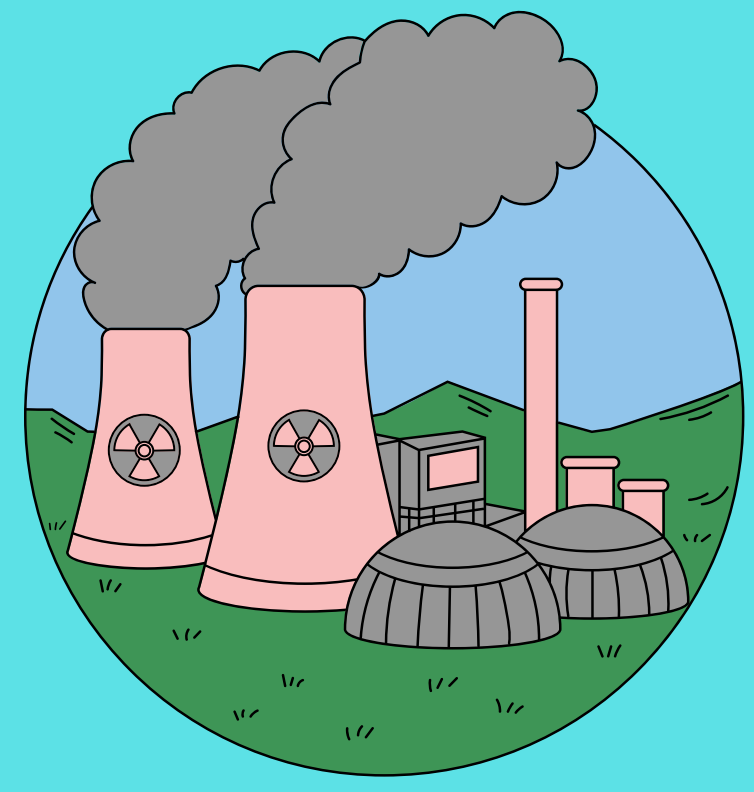


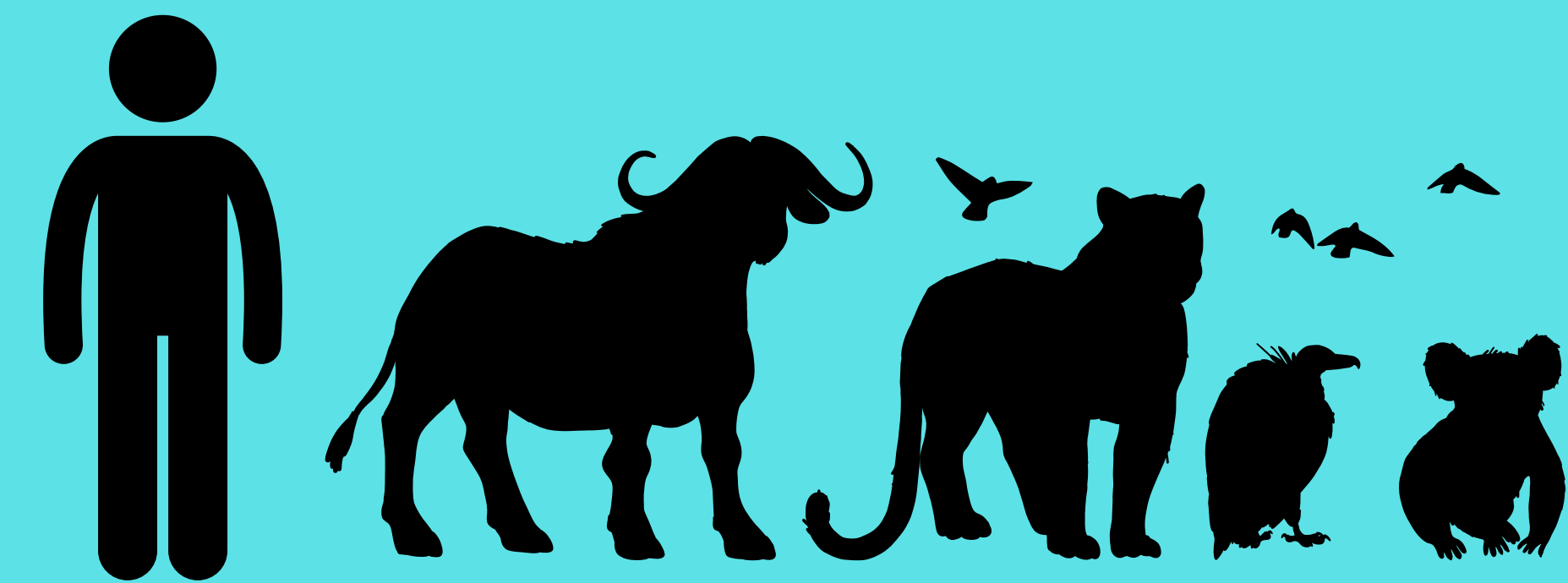
Jackfruit Seed Waste Biochar for Iodine Sorption in Nuclear Waste Management

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Introduction



Developing technologies in the nuclear world like closed fuel cycles and fuel repurposing leads to the formation of radioiodides (I-129 and I-131) in wastewater streams, polluting the environment.



