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Comparative analysis of *Hypericum perforatum* liniment in different ratio with quality control

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Abstract

Background: To compare the *Hypericum perforatum* liniment prepared by *Hypericum perforatum* mother tincture in olive oil at different drug and vehicle ratio under the quality assessment by UV- Visible Spectroscopy and FTIR (Fourier Transform Infrared Spectroscopy)

Methodology: In this process preparing the Liniment from Standard *Hypericum perforatum*- Q, which was taken from pharmaceutical company and mixed in the olive oil as a baseline sample. Samples were prepared by measuring the quantity first, mixing, filling and finally labelling. Samples were divided into three groups; such as standard group, sample group and control group. All these samples were passed under the UV-Visible Spectrophotometer and FTIR (Fourier-Transform Infrared Spectroscopy).

Conclusion: After Data analysis, it was found that absorbance value of *Hypericum perforatum* liniment prepared in (1:4) drug and vehicle ratio gives better results in analysis done by UV- Visible Spectrophotometer and FTIR (Fourier Transform Infrared Spectroscopy) as compare to other drug and vehicle ratio i.e. (1:1) and (1:9).

Whereas in FTIR, the maximum transmission is brought on (1:1) as compared to the other drug and vehicle ratio i.e. (1:4) and (1:9)

Keywords: *Hypericum perforatum*, FTIR, UV

Introduction

Liniment (from Latin: linere, signifying "to bless"), likewise called embrocation and intensity rub, is a sedated effective groundwork for application to the skin. A few liniments have consistency like that of water; others are moisturiser or emollient; still others are in trans-dermal patches, delicate strong sticks, and showers. Liniment typically is focused on to the skin, which the dynamic fixings enter. Liniments are normally offered to alleviate agony and solidness, for example, from strong throbs and strains, and joint inflammation. These are regularly figured out from liquor, CH₃CO, or comparable rapidly vanishing solvents and contain counterirritant sweet-smelling substance compounds, for example, methyl salicylate, benzoin sap, menthol, and capsaicin. They produce a sensation of warmth inside the muscle of the area they are applied to, ordinarily going about as rubefacients through a counterirritant impact ^[1].

Hypericum perforatum is an enduring spice native to Europe, western Asia, and northern Africa (PDR for Natural Drugs 1998). The plant can now be found all through the US, and is recognized by its brilliant yellow blossoms. The blossoms contain a red fluid contained complex, organically dynamic mixtures. St. John's wort, which comprises of the dried, over-the-ground bits of *Hypericum*, is sold as a nourishing enhancement (NCCAM 1999). The herbal is monetarily accessible in tablet, container, tea, and colour structures. *Hypericum* has been utilized as a therapeutic plant for hundreds of years. Slick *Hypericum* arrangements might be applied remotely to treat minor consumes, wounds, irritation of the skin, and nerve torment (Blumenthal *et al.* 1998). Inside, the natural planning is shown for the treatment of tension and burdensome episodes (PDR for Home grown Prescriptions 1998). Today, *Hypericum* is utilized broadly in Germany for the treatment of discouragement where it is recommended roughly multiple times more frequently than fluoxetine, perhaps of the most exceptionally recommended energizer in the US (NCCAM 1999). In the U.S., *Hypericum* is progressively utilized as an over-the-counter cure by a huge part of the lay populace for the treatment of misery. In 1998, *Hypericum* was supposed to earn \$400 million in deals in the U.S. (NCCAM 1999) and an expected \$6 billion in Europe (Ernst 1999), notwithstanding an absence of agreement with respect to its viability among the clinical local area and the non-appearance ^[2]

Naphthodianthrones:

The class of mixtures confined from *H. perforatum* which is the most explored is the naphthodianthrones [3, 4, 5]. They incorporate hypericin, pseudohypericin, isophypericin, and protohypericin [6, 7]. Of these, hypericin — an anthraquinone inferred shade that is mindful for the red shade of SJW oils. Hypericin is viewed as in the blossoms as dark spots that are situated along the petals. Because of its substance structure, hypericin is exceptionally photoreactive.

Materials and Methodology

There are following steps given as;

Formulation prepared by;

1. *Hypericum perforatum*-Q
2. Olive oil

Site of study:

Centre of Research and Development of Parul University CR4D

Investigational tool;

UV- Visible Spectrophotometer (Double beam)
FTIR (Fourier Transform Infrared Spectroscopy)

Drug and Vehicle Ratio;

Drug and vehicle ratio is (1:1)
Drug and vehicle ratio is (1:4)
Drug and vehicle ratio is (1:9)

Procedure;

For Preparation of liniment following steps should be taken; such as;

1. Measurement
2. Mixing
3. Filling
4. Labelling

Measurement

- **Preparation of *Hypericum perforatum* liniment (1:1)**

Drug and Vehicle ratio is (1:1)
Hypericum perforatum Q- 1part
Olive oil- 1 part

- **Preparation of *Hypericum perforatum* liniment (1:4)**

Drug and Vehicle ratio is (1:4)

Hypericum perforatum Q- 1 part

Olive oil- 4 parts

- **Preparation of *Hypericum perforatum* liniment (1:9)**

Drug and Vehicle ratio is (1:9)

Hypericum perforatum Q- 1 part

Olive oil- 9 parts

- **Mixing:**

After preparation mixing done by the glass rod.

