

Background problem and Introduction

- ❖ Water pollution is considered as one of the most severe and challenging environmental issues.
- ❖ Hexavalent chromium (Cr VI) is a toxic heavy metal that causes severe environmental and human health hazards
- ❖ Based on the exposure time and concentration, Cr (VI) can have chronic and acute health effects on the human body.
- ❖ Cr (VI) also has mutagenic, carcinogenic, and teratogenic effects in human beings. It increases the risk of cancer, skin allergies and damages the liver and kidney.

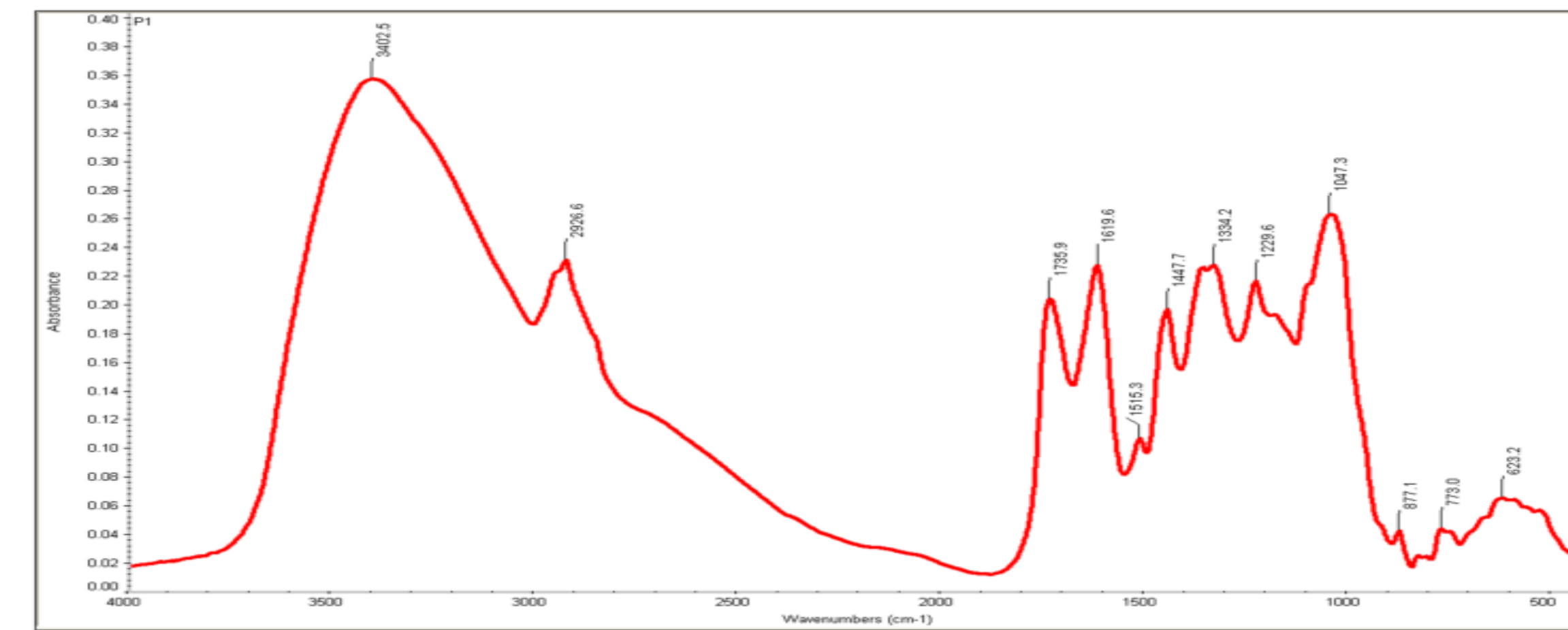


Synthesis

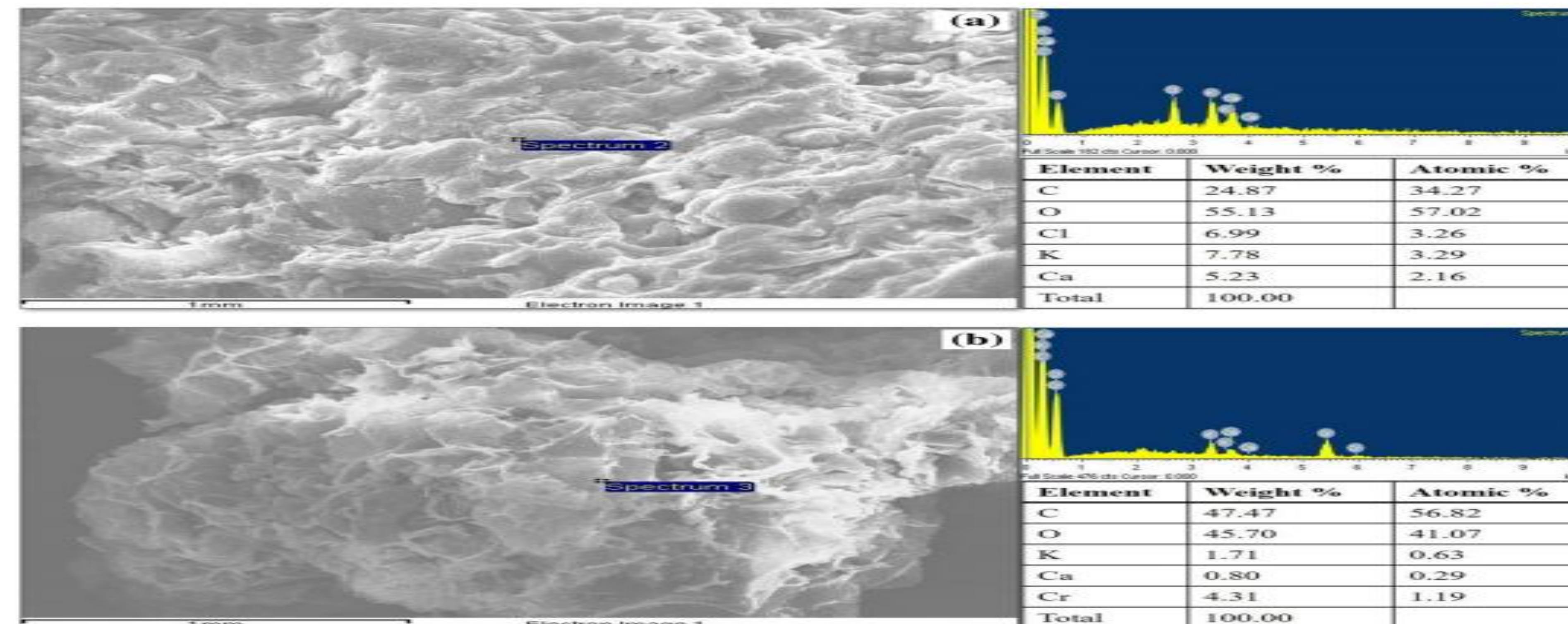
Removal Comparison

Adsorbent	q_{max} (mg/g)	References
Ash gourd (<i>Benincasa hispida</i>) peel	18.7	Sreenivas et al. (2014)
Modified litchi peel	9.55	Yi et al. (2017)
Orange peels powder	4.69	Malook (2019)
Orange peels	7.14	Khalifa et al. (2019)
Common tobacco (<i>N. tabacum</i> L.)	9.87	Prokopov et al. (2019)
Pomegranate peel	20.87	Present study

