, extensive advancement has been accomplished as to organic movement and therapeutic uses of neem. It is currently viewed as an important wellspring of exceptional normal items for improvement of meds against different infections and furthermore for the improvement of modern items. This audit gives an elevated perspective basically on the natural exercises of a portion of the neem intensifies confined, pharmacological activities of the neem separates, clinical examinations also, conceivable restorative utilizations of neem along with their security assessment [7].

### **Hypericum perforatum**

*Hypericum perforatum* L. (Hypericaceae) is a perpetual spice that is ordinarily known as St. John's Wort. The plant has been esteemed for its significant organic and synthetic points of view and its utilization in the treatment of irresistible sicknesses has been archived in ethnobotanical reports. Latest interest in *H. perforatum* has zeroed in on its upper impacts, and as of late has its antimicrobial action been considered in contrast to various bacterial and contagious strains. The current survey gives a far reaching synopsis of the ethnobotanical utilizes, substance constituents and organic impacts (antibacterial and antifungal) of this species. A far reaching record of the substance constituents including anthraquinone subsidiaries (naphthodianthrones), flavonoids, prenylated phloroglucinols, tannins and unpredictable oils is too included. Different kinds of arrangements, salves, creams and concentrates ready with and compounds separated from this species have been found to have a wide range of organic and pharmacological impacts, for example, upper impacts, wound-recuperating, antiviral and antimicrobial movement. The antibacterial action of rough concentrates can be connected with the utilization of the spice as an injury healer in old times. The sole antibacterial guideline secluded to date is a tetraketone, hyperforin, likewise remembered to be liable for the upper movement of the spice. The accessible writing shows that it has a higher antibacterial movement against Gram-positive than Gram-negative microscopic organisms, and alcoholic concentrates (methanolic/ethanolic) were displayed to have more articulated movement than watery concentrates. Based on the compound and pharmacological attributes of *H. perforatum*, we presumed that this species has gainful helpful properties and has the potential for use as a compelling adaptogenic home grown cure [8].

## **Materials and Methodology**

### **Type of Study**

Experimental study

### **Tool used**

1. UV- VIS Spectroscopy
2. FTIR (Fourier Transform Infrared spectroscopy)

### **Duration of study:**

15 Days

**Materials Required:** Beaker (100 ml capacity), Pipette (10 ml), Hard glass bottles (30 ml capacity)

## **Medicinal products**

1. *Azadirachta indica* Q
2. *Hypericum perforatum* Q

## **Control**

Glycerol

## **Preparation**

Preparation of formulation from *Azadirachta indica*- Q and *Hypericum perforatum*- Q is done by following steps;

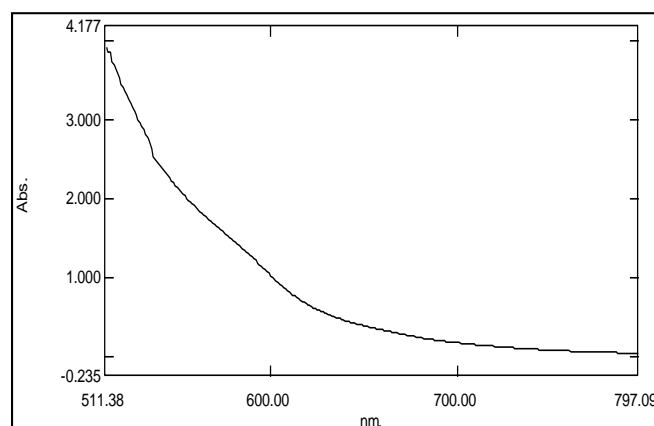
1. **Measurement:** Take appropriate quantity of Homoeopathic mother tincture (Q) *Azadirachta indica* and *Hypericum perforatum* along with glycerol as Drug and vehicle ratio of (1:9) in measuring cylinder
2. **Mixing:** After adding in a beaker gentle mix with glass rod.
3. **Filling:** The sample of this medicated glycerol were filled into the hard glass bottles separately
4. **Labelling:** Paste label on the bottom on the bottom of the hard glass bottles with name of medicated formulation, date of manufacture, volume, Caution etc.
5. **Storage:** Placed the sample of homoeopathic medicated glycerol as on hard glass bottle on cool and dark place, away from dampness, sunlight, strong smelling bottles, perfumes etc.

