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Bayview Beach Hotel, Penang



Compatibility Studies of Triclosan and Flurbiprofen with Formulation Excipients: A Systematic Drug-Drug and Drugs-excipients Compatibility Screening

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by

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Introduction

- Study of drug-excipient compatibility is vital in the design and early development stage of a stable and quality drug product
- Incompatibility between drugs and excipients can alter drug product stability and bioavailability and thereby affect their safety and efficacy
- No universally accepted protocol is available for evaluating the drug compatibility with different excipients

However, Isothermal Stress Testing (IST) is a frequently used method in compatibility evaluations.

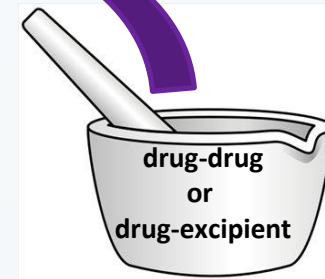
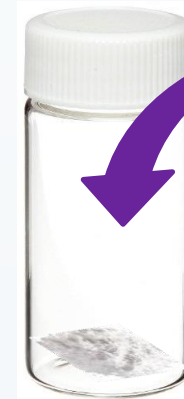
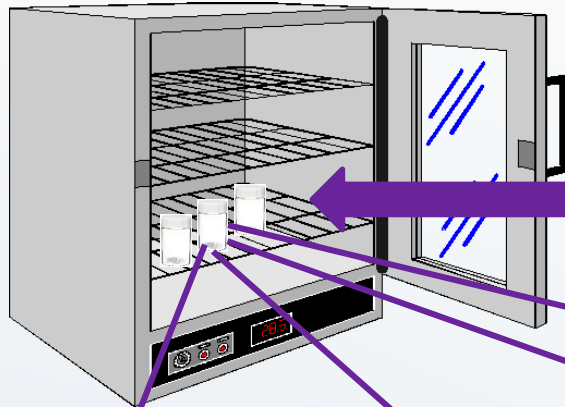
- It involves storage of the drug-excipient blends with or without moisture at elevated temperature and subsequent investigation or determination of the drug content by a suitable method such as:
 - Differential Scanning Calorimetry (DSC)
 - High Performance Liquid Chromatography (HPLC)
 - High Performance Thin Layer Chromatography (HPTLC)
 - Fourier–Transform Infrared spectroscopy (FT-IR)
 - X-Ray Powder Diffraction (XRPD)

Objective

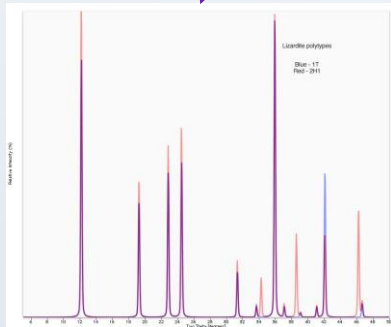
To assess the compatibility of triclosan-flurbiprofen, and the drug duo against selected excipients used in the fabrication of nanogel formulation.

Methodology

Oven (Carbolite, UK) at 50°C for 14 days

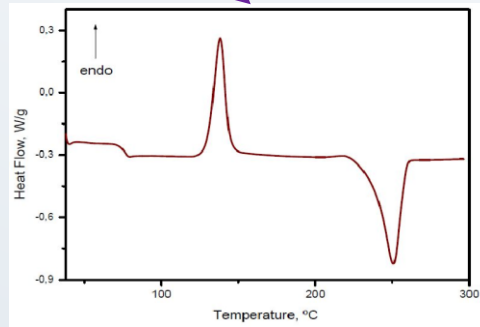


Physical mixtures of drug-drug or drug-excipient mass in ratio of 1:1



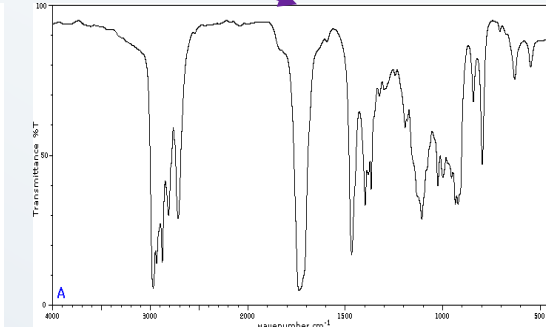
XRPD

Bruker D8 Advance



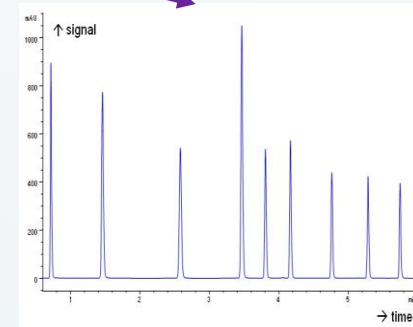
DSC

Perkin Elmer (Pyris 6 DSC)



FTIR

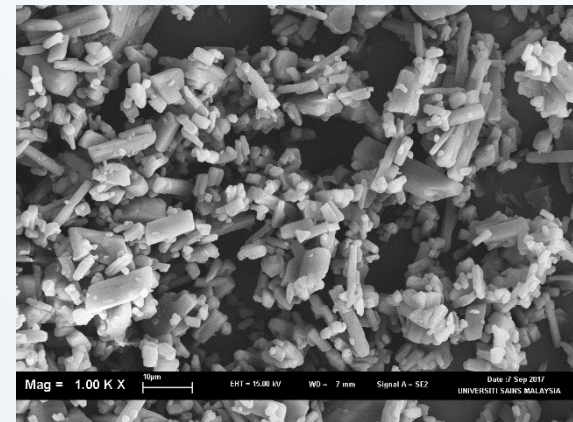
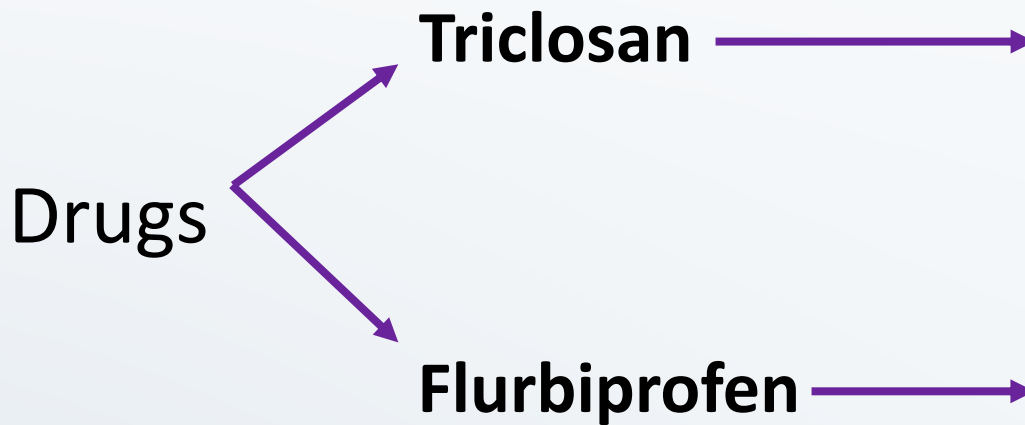
Perkin Elmer (System 2000 FT-IR)



HPLC

Shimadzu HPLC (LC-20AD)

Results



Leo Supra 50 VP Field Emission SEM
(Carl-Ziess SMT, Oberkochen, Germany)

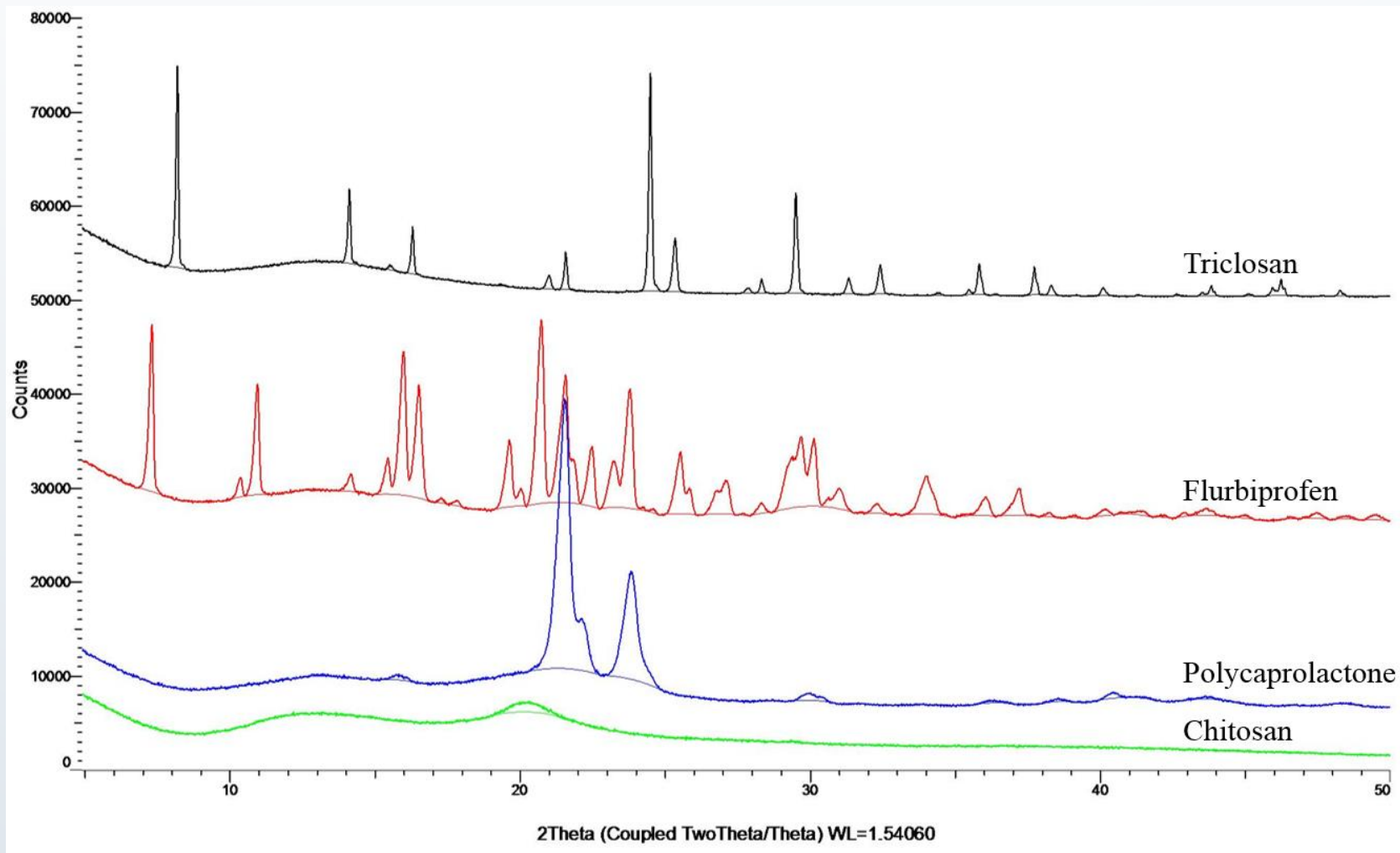
Polymers: Poly- ϵ -caprolactone & Chitosan

