

Introduction

Antibiotics consumption is on the increase due to increase in world population and improved life expectancy.

The inefficiency of waste water treatment plants has led to the release of antibiotics into aquatic environment in form of complex compounds which has resulted in antibiotics resistance ¹.

Adsorption which is an established technique for the removal of contaminants due to it features such as lower toxicity, environmental amiability, simple design, low energy cost and safe operation.

Lignocellulose material like sawdust are utilized as adsorbent due to their porosity, wide surface area, easy modification, good liquid retention capacity and biodegradability ²

Objectives

To evaluate lignocellulosic material for the adsorption of pharmaceuticals.

To access the effect of physio-chemical parameters on adsorption process.

To access the effect of acid pretreatment on sawdust.

Discussion

The result of this research shows that at pH 3, the treated sawdust had the maximum adsorption capacity with a removal efficiency of 73% compared to raw sawdust 62.6%. At an initial concentration of 25µg/ml at pH 7, the treated sawdust had a removal efficiency of 52.45% compared to the raw sawdust of 32.79%. Furthermore, contact time result shows that after 48 hours, the treated sawdust had the highest removal efficiency of (57.20%)compared to the raw sawdust (46.29%). At a temperature of 35°C treated sawdust had a removal efficiency of 55.6% compared to raw sawdust which was 34.62%

Conclusion

Rifampicin was adsorbed by the treated sawdust with a removal efficiency of 73% as observed, which suggest the potential of Sitka spruce sawdust as an effective and low-cost adsorbent for the removal of antibiotics from water.

The next phase of this research work is to characterize the saw dust samples to ascertain the effect of pretreatment.

References

- Akinsanmi, O., Kaya, S., Tretsiakova-McNally, S., Arnscheidt, J. and Coleman, H.M., 2019, July. Tackling Antimicrobial Resistance: Adsorption of meropenem and ciprofloxacin on lignocellulosic substrate from sawdust. In European Waste Water Management Conference
- Bankole, D.T., Oluyori, A.P. and Inyinbor, A.A., 2023. The removal of pharmaceutical pollutants from aqueous solution by Agro-waste. Arabian Journal of Chemistry, 16(5), p.104699.