## **Observation**

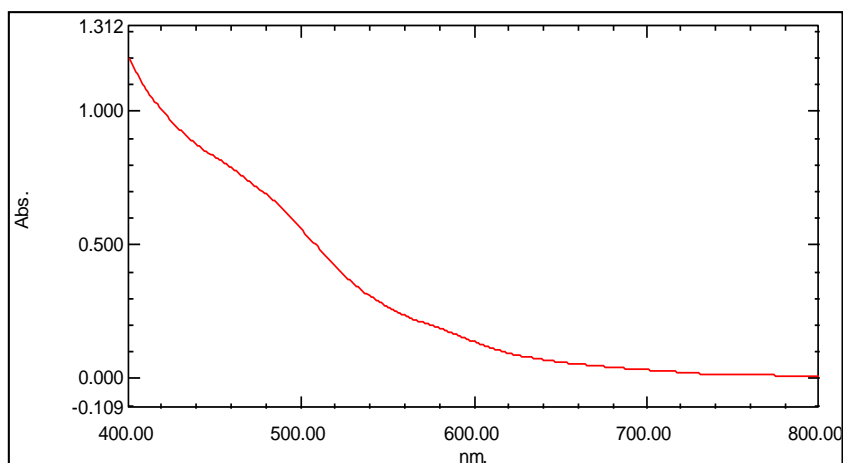
After preparation sample should be kept on cool and dark place and observed by organoleptic evaluation like smell, colour, consistency etc.

## **Results**

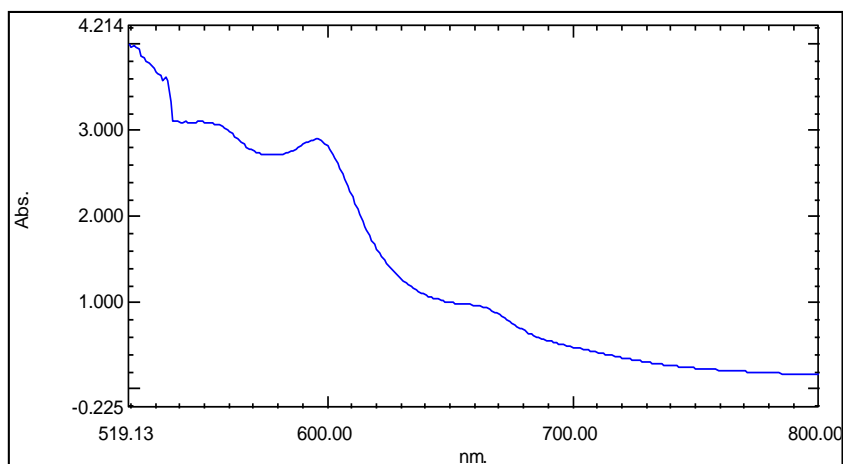
Analysis done by UV- Visible spectrophotometer suggest absorbance value of *Azadirachta indica*- Q is 0.989  $\lambda_{max}$  at 602.00 nm, *Azadirachta indica* glycerol is 0.997  $\lambda_{max}$  at 419 nm, *Hypericum perforatum*- Q is 0.996  $\lambda_{max}$  at 651.00 nm, *Hypericum perforatum* glycerol is 0.994  $\lambda_{max}$  at 457 nm, whereas analysis under FTIR (Fourier transform infrared spectroscopy) suggest maximum transmission of *Azadirachta indica*- Q is at 1044.58  $cm^{-1}$ , *Azadirachta indica* glycerol is at 1033.29  $cm^{-1}$ , *Hypericum perforatum*- Q at 1044.76  $cm^{-1}$ , *Hypericum perforatum* glycerol is at 1033.50  $cm^{-1}$ .+