Combinations
Triclosan-flurbiprofen
Polycaprolactone-chitosan
Triclosan-polycaprolactone
Triclosan-chitosan
Flurbiprofen-polycaprolactone
Flurbiprofen-chitosan
Triclosan-flurbiprofen-polycaprolactone-chitosan

Visual observation

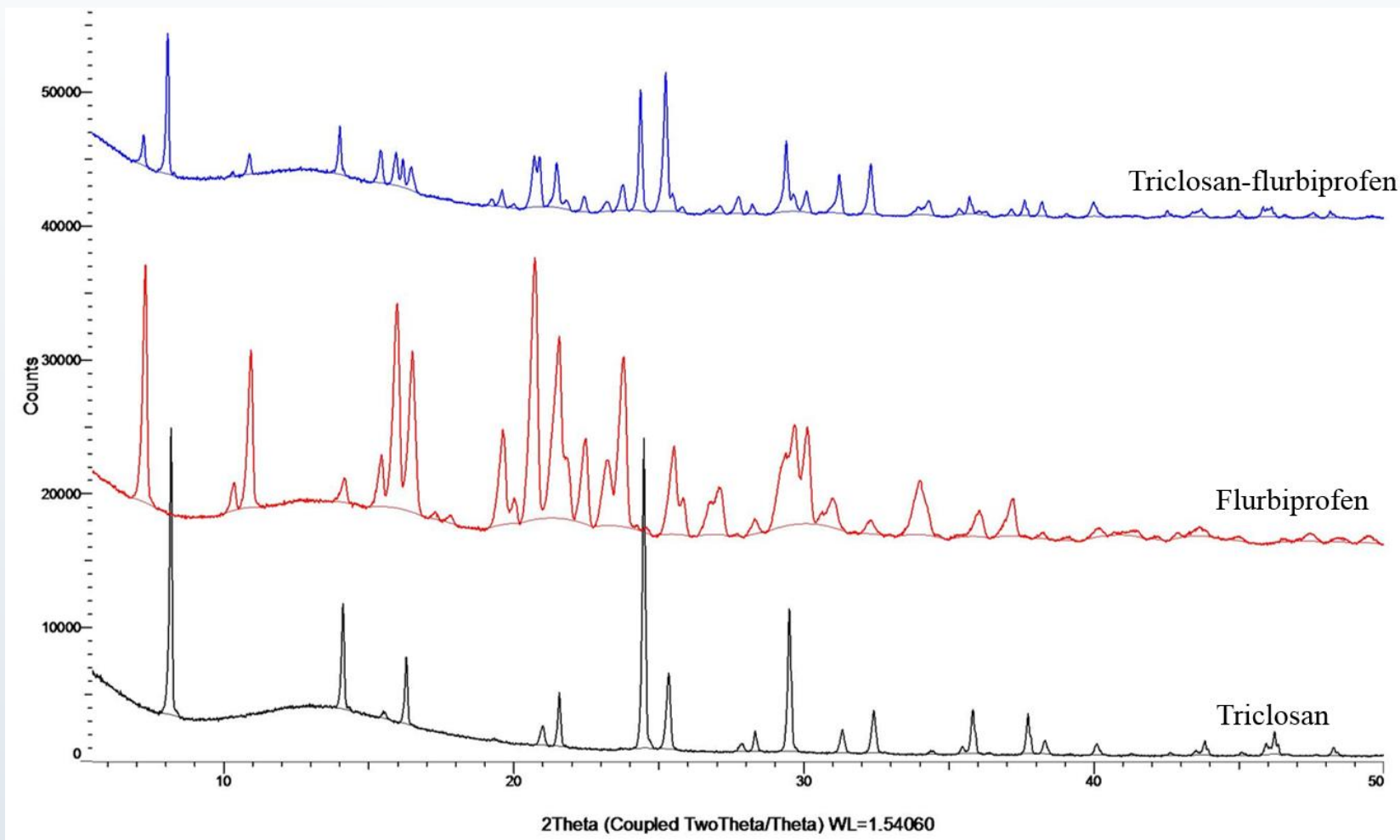
No visually discernible changes was observed in the samples on visual observation

XRPD



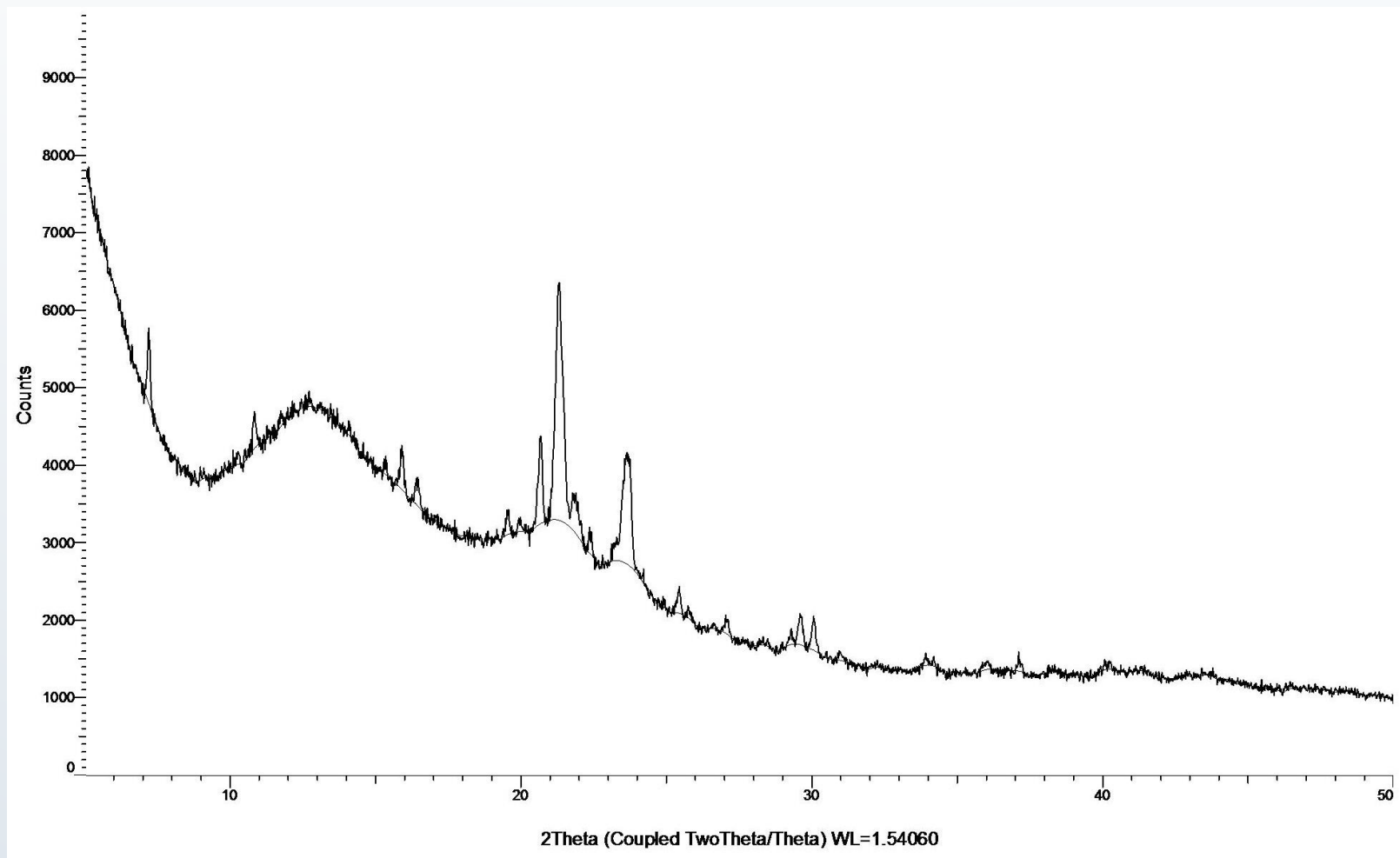
Diffractograms of pure triclosan, flurbiprofen, polycaprolactone and chitosan