- **Filling:**

Sample should be filled in the hard glass bottles, which is clean and sterile first.

- **Labelling:**

Paste label on the body of hard glass bottle, which contains Drug name, manufacturer date, Indications, quantity of drug and vehicle, overall drug and vehicle ratio.

- **Precaution:**

Samples should be away from the heat, sunlight, dust, strong smelling bottles, kept in a cool and dark place.

- **Results:**

While sample passing under UV- Visible Spectrophotometer, maximum absorption of *Hypericum perforatum*- Q is 0.992 at 646 nm, *Hypericum perforatum* liniment (1:9) is 0.893 at 318 nm and *Hypericum perforatum* liniment (1:4) is 0.989 at 226 nm, *Hypericum perforatum* liniment (1:1) is 0.924 at 226 nm, Ethanol is 0.997 at 221 nm. Whereas absorbance of olive oil is 0.963 at 347 nm.

On other hand, In FTIR the Maximum transmission of *Hypericum perforatum*- Q at the wavelength of 3380.90 nm, Maximum transmission of *Hypericum perforatum* liniment (1:9) at the wavelength of 2922.15 nm, whereas the Maximum transmission of *Hypericum perforatum* liniment (1:4) at the wavelength of 2924.20 nm, Maximum transmission of *Hypericum perforatum* liniment (1:1) at the wavelength of 3344.72 nm, Maximum transmission of ethanol at the wavelength of 2976.71 nm, Maximum transmission of olive oil at the wavelength of 2922.79.