Results

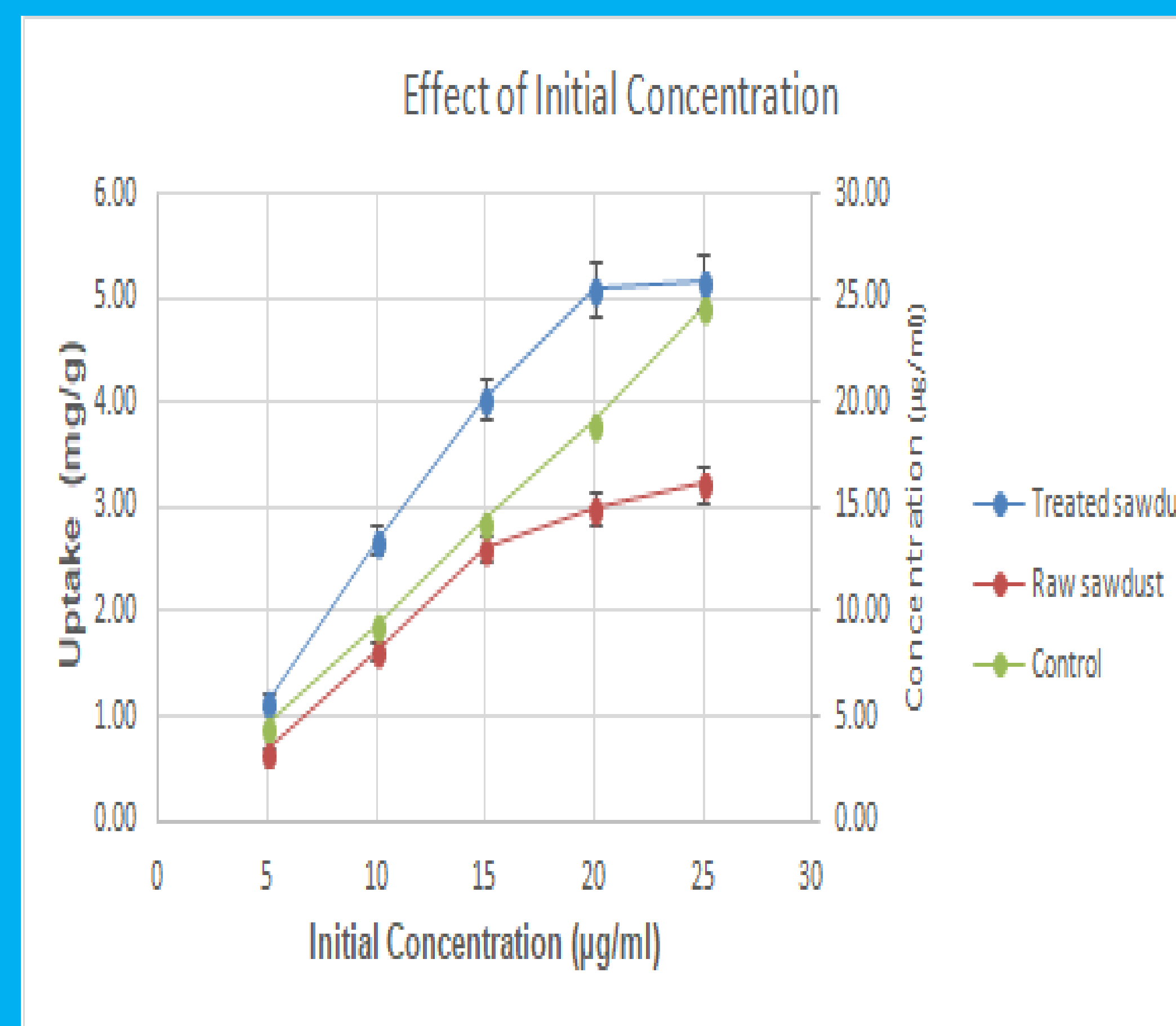


Fig 1: Effect of initial concentration on Rifampicin removal