XRPD



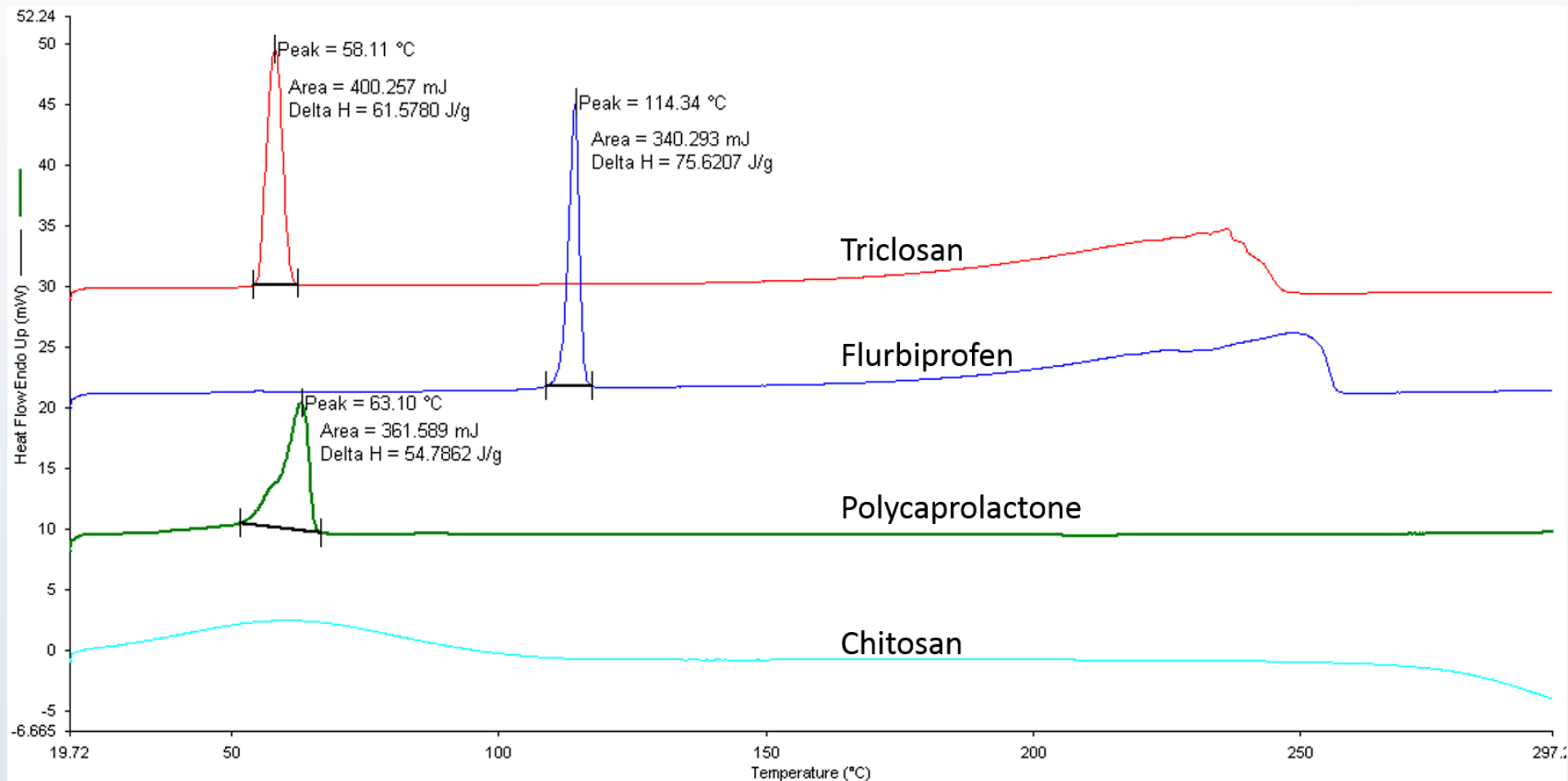
Diffractograms of triclosan, flurbiprofen and triclosan-flurbiprofen combination

XRPD



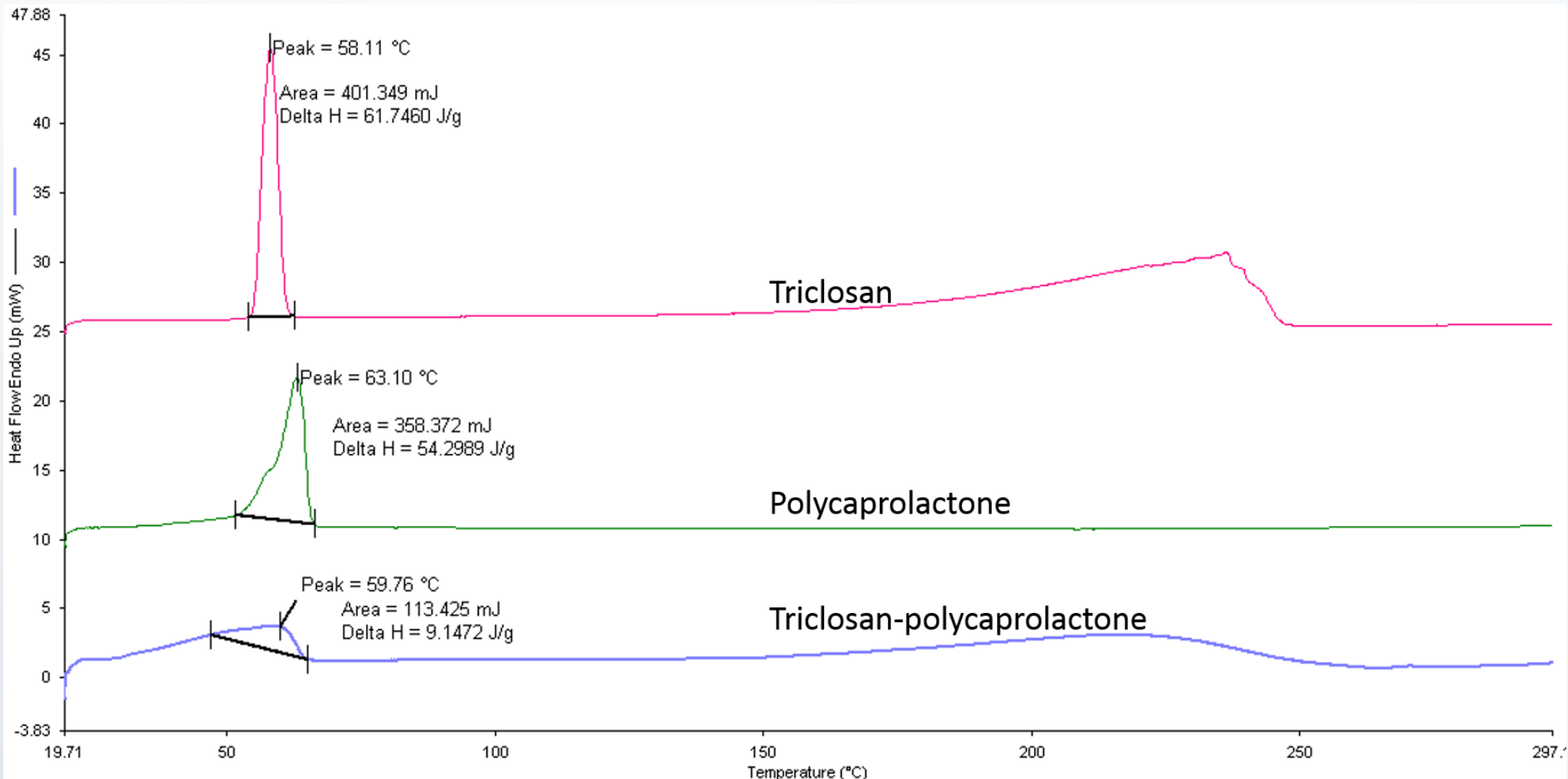
Diffractogram for blend of triclosan, flurbiprofen, polycaprolactone and chitosan