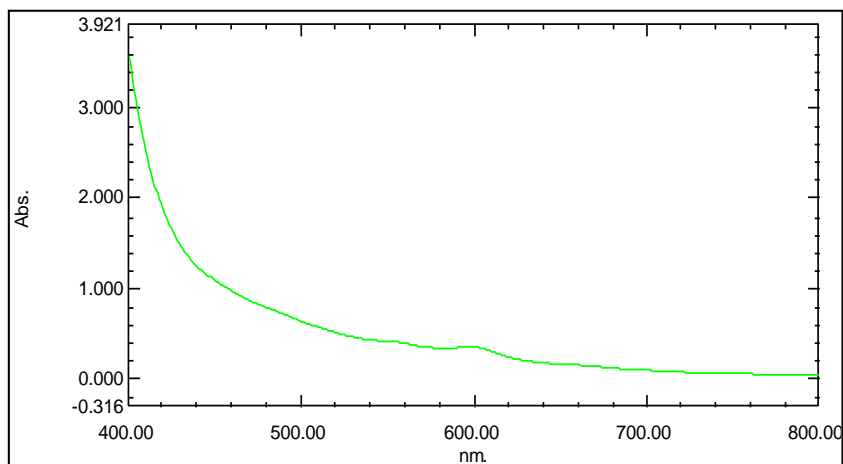
**Fig 1:** Absorbance value of *Azadirachta indica* Q