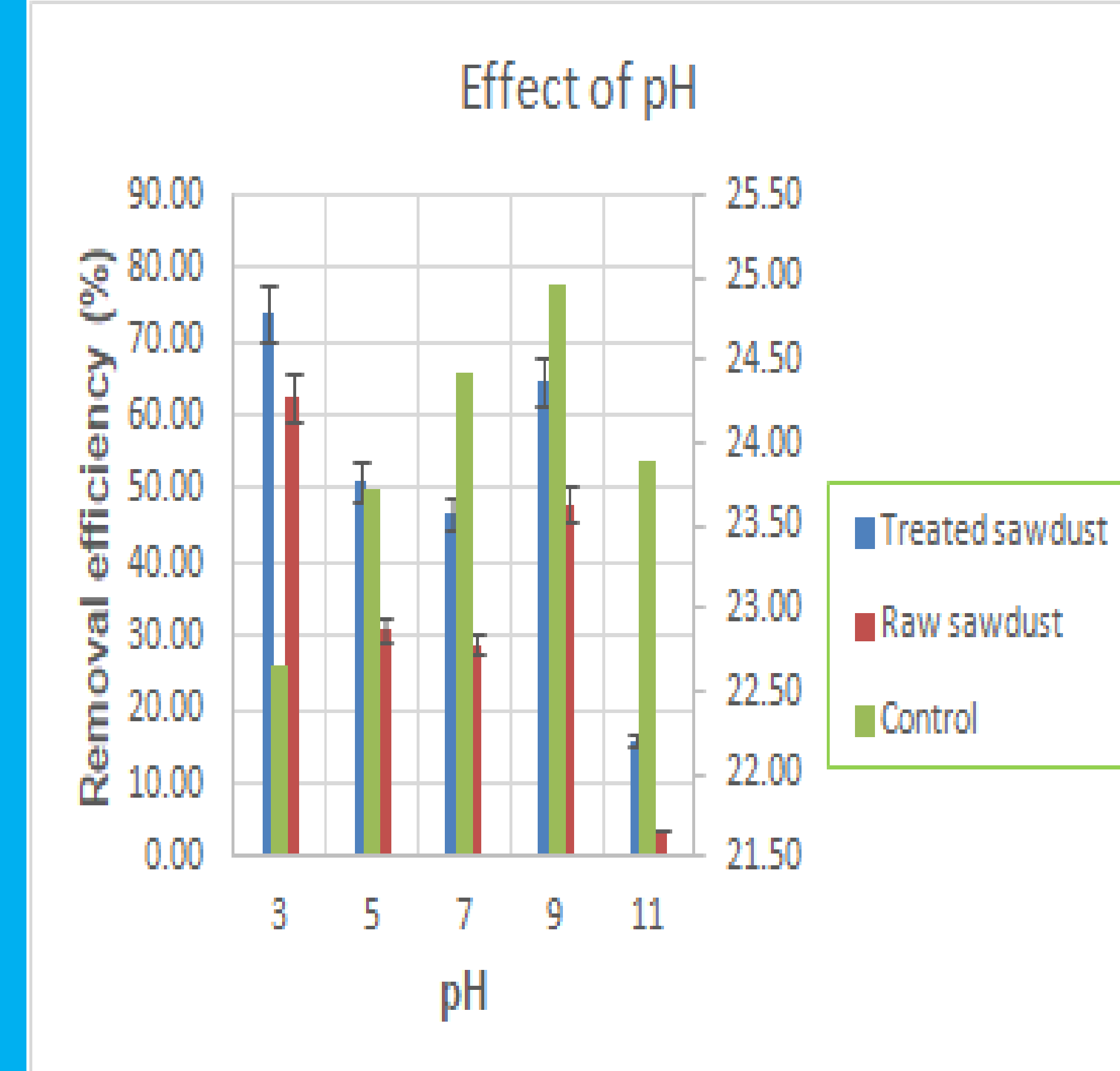


Fig 2: Effect of pH on Rifampicin removal

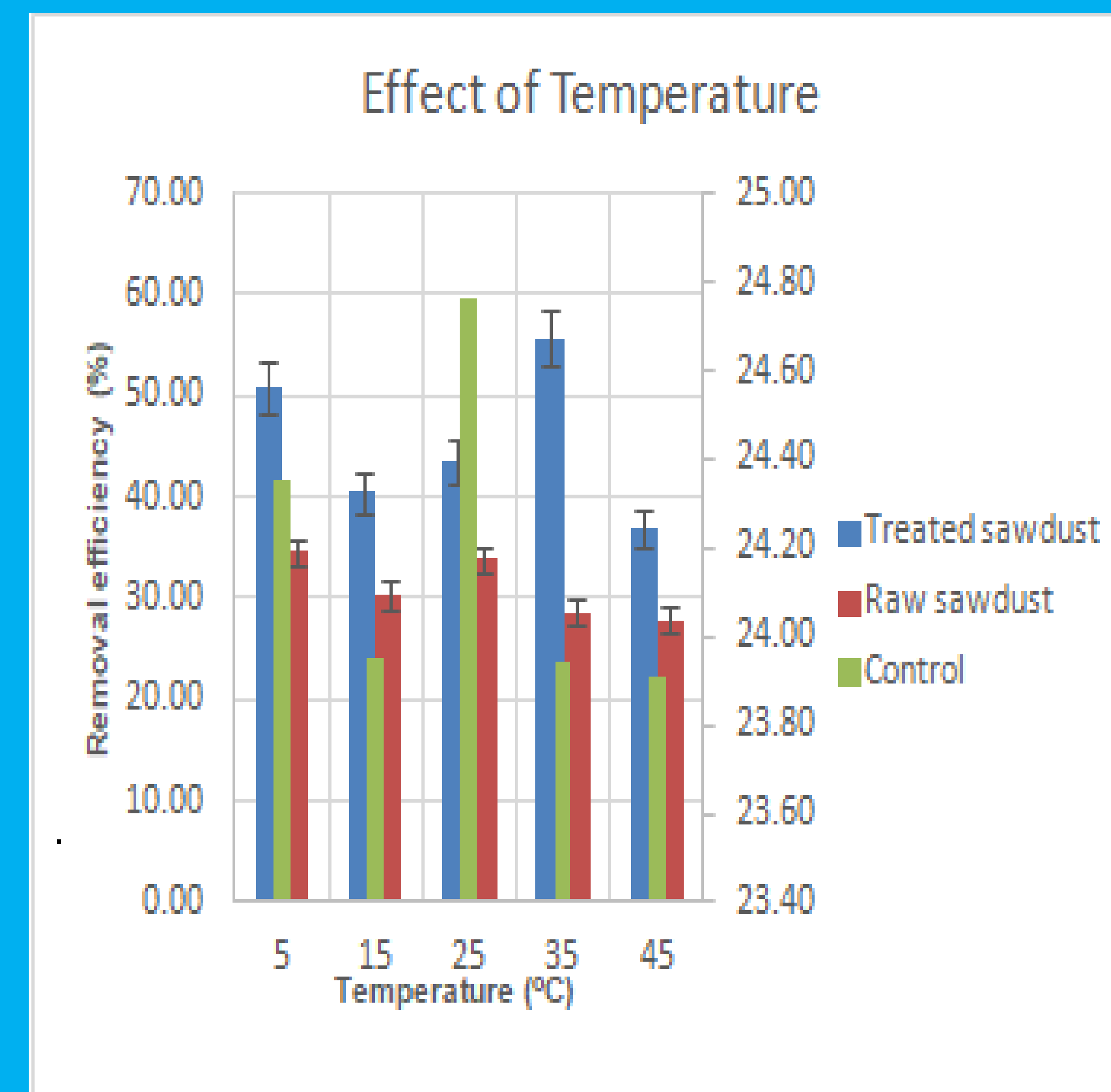