DSC



DSC thermograms of pure triclosan, flurbiprofen, polycaprolactone and chitosan

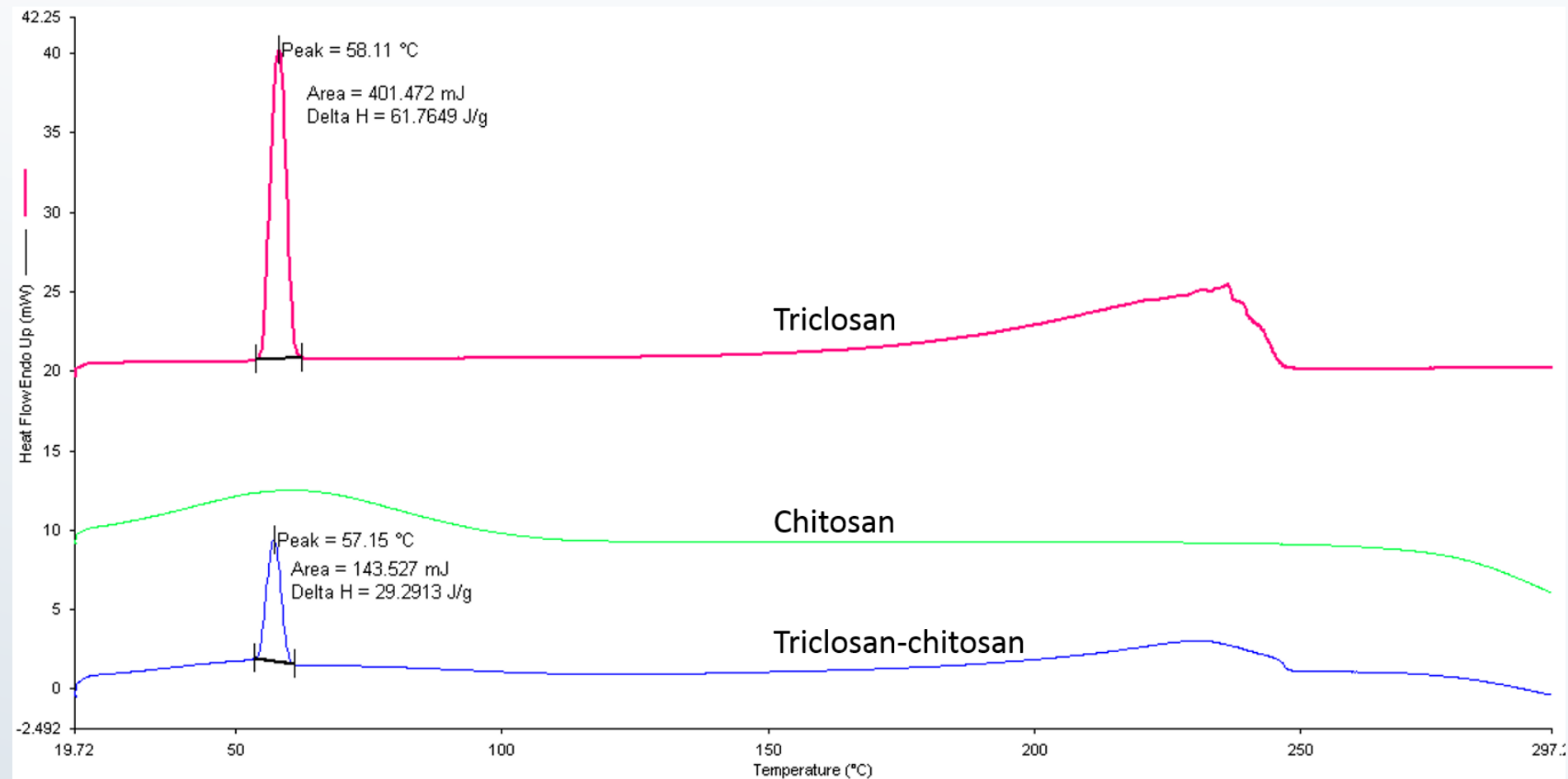
DSC



DSC thermograms of pure triclosan, polycaprolactone and triclosan-polycaprolactone combination

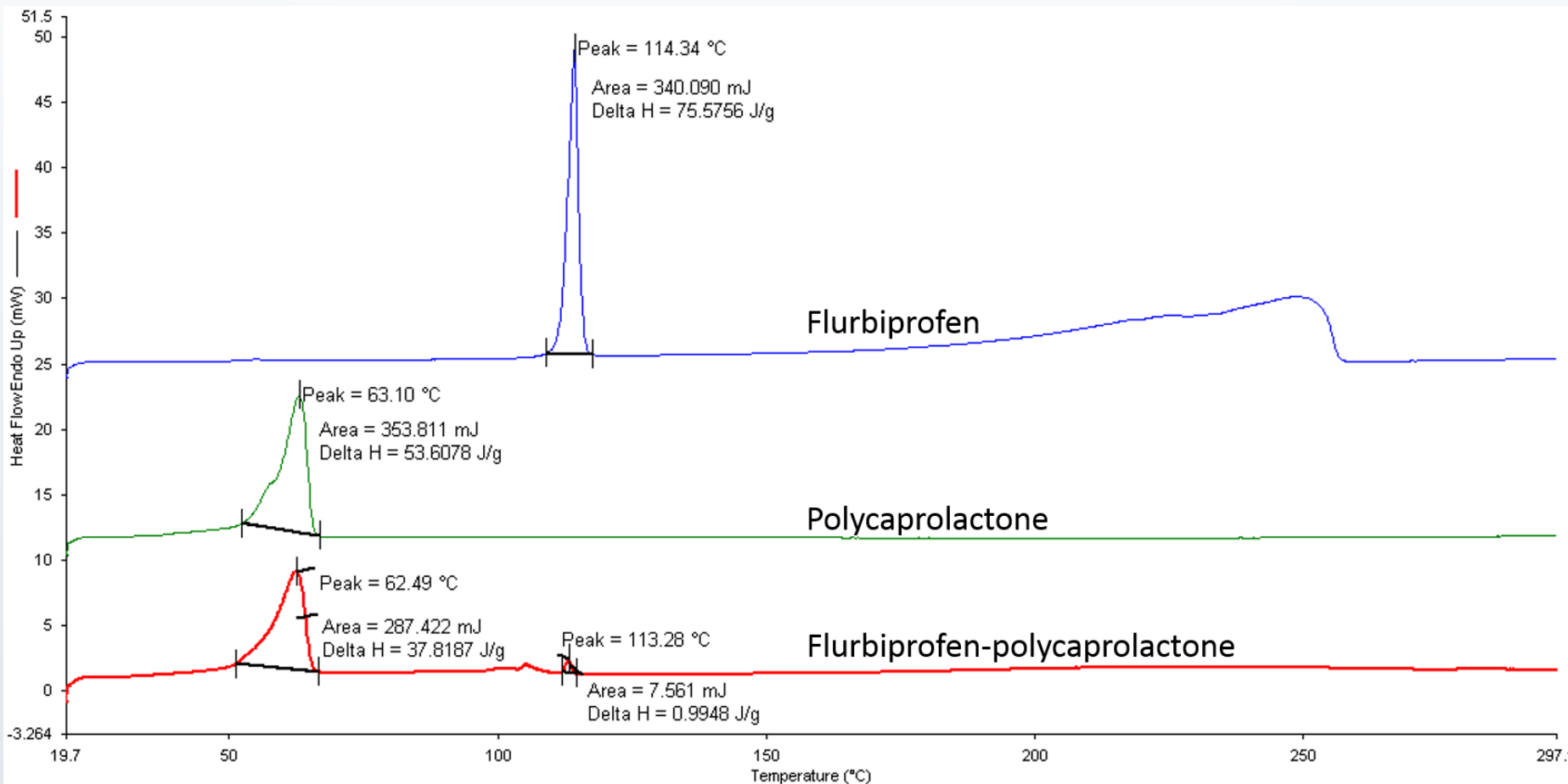


DSC



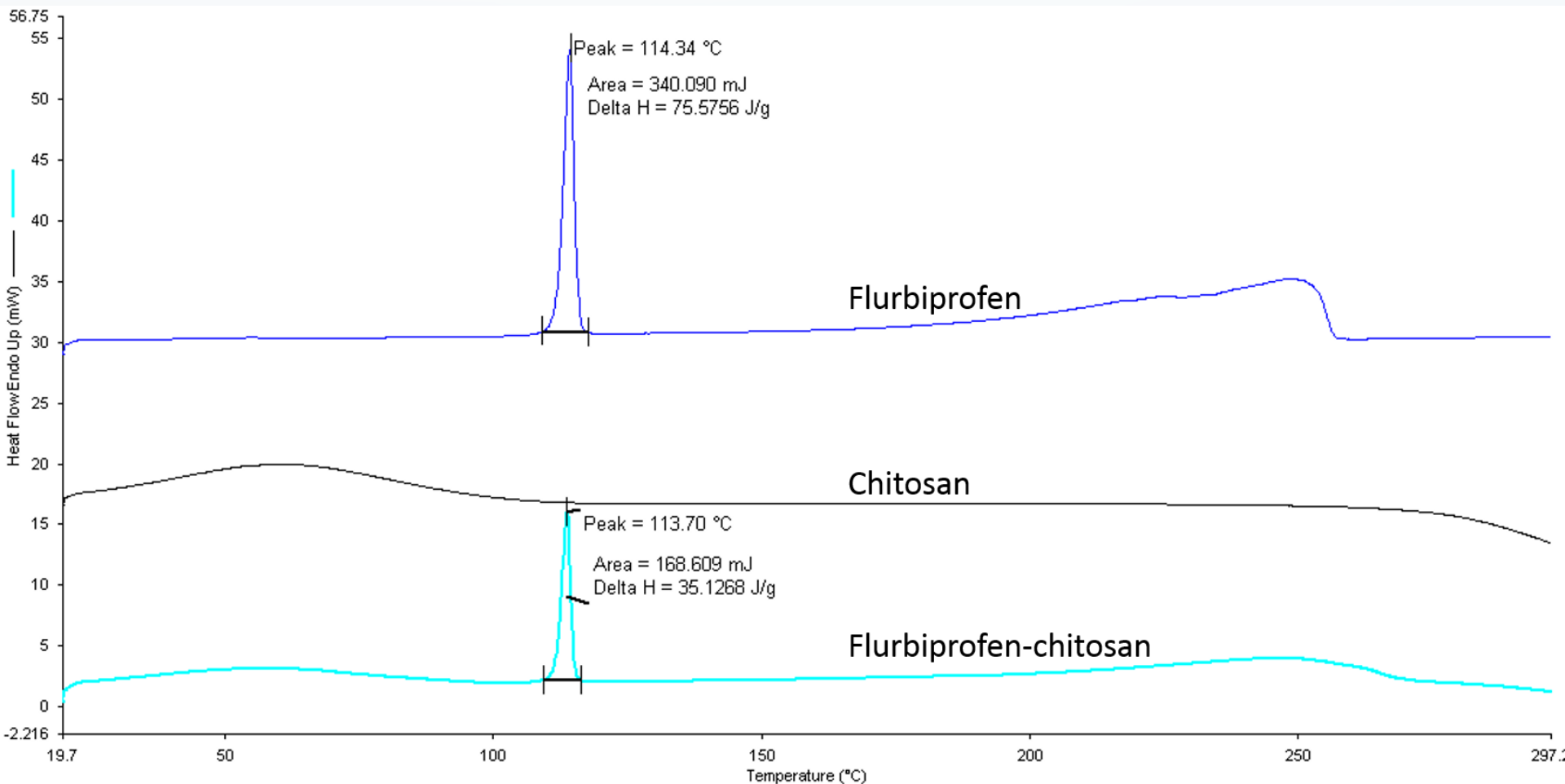
DSC thermograms of pure triclosan, chitosan and triclosan-chitosan combination