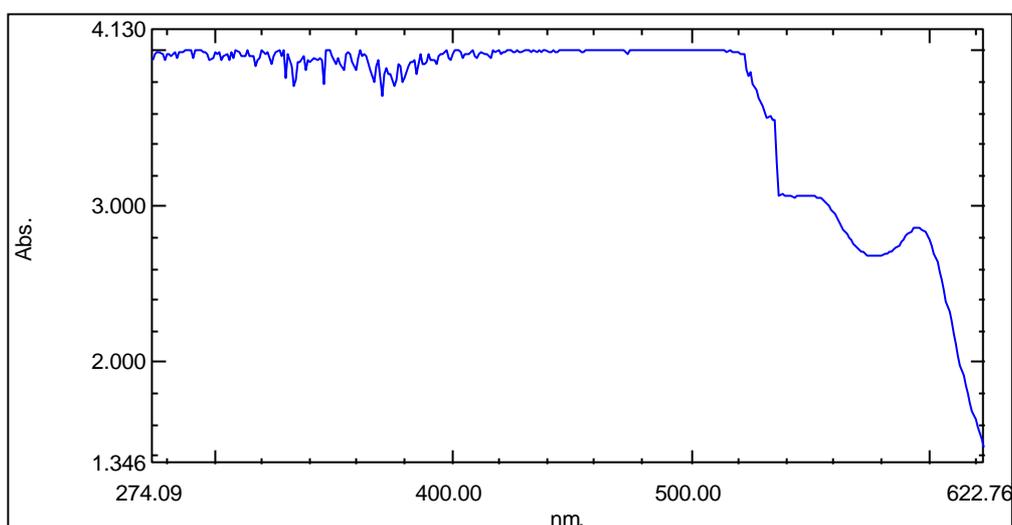
UV visible spectrophotometer

Fig 1: Absorbance of *Hypericum perforatum*- Q

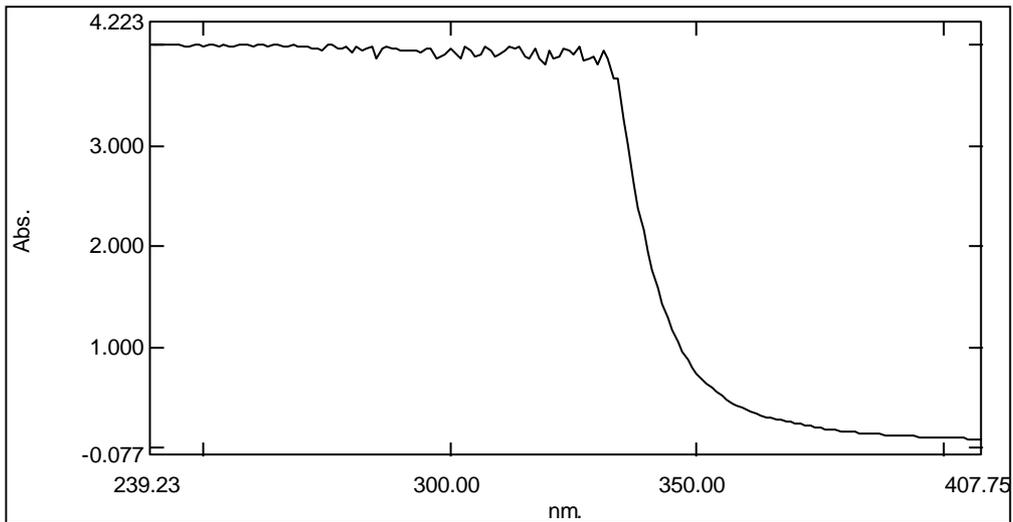


Fig 2: Absorbance of olive oil

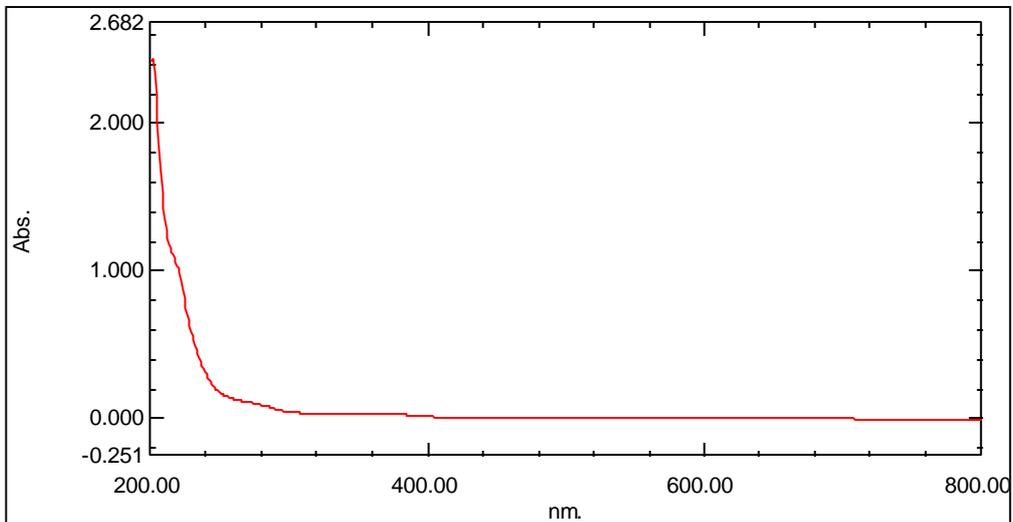