Characterization

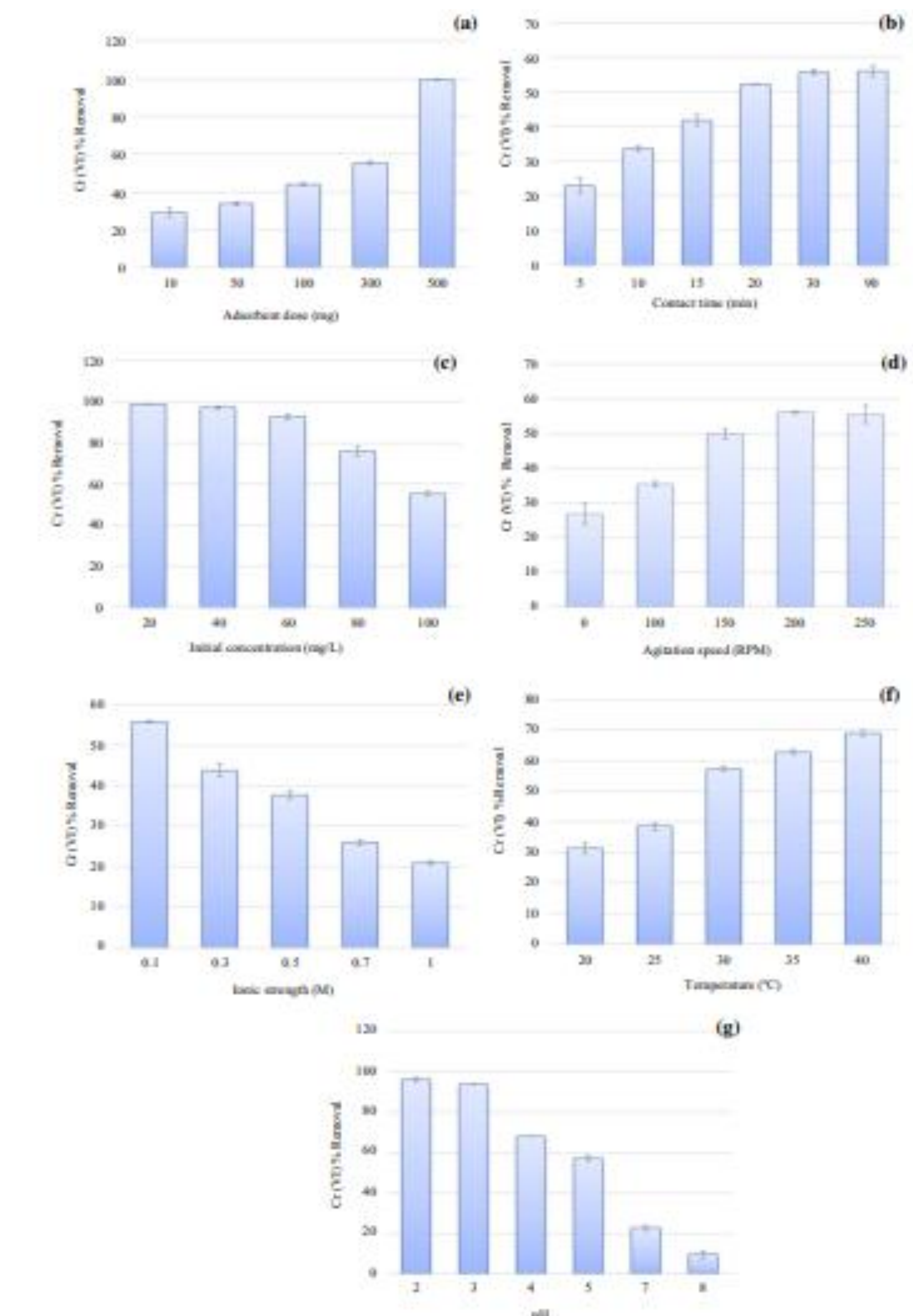


FTIR



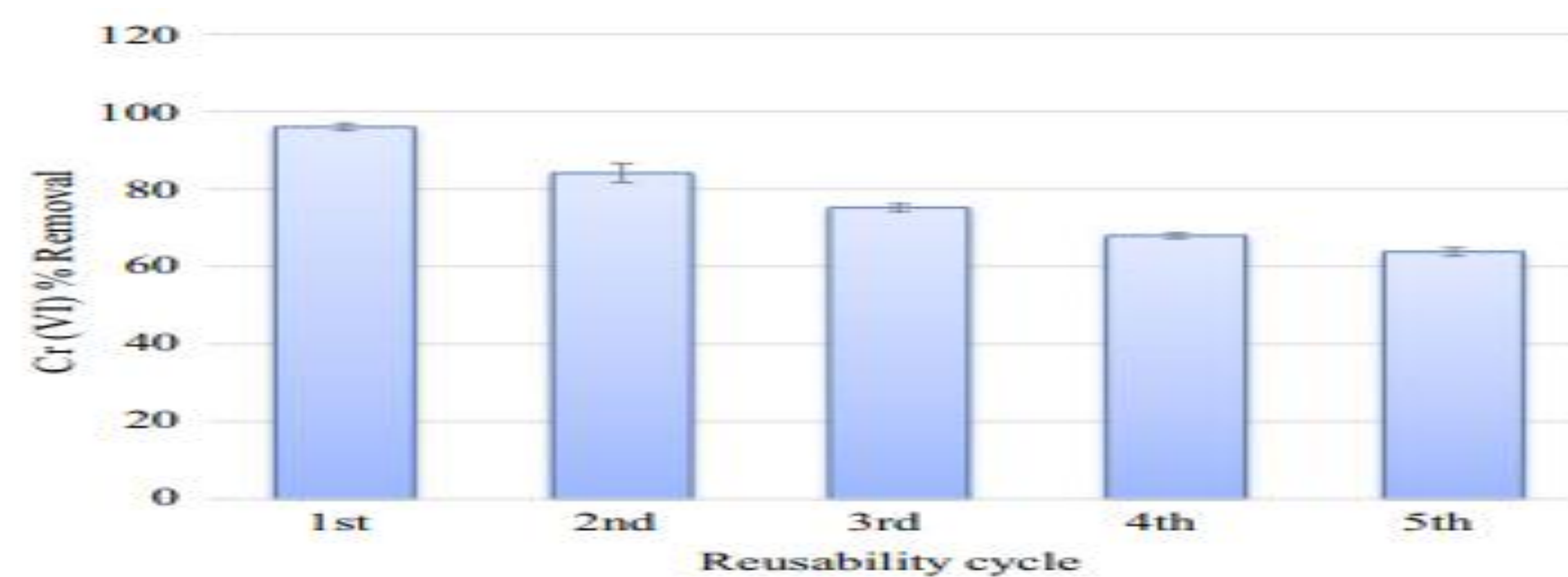
FESEM

Results



Effect of reaction conditions on Cr (VI) removal efficiency a) adsorbent dosages, b) contact time, c) initial concentration, d)agitation speed, e ionic strength, f) temperature, g) pH. Error bars represent standard deviation of the mean value of triplicates

Reusability



Conclusion

- The present study showed that pomegranate peel is a promising candidate for Cr (VI) removal from contaminated aqueous matrices.
- The removal efficiency of Cr (VI) was found to be dependent on adsorbent dosage, solution pH, contact time, initial Cr (VI) concentration, temperature, agitation speed, and ionic strength
- The maximum adsorption capacity (q_{max}) was observed to be 20.87 mg/g.
- The reusability experiments indicated that the pomegranate peel could be reused effectively for Cr (VI) adsorption up to five cycles.
- For industrial applications, pilot-scale studies are needed to be carried out to ensure optimization of the overall process adapted to the production system..