DSC



DSC thermograms of pure flurbiprofen, PCL and flurbiprofen-PCL combination

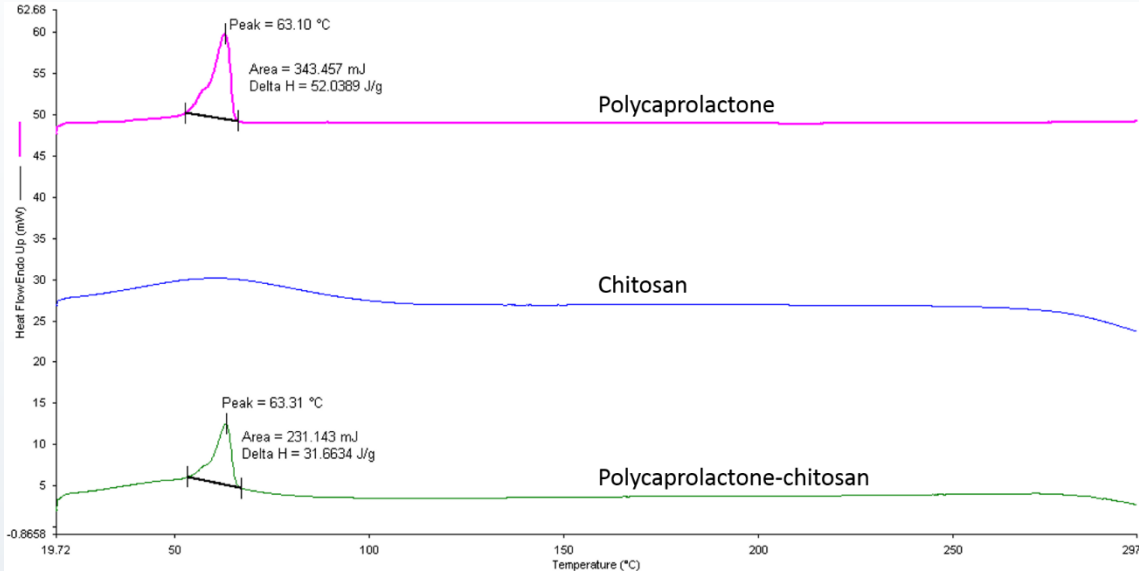
DSC



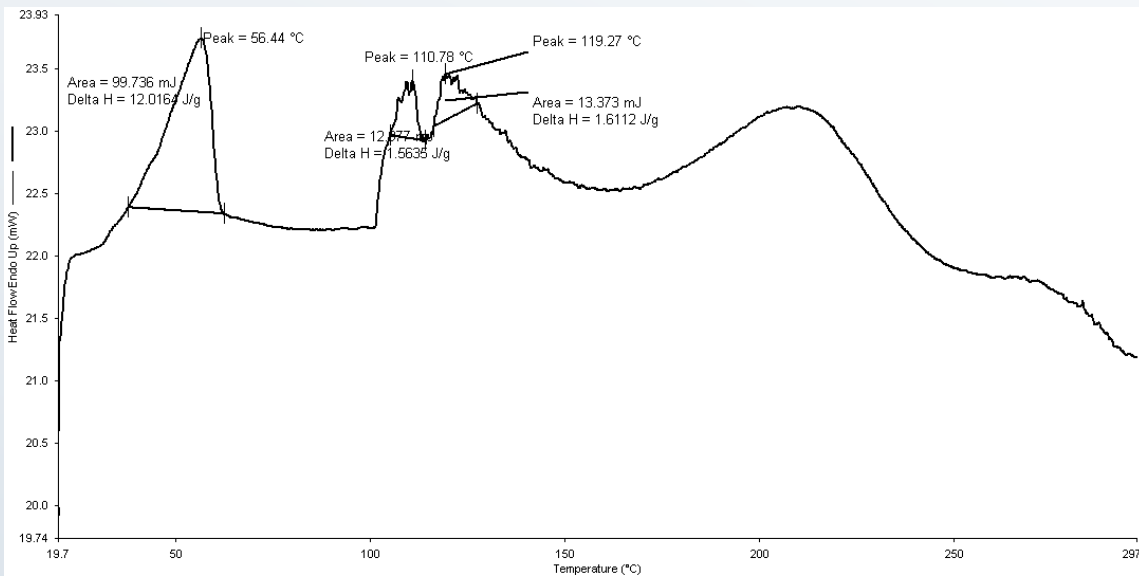
DSC thermograms of pure flurbiprofen, CS and flurbiprofen-CS combination