Fig 3: Absorbance of Ethanol

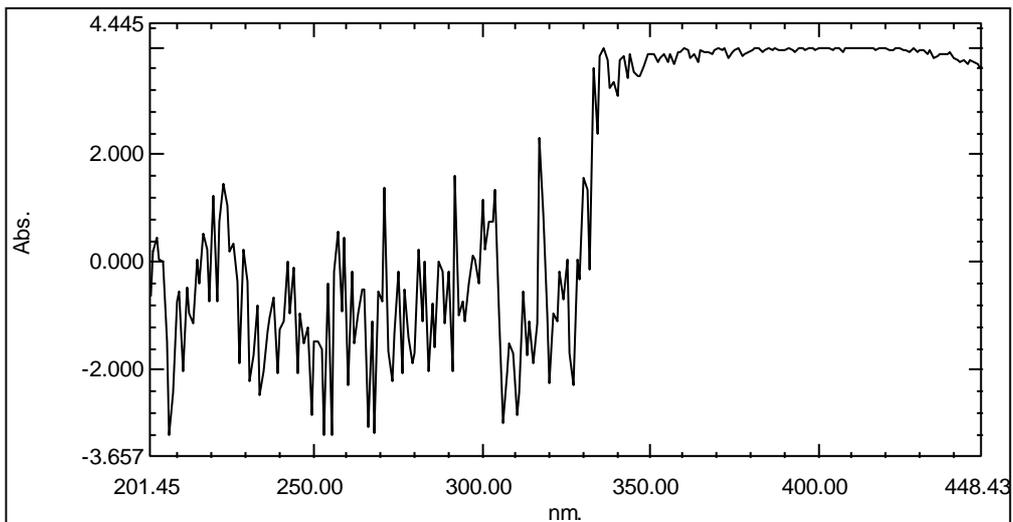


Fig 4: Absorbance of *Hypericum perforatum* liniment (1:9)

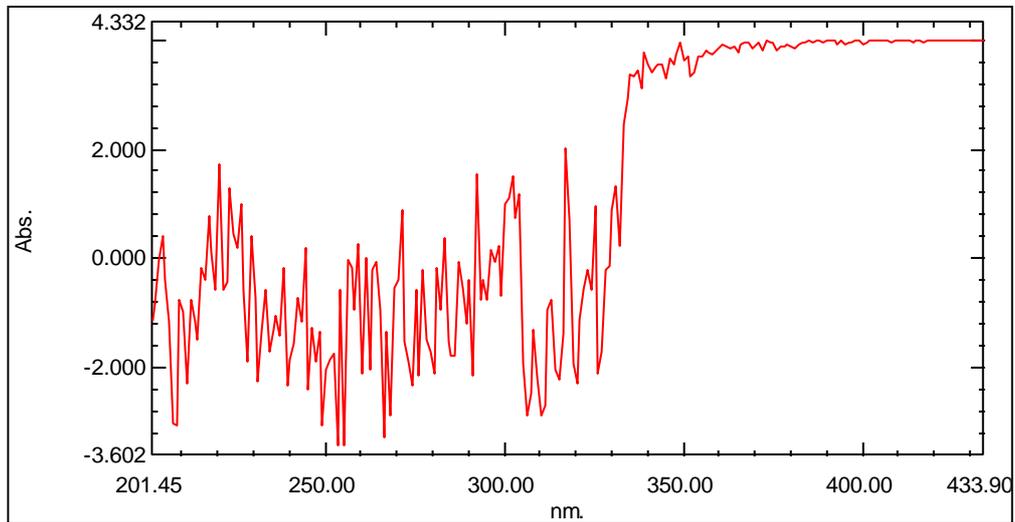


Fig 5: Absorbance of *Hypericum perforatum* liniment (1:4)