Fig 3; Effect of temperature on Rifampicin removal

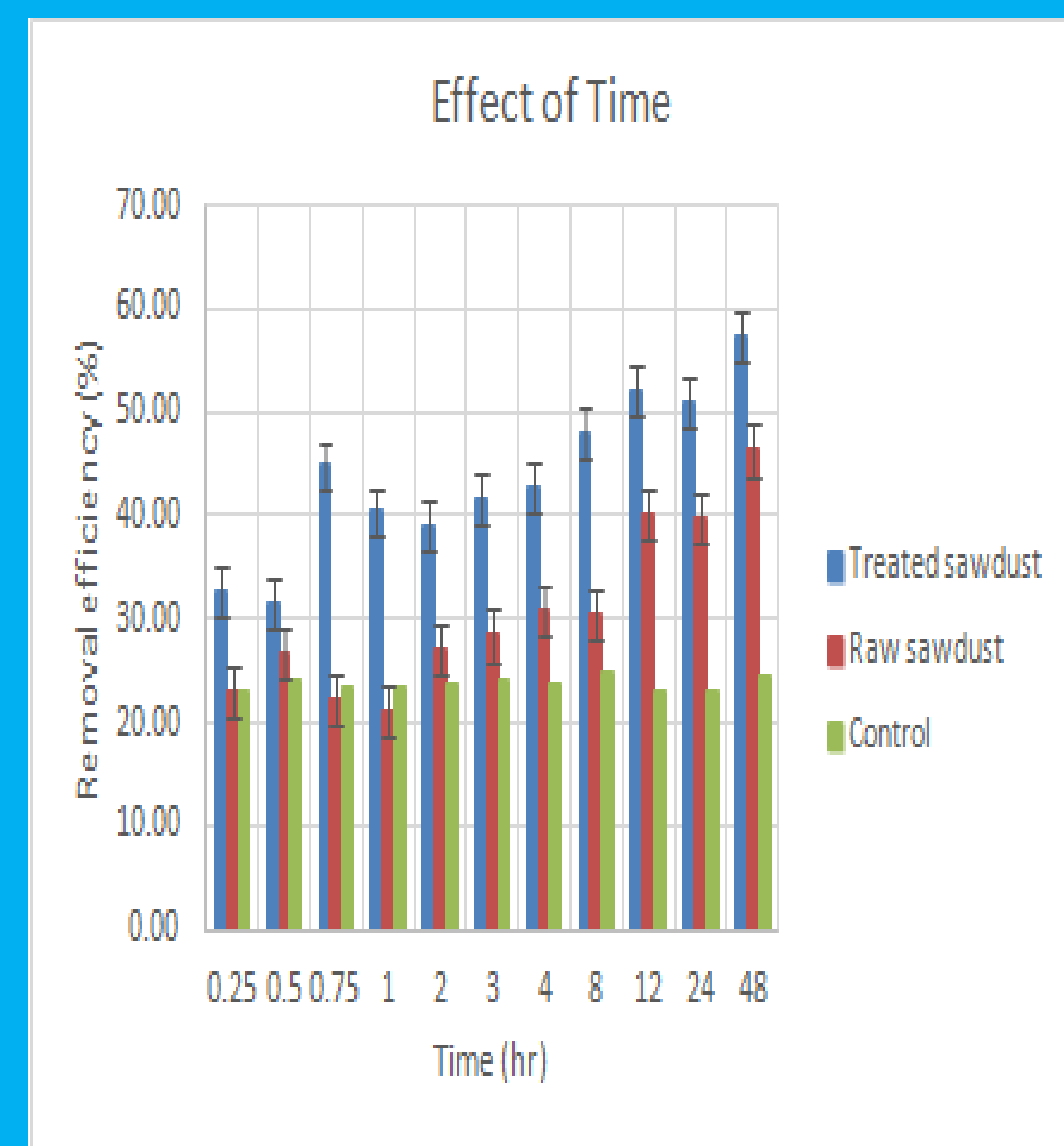


Fig 4: Effect of time on Rifampicin removal

Methods