DSC

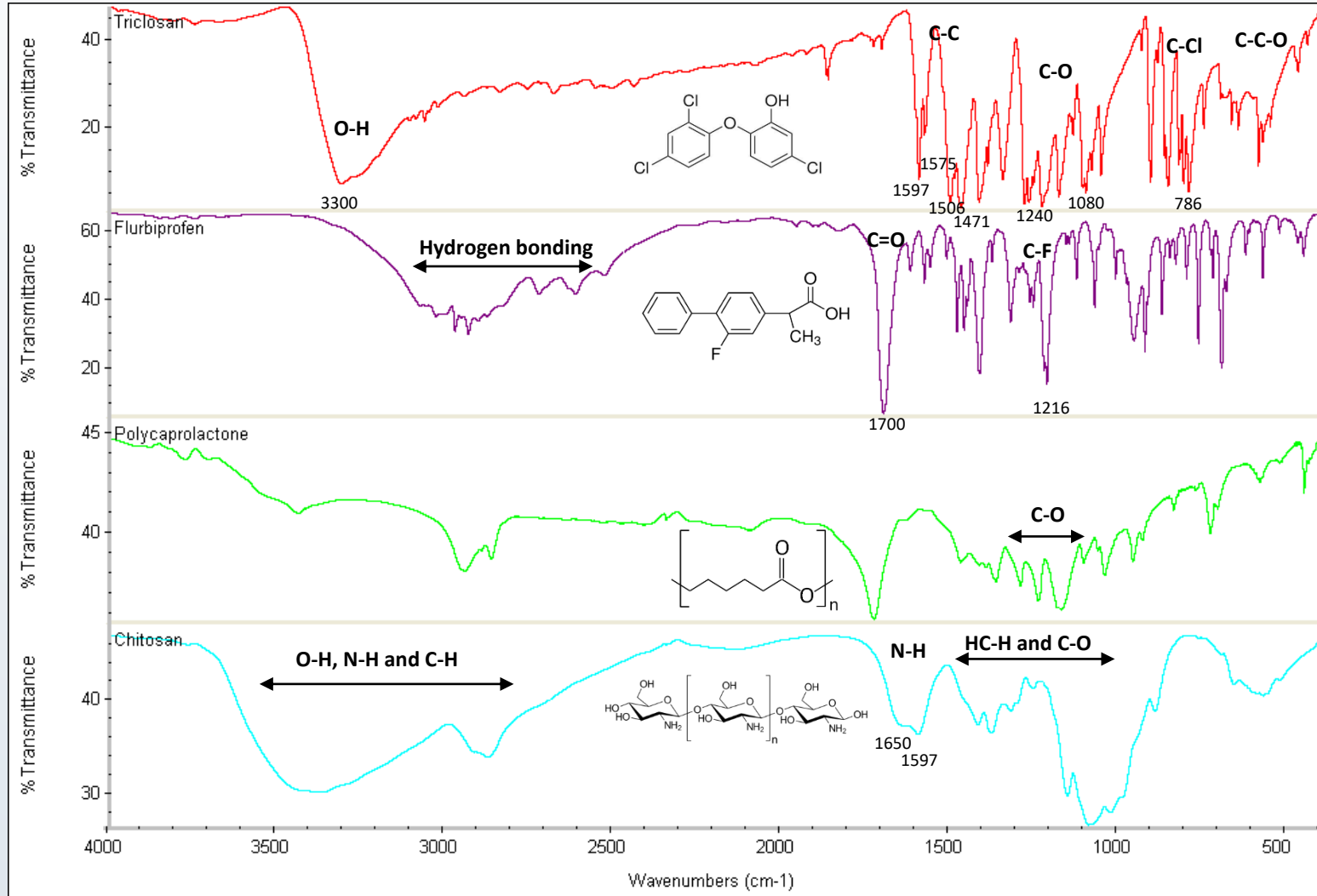


DSC thermograms of pure PCL, CS and PCL-CS combination

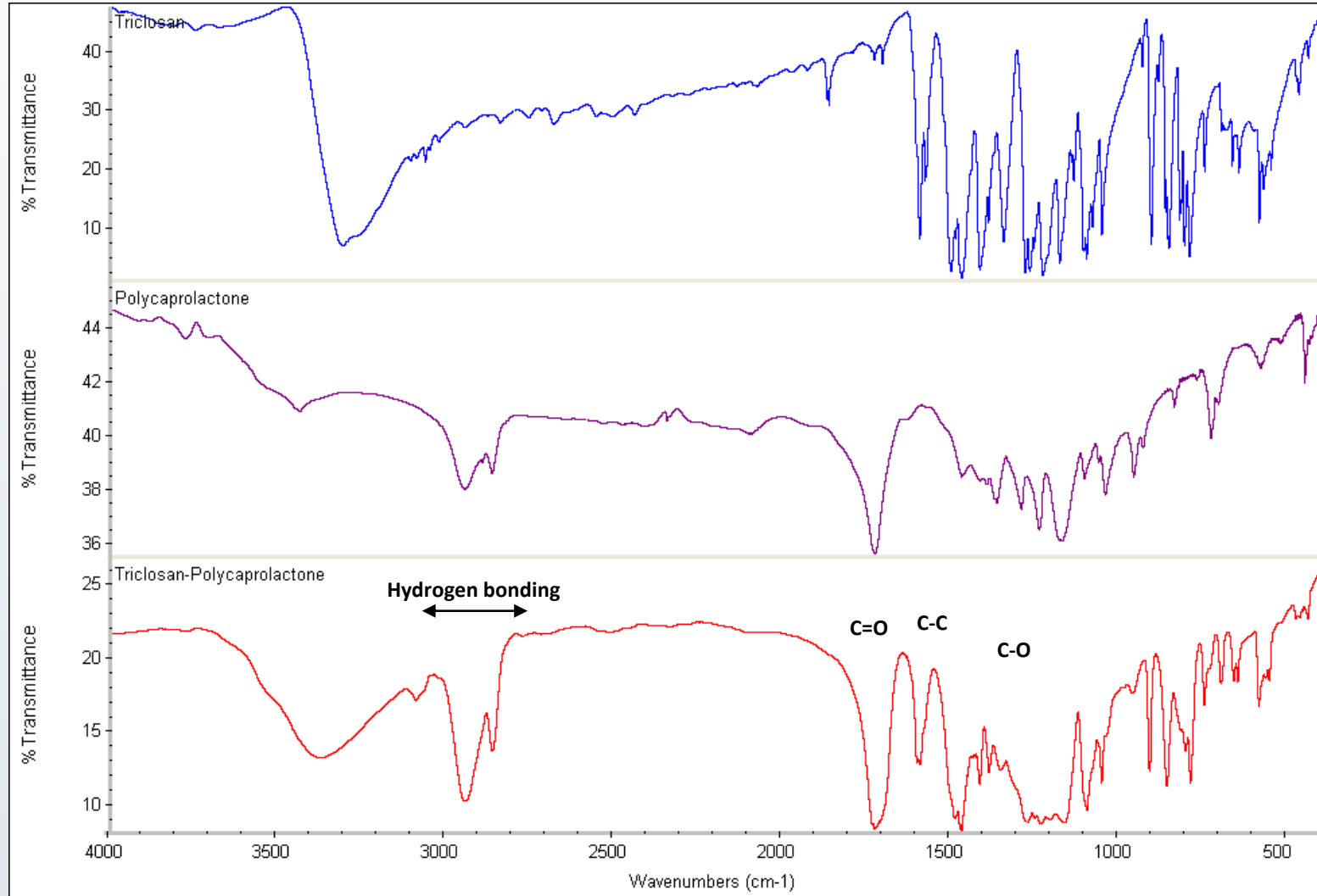


DSC thermograms of blend of triclosan, flurbiprofen, PCL and CS

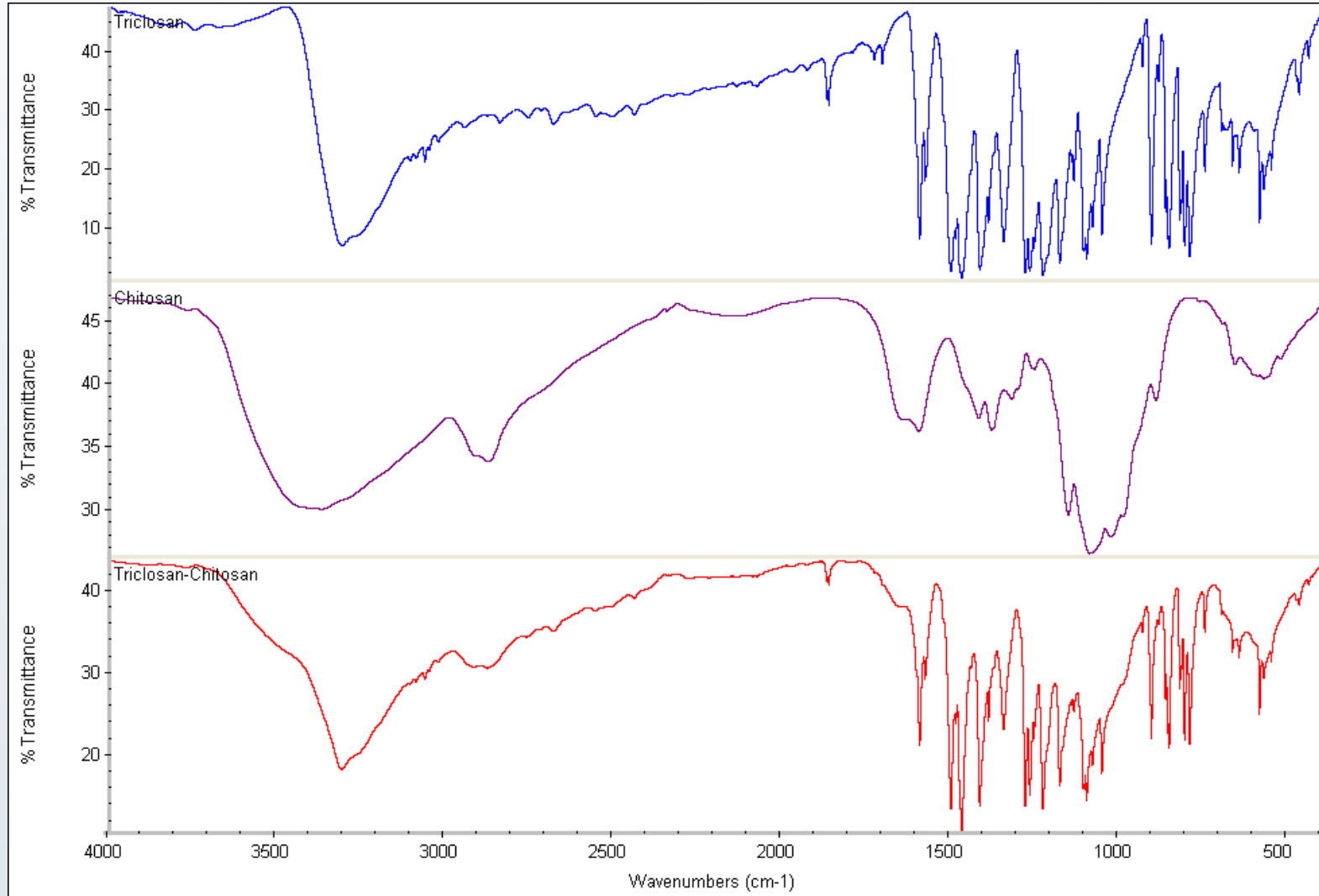
FTIR



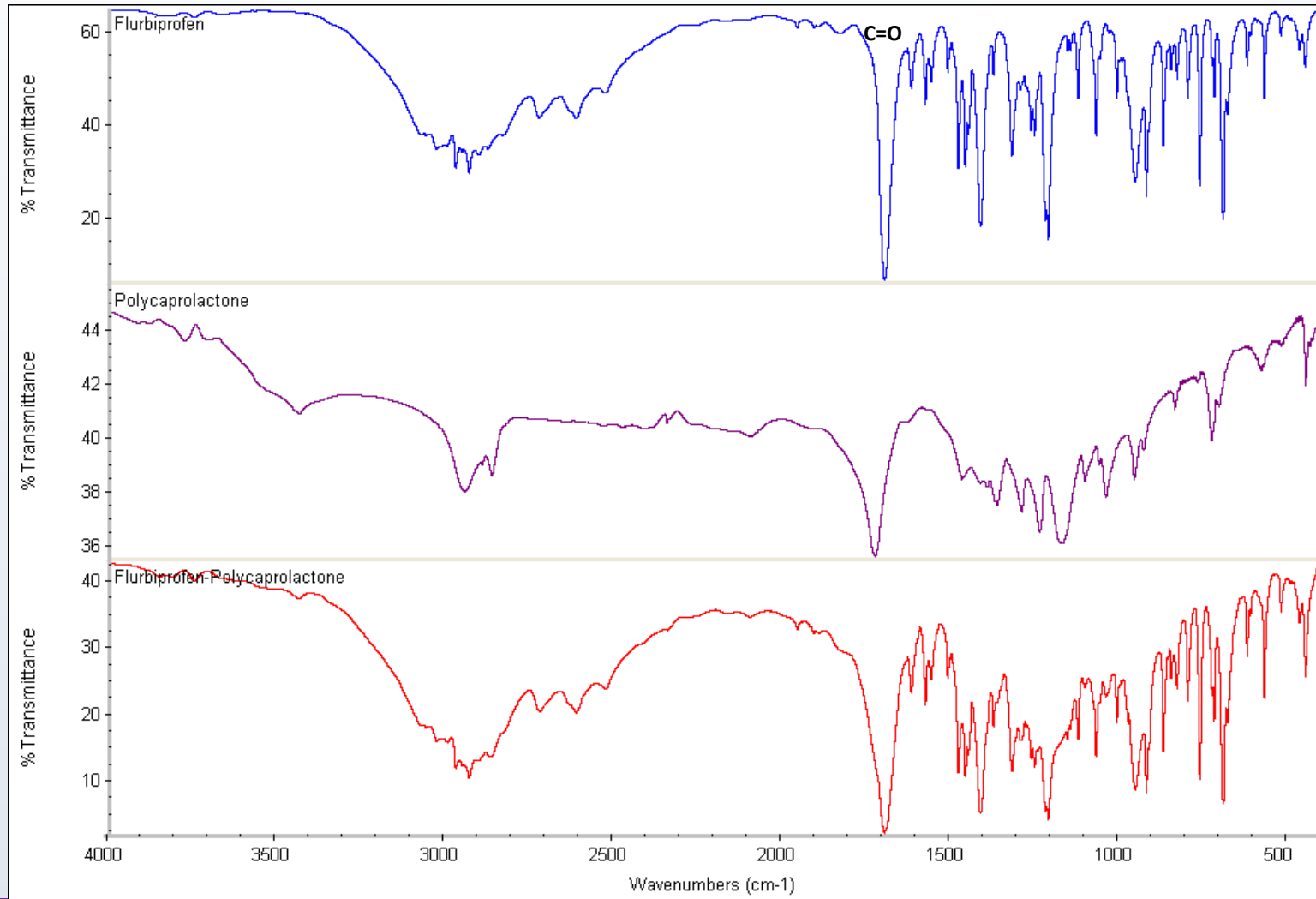