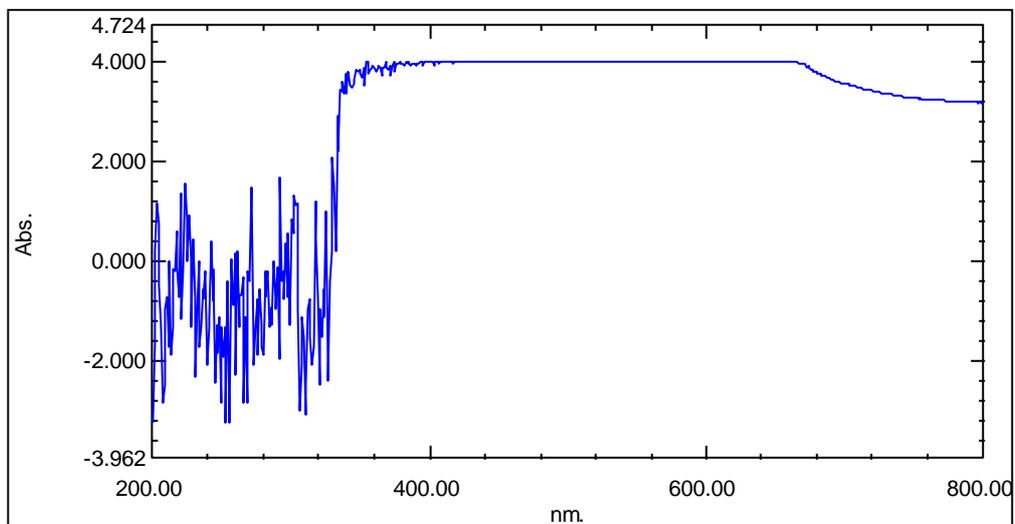


Fig 6: Absorbance of *Hypericum perforatum* liniment (1:1)

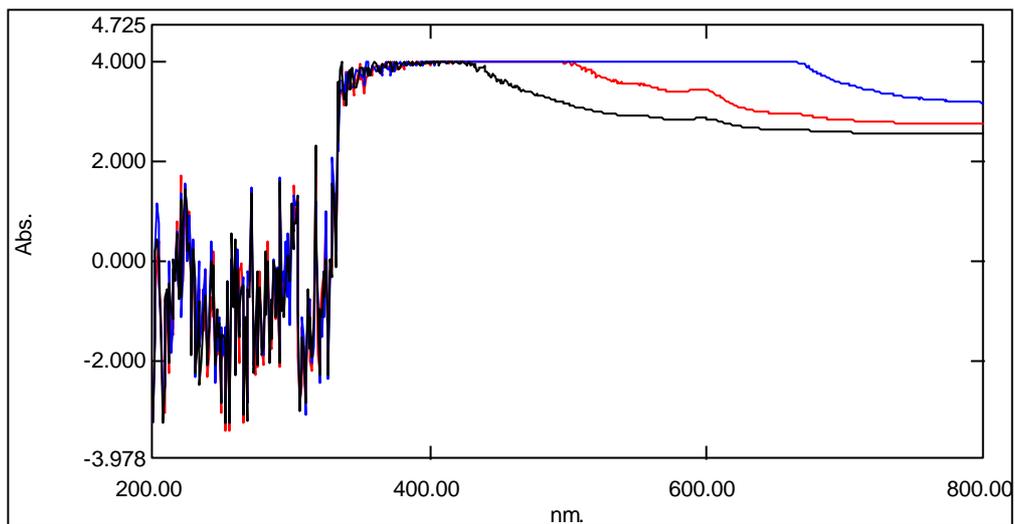
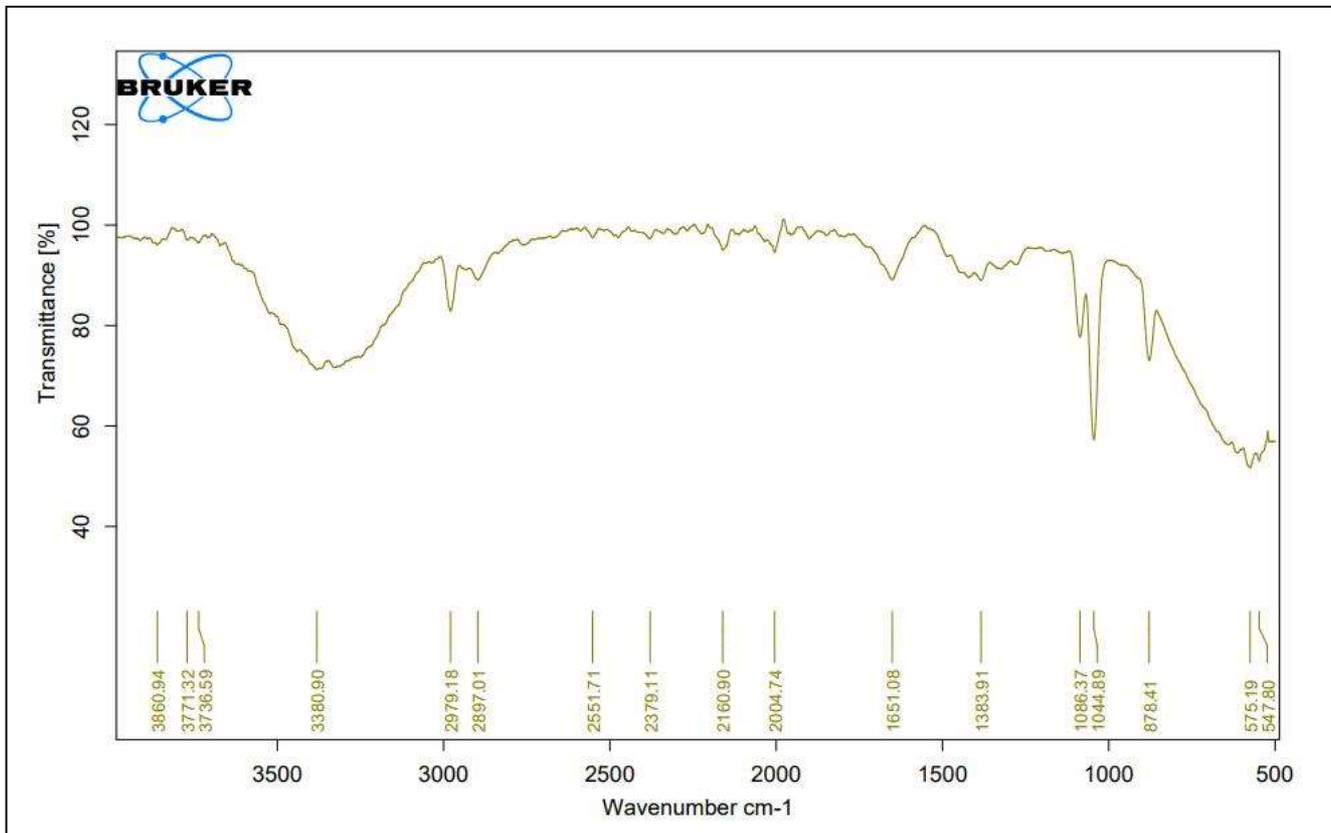