**Fig 2:** Absorbance value of *Azadirachta indica* glycerol



**Fig 3:** Absorbance value of *Hypericum perforatum* Q

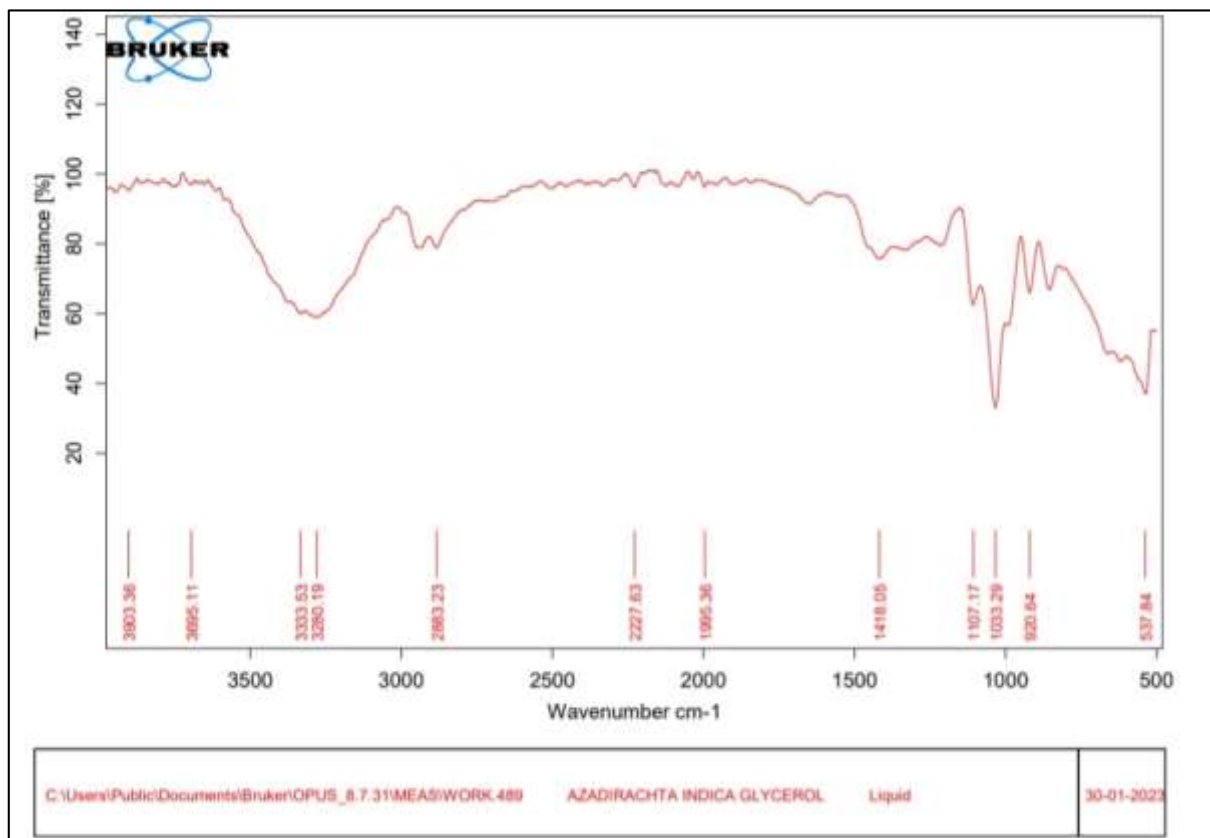


**Fig 4:** Absorbance value of *Hypericum perforatum* glycerol

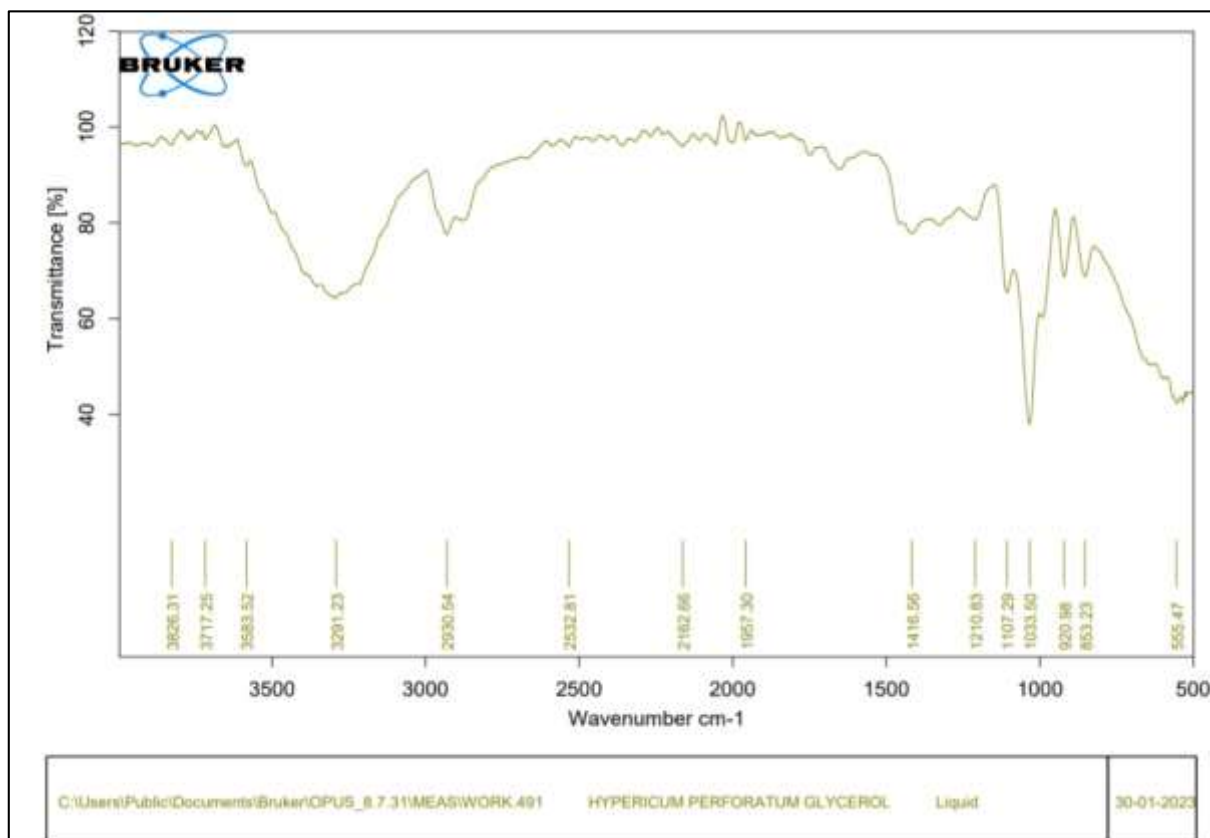
**Table 1:** Absorbance value of Formulation of Glycerol prepared with different homoeopathic mother tincture in a definite drug and vehicle ratio

S. no.	Wavelength (nm)	<i>Azadirachta Indica</i> Q ( $\lambda_{max}$ )	<i>Azadirachta Indica</i> glycerol ( $\lambda_{max}$ )	<i>Hypericum perforatum</i> Q ( $\lambda_{max}$ )	<i>Hypericum perforatum</i> glycerol ( $\lambda_{max}$ )
1.	653.00	0.382	0.059	0.988	0.150
2.	654.00	0.377	0.059	0.984	0.149
3.	655.00	0.372	0.058	0.982	0.149
4.	656.00	0.367	0.057	0.979	0.148
5.	657.00	0.362	0.057	0.977	0.147
6.	658.00	0.357	0.056	0.974	0.146
7.	653.00	0.382	0.059	0.988	0.150
8.	654.00	0.377	0.059	0.984	0.149