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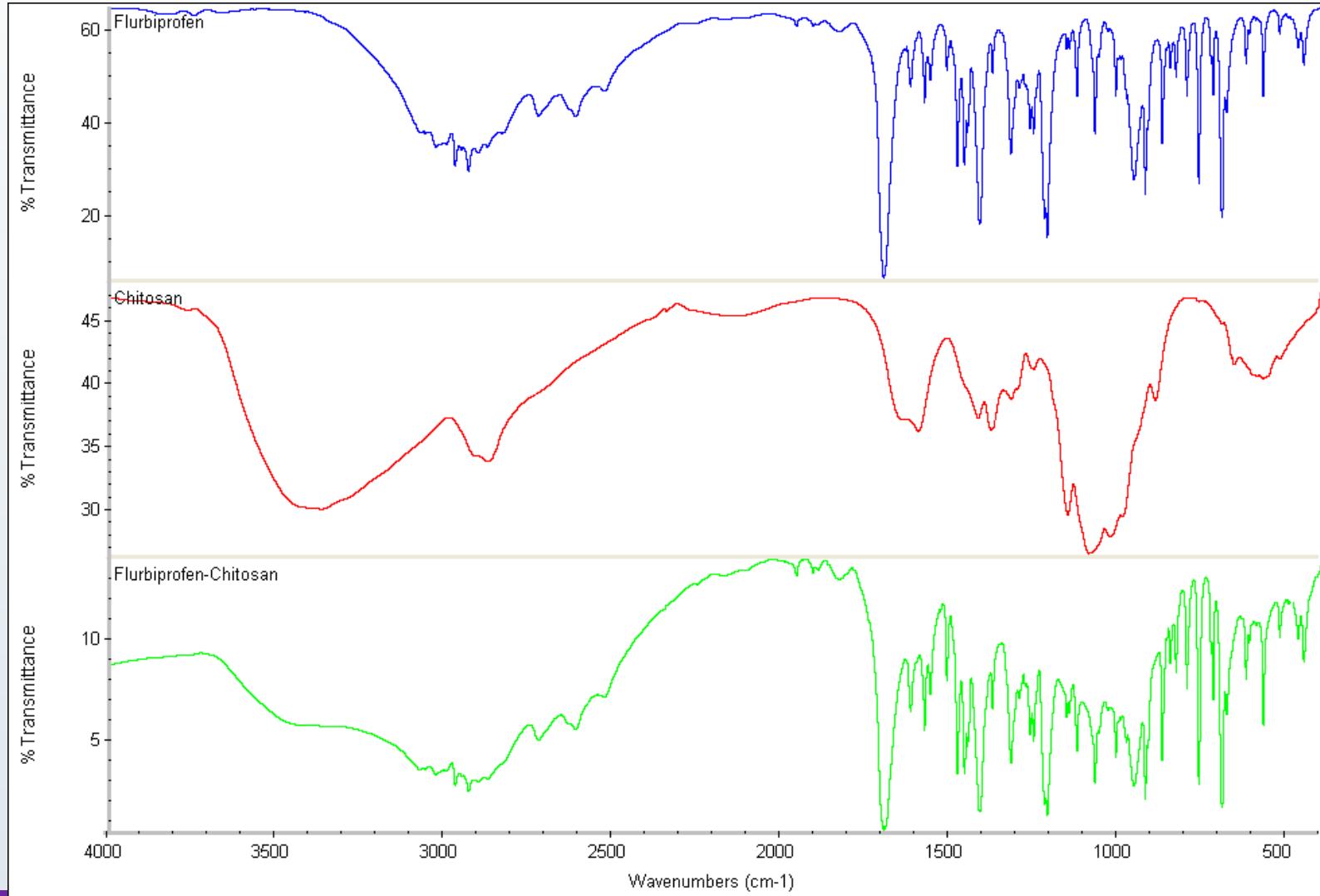
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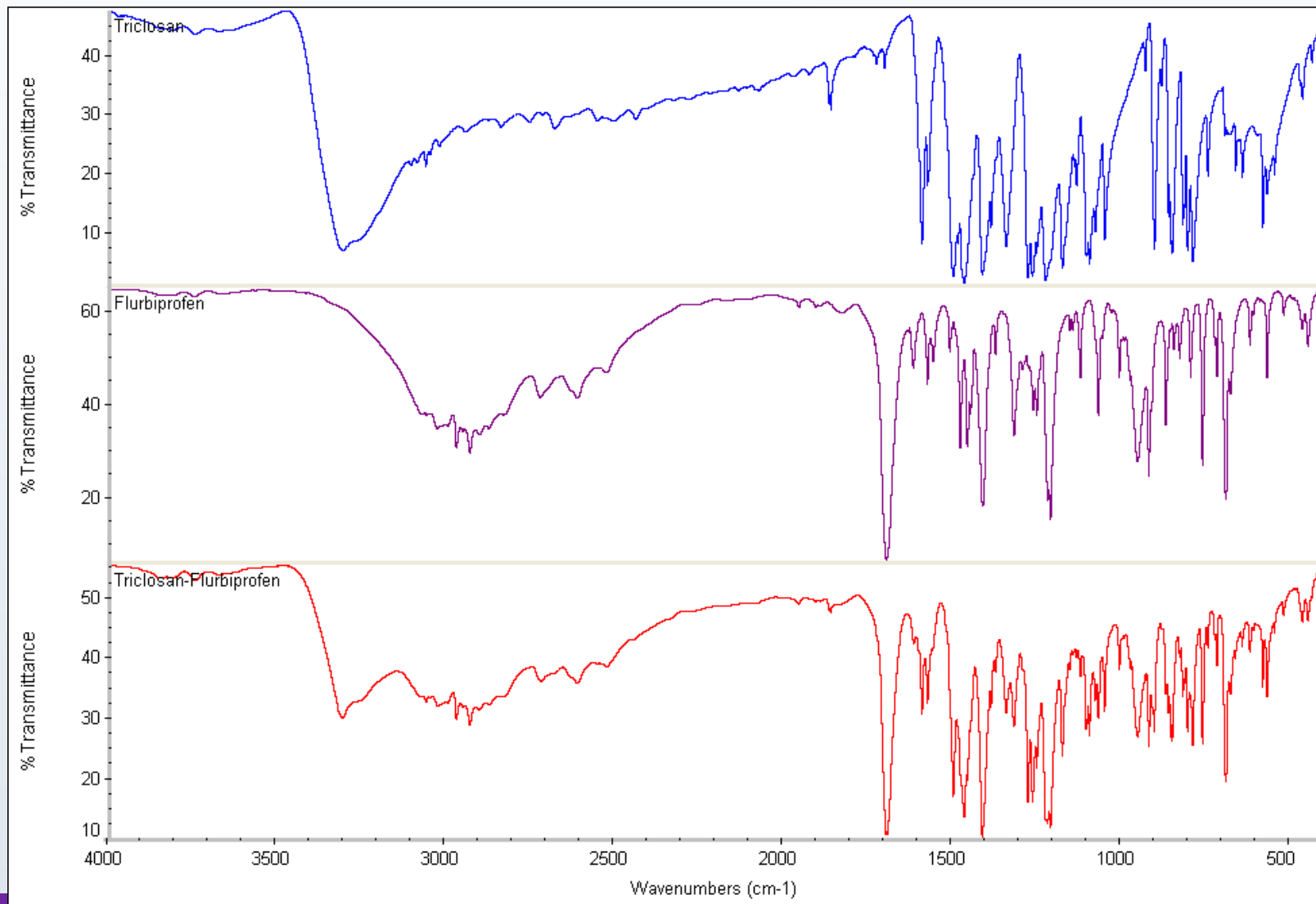
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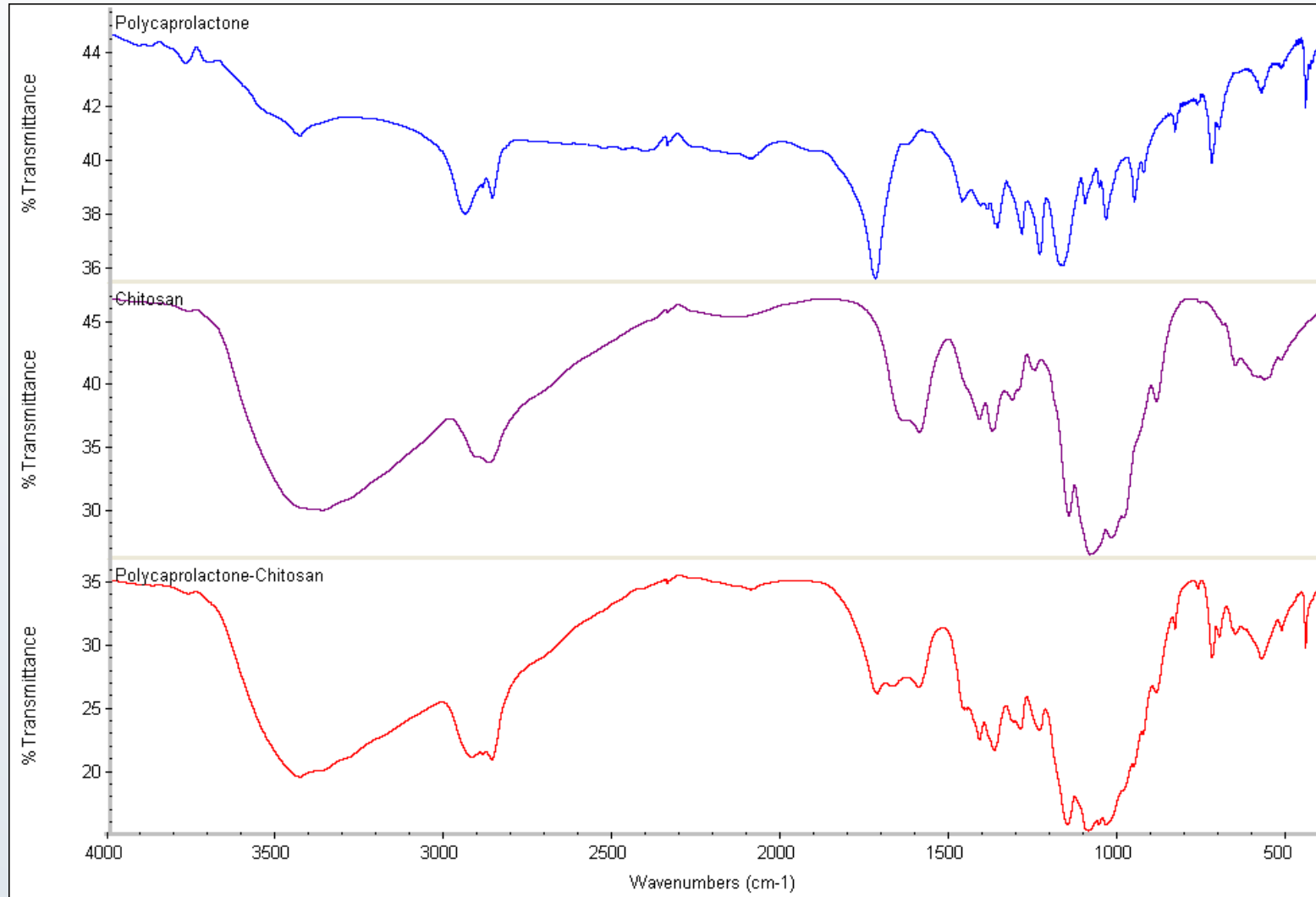