Fig 7: Compare absorbance of *Hypericum perforatum* liniment (1:9), *Hypericum perforatum* liniment (1:4), *Hypericum perforatum* liniment (1:1)



FTIR Analysis (Fourier transform infrared spectroscopy)

Fig 7: Maximum Transmission of *Hypericum perforatum-Q*

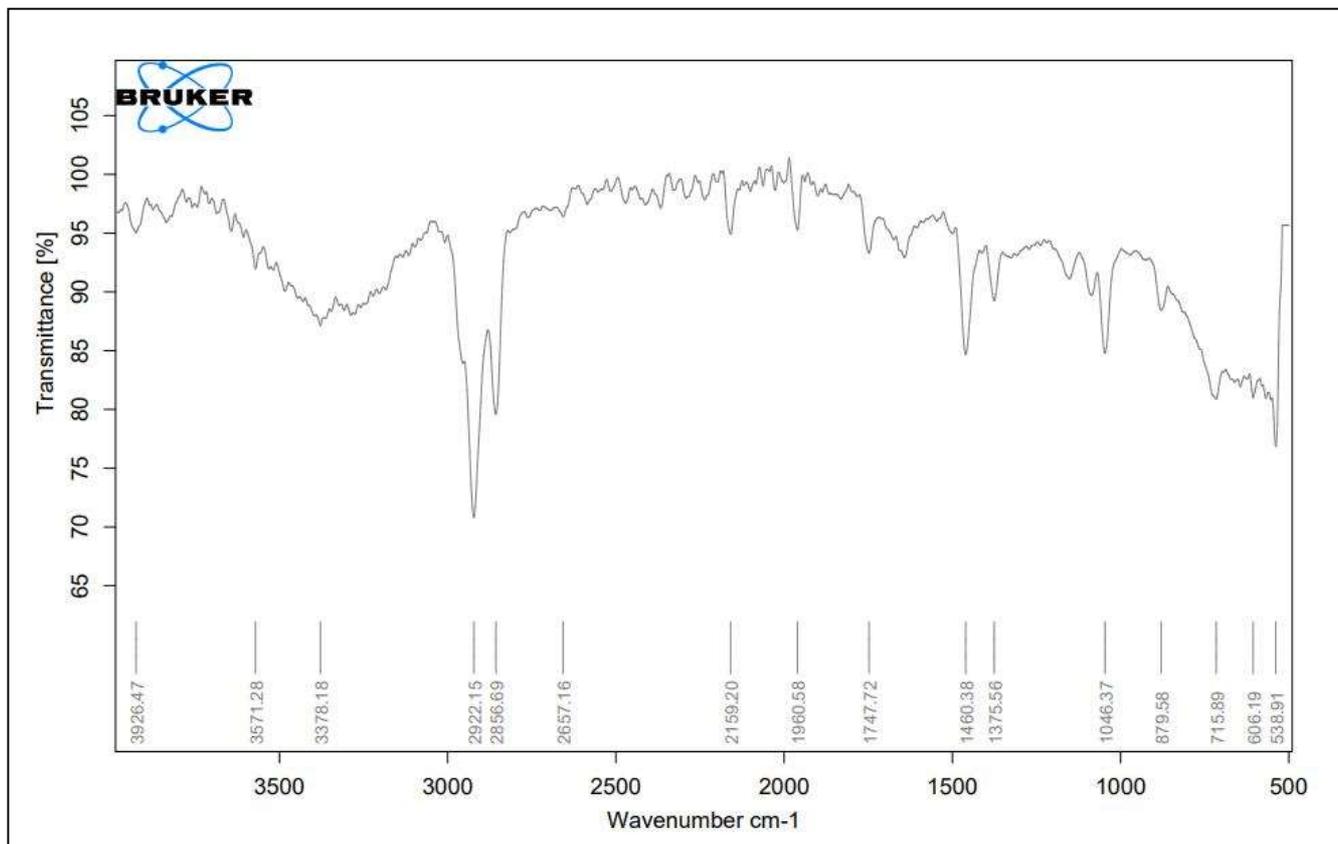


Fig 8: Maximum Transmission of *Hypericum perforatum liniment (1:9)*

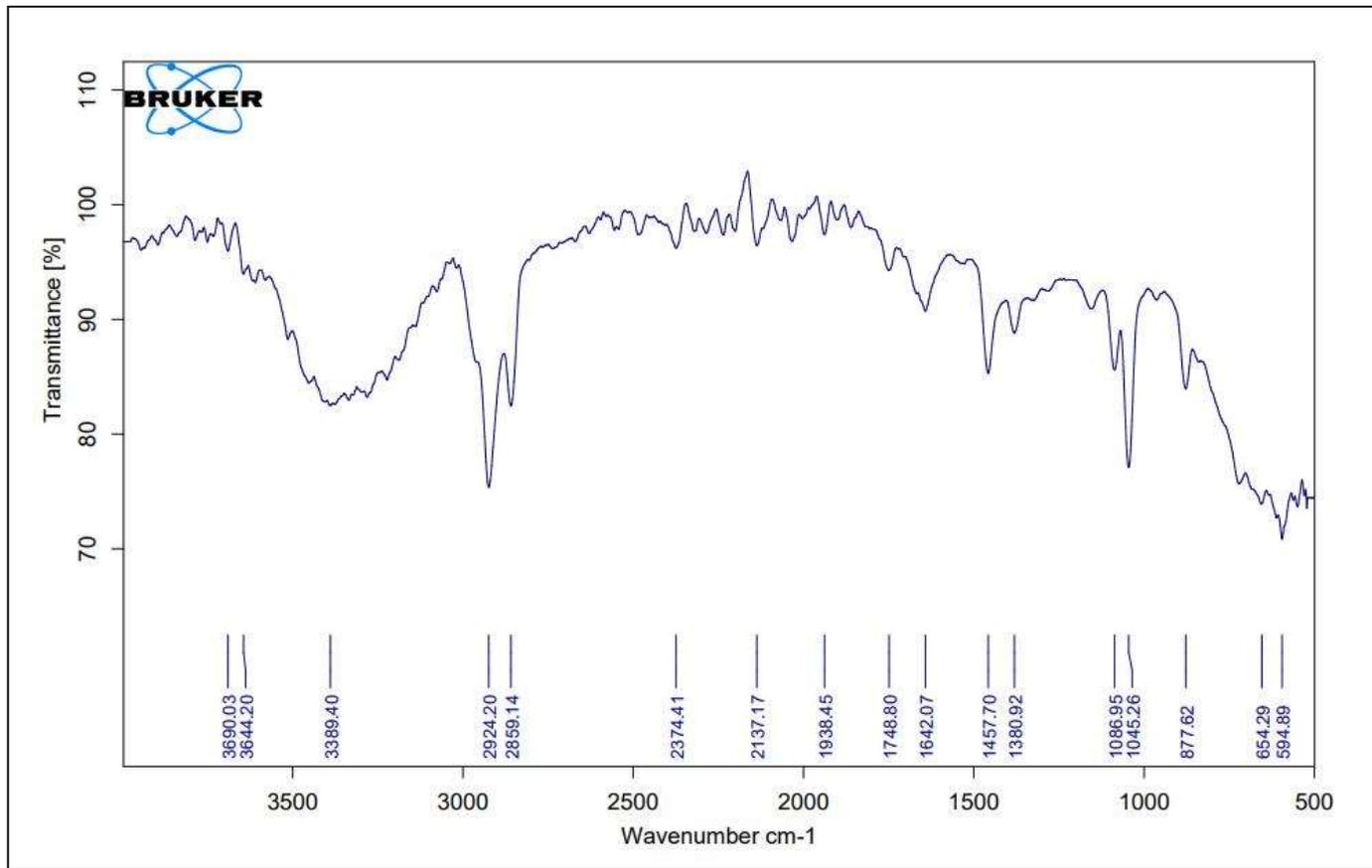


Fig 9: Maximum Transmission of *Hypericum perforatum* liniment (1:4)