**FTIR (Fourier Transform Infrared Spectroscopy)**



**Fig 5:** Maximum Transmission of *Azadirachta indica* Glycerol



**Fig 6:** Maximum Transmission of *Hypericum perforatum* Glycerol

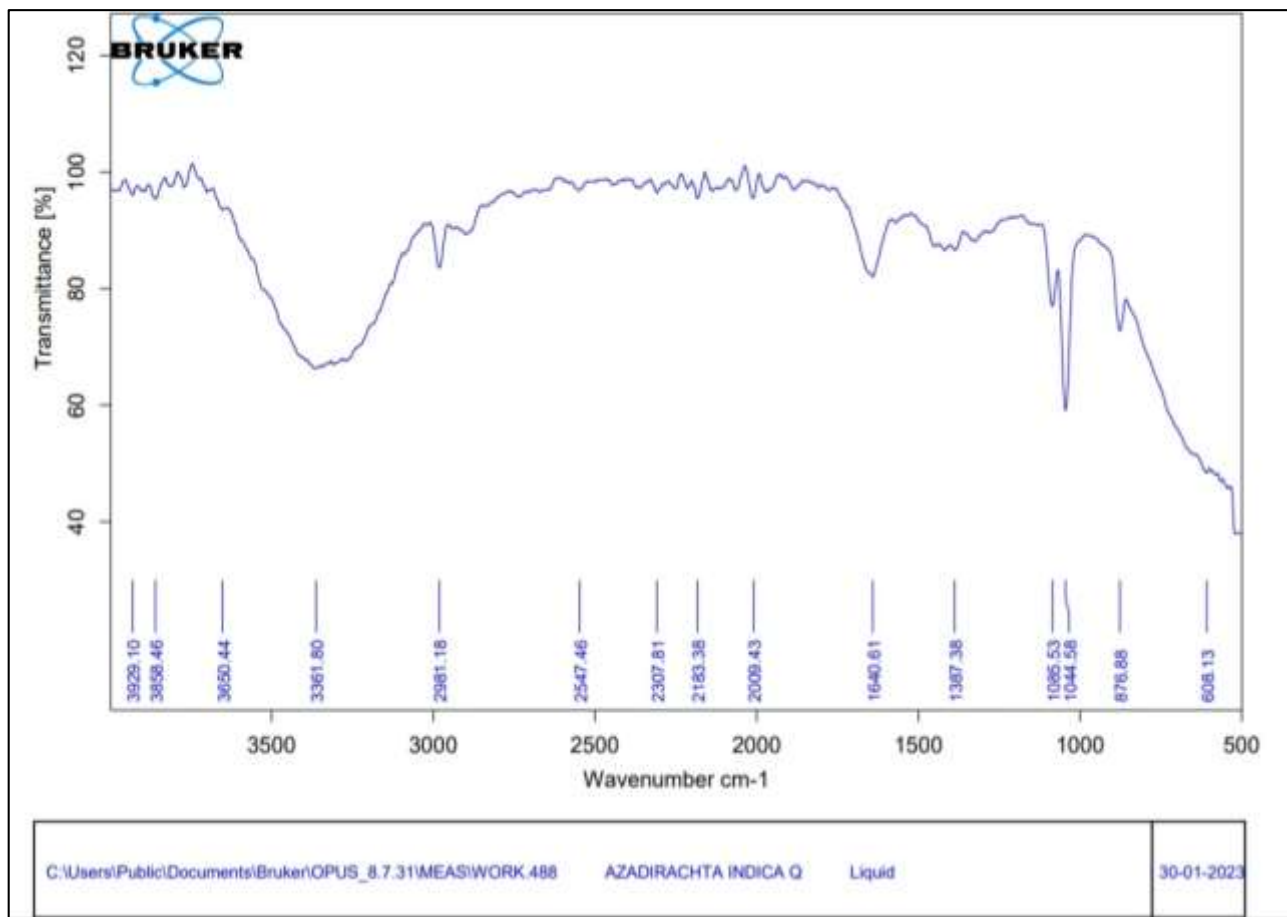


Fig 7: Maximum Transmission of *Azadirachta indica* Q

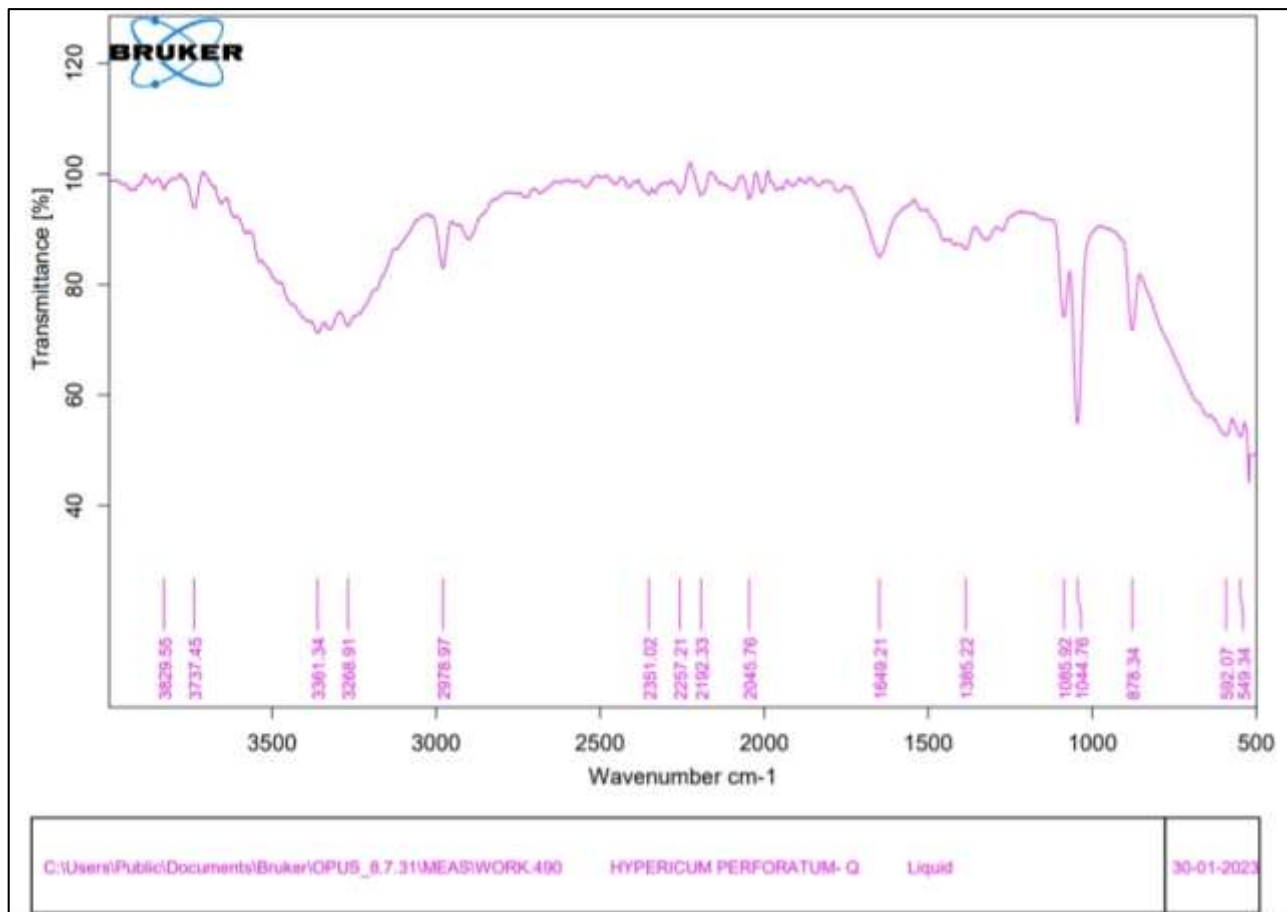


Fig 8: Maximum Transmission of *Hypericum perforatum*-Q

## Conclusion

Both the formulation of glycerol prepared by two different homoeopathic mother tincture in a glycerol with drug and vehicle ratio of 1:9 gives an good result in UV- VIS and FTIR spectroscopy.

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## References

1. JA Hunt. Pharm. J. 1999, 263, 985.
2. See the recent report from Frost & Sullivan: "R&D Creating New Avenues for Glycerol" (August 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, R. Ciriminna, C. Della Pina, W. Kesber, WO2006051574, 2004.
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8. Saddiqe Z, Naeem I, Maimoona A. A review of the antibacterial activity of *Hypericum perforatum* L. Journal of ethnopharmacology. 2010;131(3):511-21.