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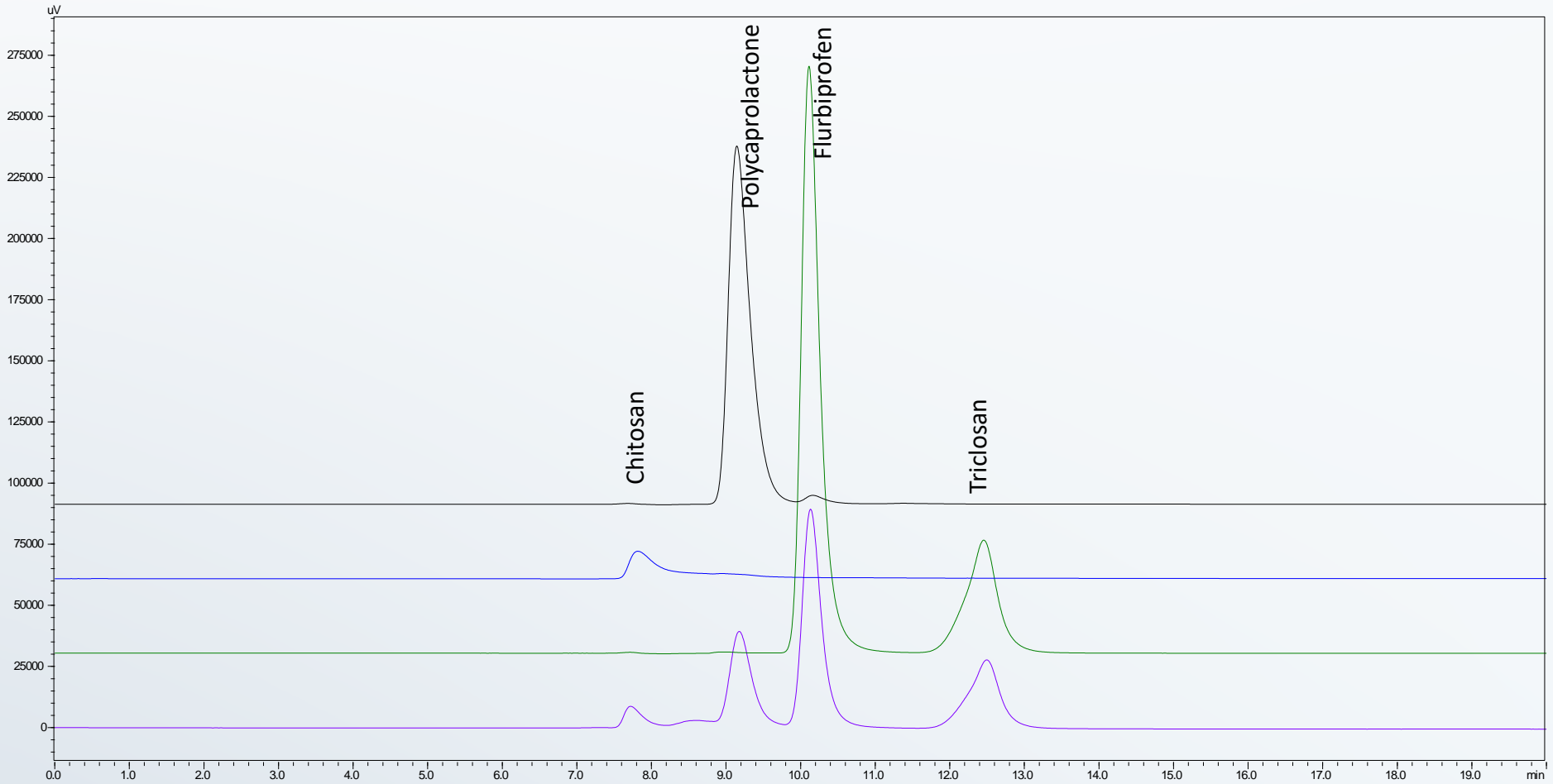
FTIR



FTIR



HPLC

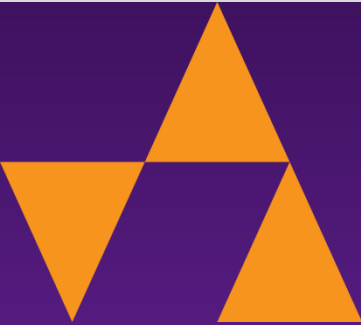


CONCLUSION

The study showed that TCS and FLB are compatible with each other and with the selected excipients for nanogel formulation.



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THANK YOU.