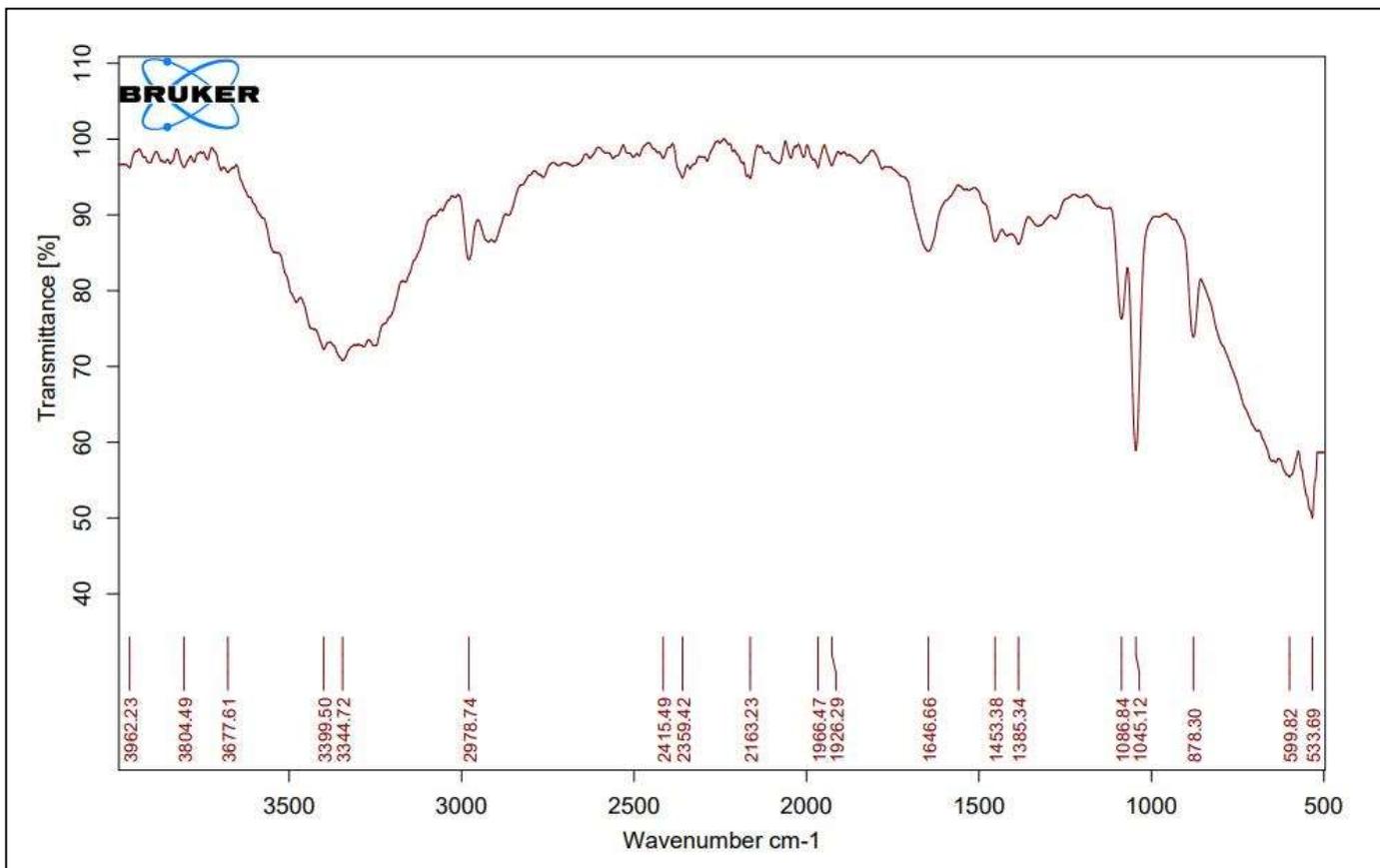


Fig 10: Maximum Transmission of *Hypericum perforatum* liniment (1:1)

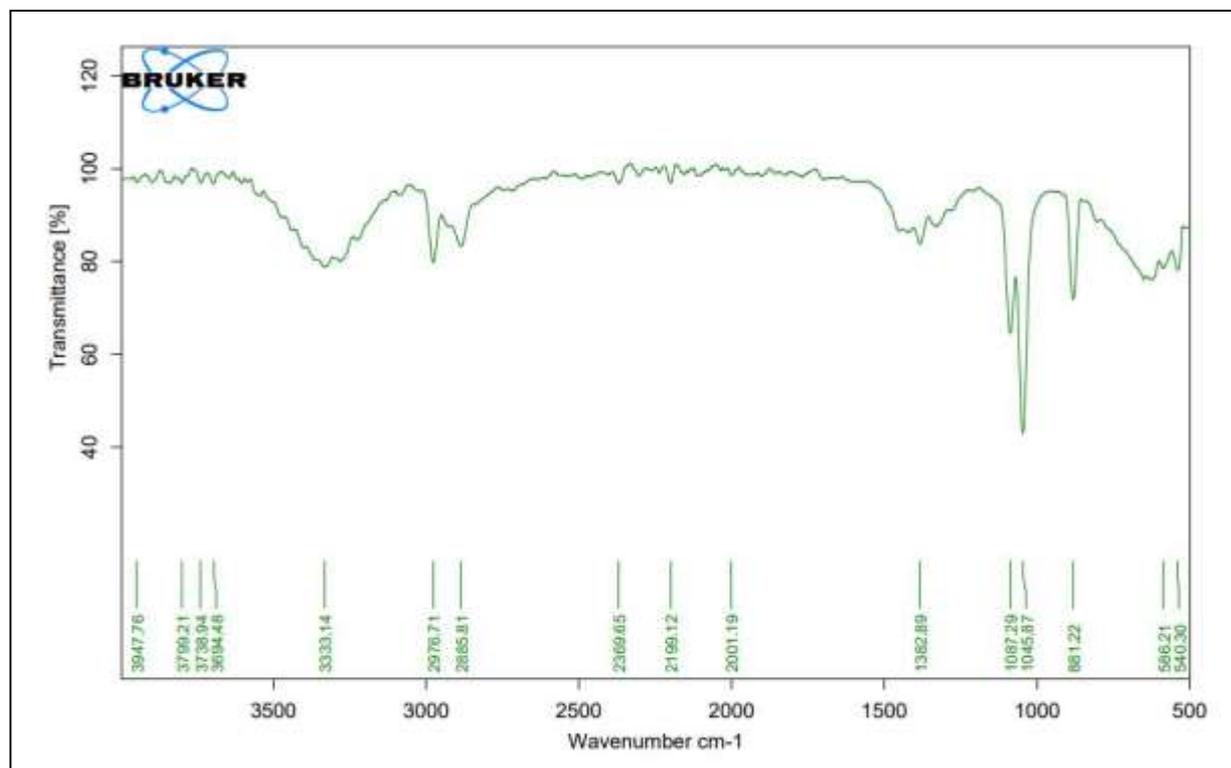


Fig 11: Maximum Transmission of Ethanol

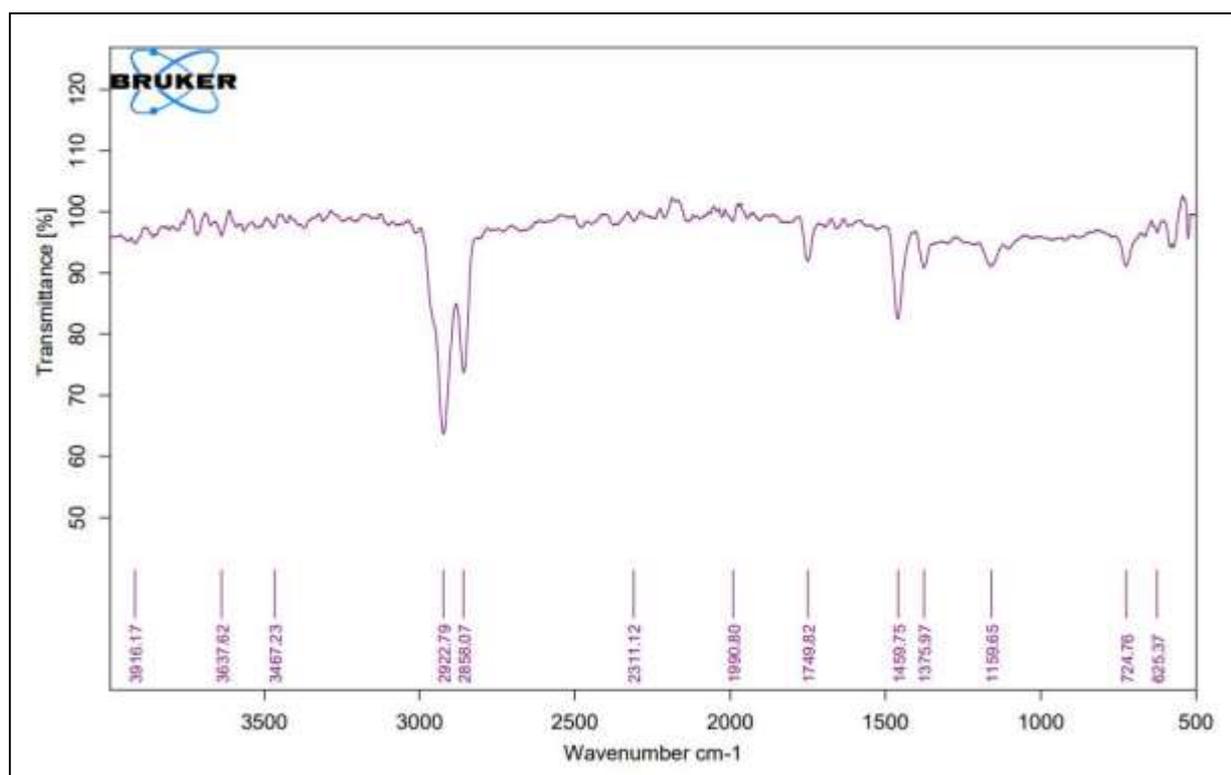


Fig 12: Maximum Transmission of Olive oil

Conclusion

After Data analysis, it was found that absorbance value of *Hypericum perforatum* liniment prepared in (1:4) drug and vehicle ratio gives better results in analysis done by UV-Visible Spectrophotometer and FTIR (Fourier Transform Infrared Spectroscopy) as compare to other drug and vehicle ratio i.e. (1:1) and (1:9).

Whereas in FTIR, the maximum transmission is brought on (1:1) as compared to the other drug and vehicle ratio i.e. (1:4) and (1:9)

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