Iodine needs to be removed to avoid human and fauna damage, as well as environmental hazards.

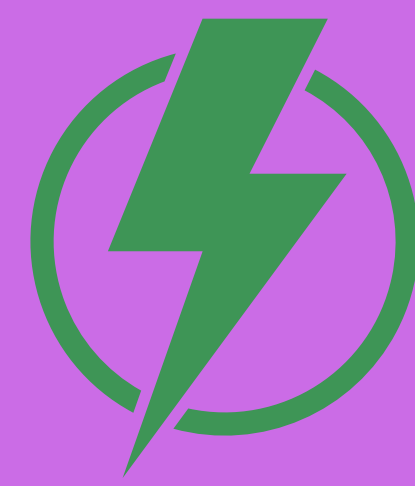


Jackfruit seeds are abundant due to their quantity in waste collection and can be utilised for biochar and adsorption equipments.

What SDG's does this project cover?



SDG 6



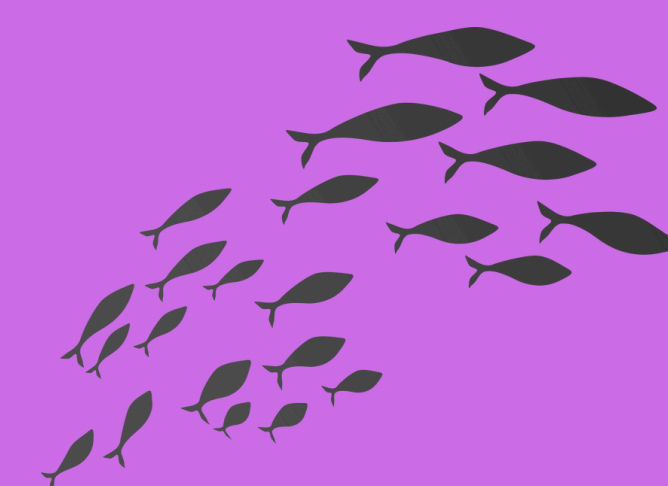
SDG 7



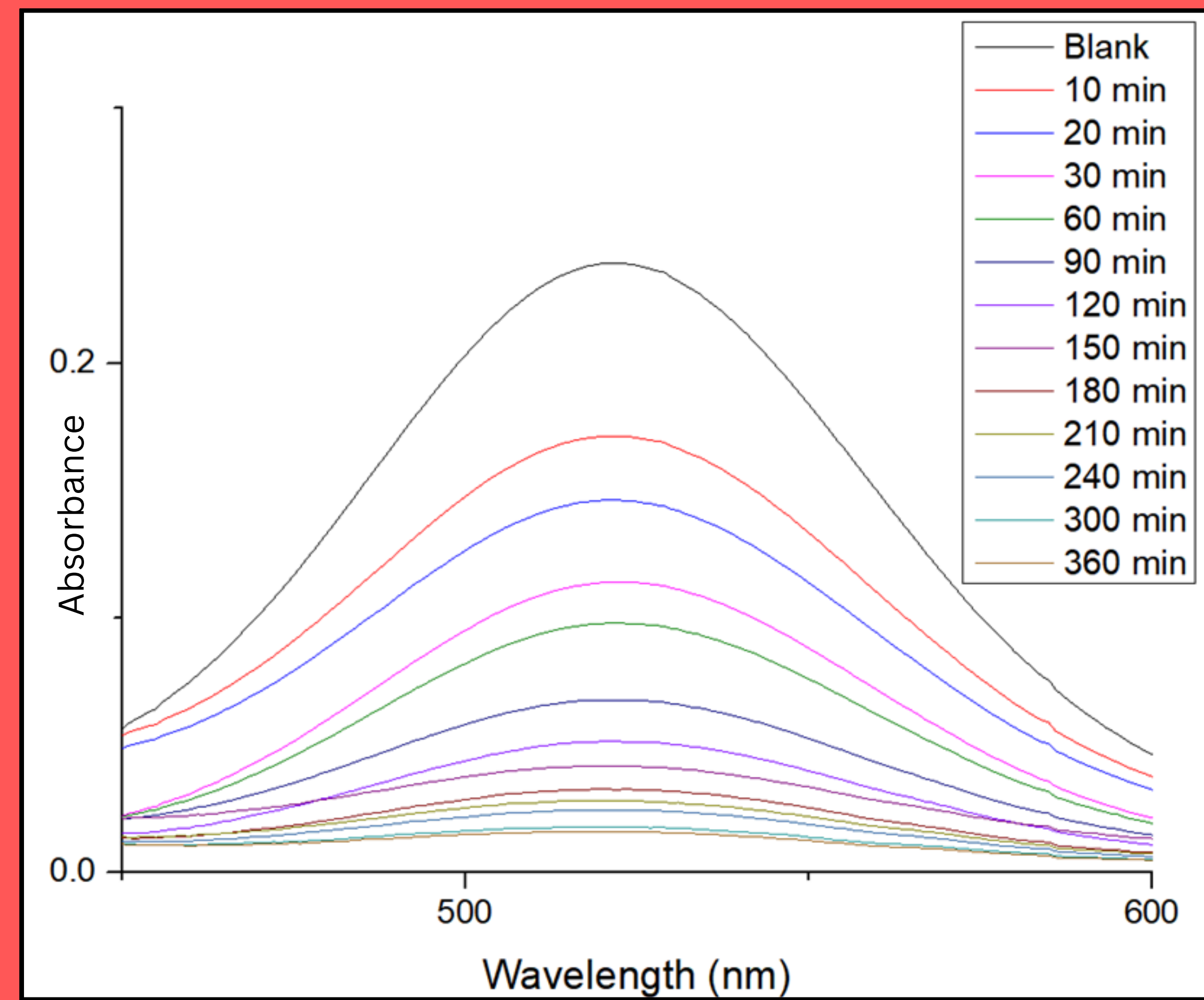
SDG 9



SDG 12



SDG 14

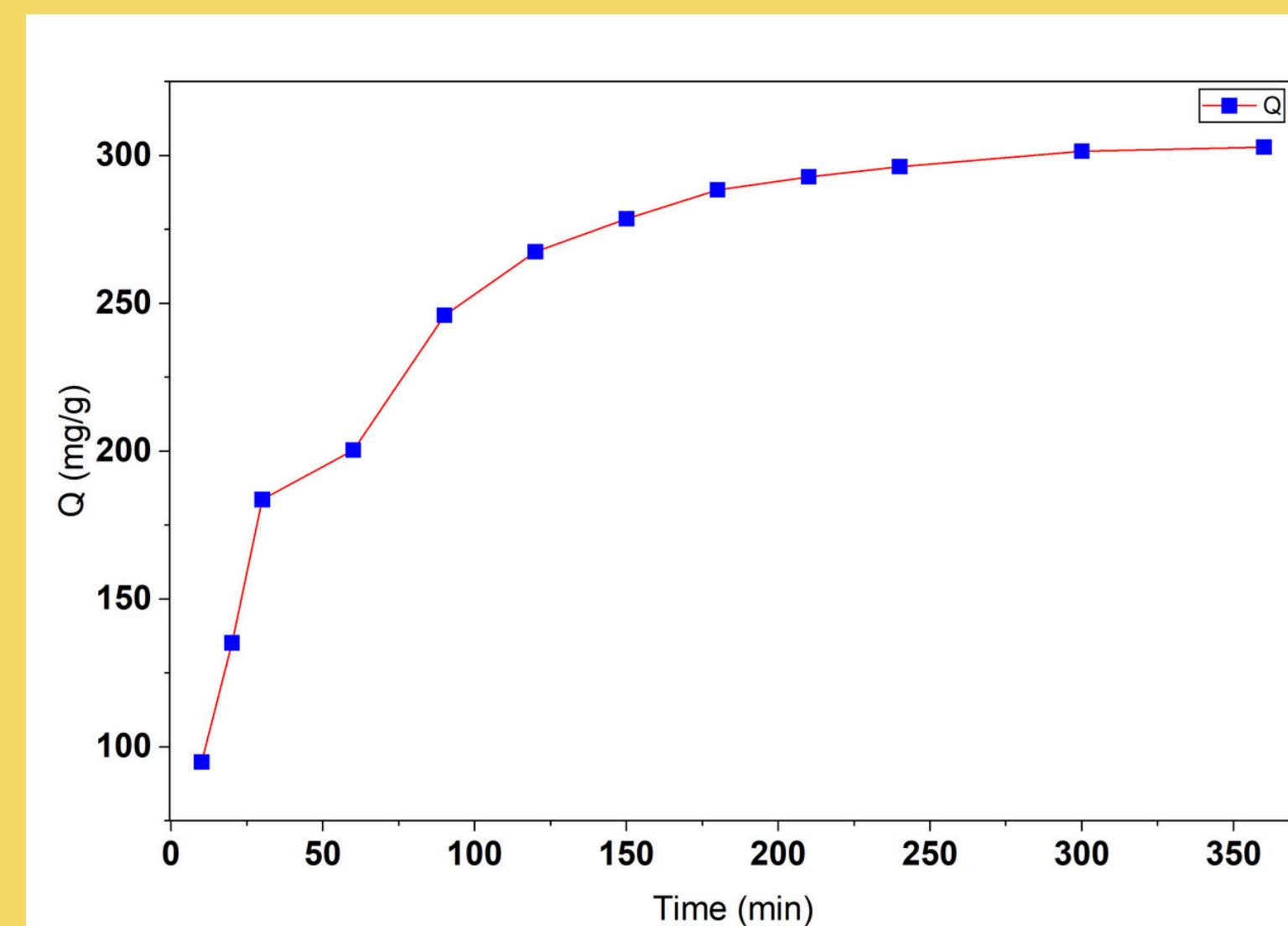


Time Interval Adsorption Studies

Iodine Conc. in Cyclohexane - 300 mg/L

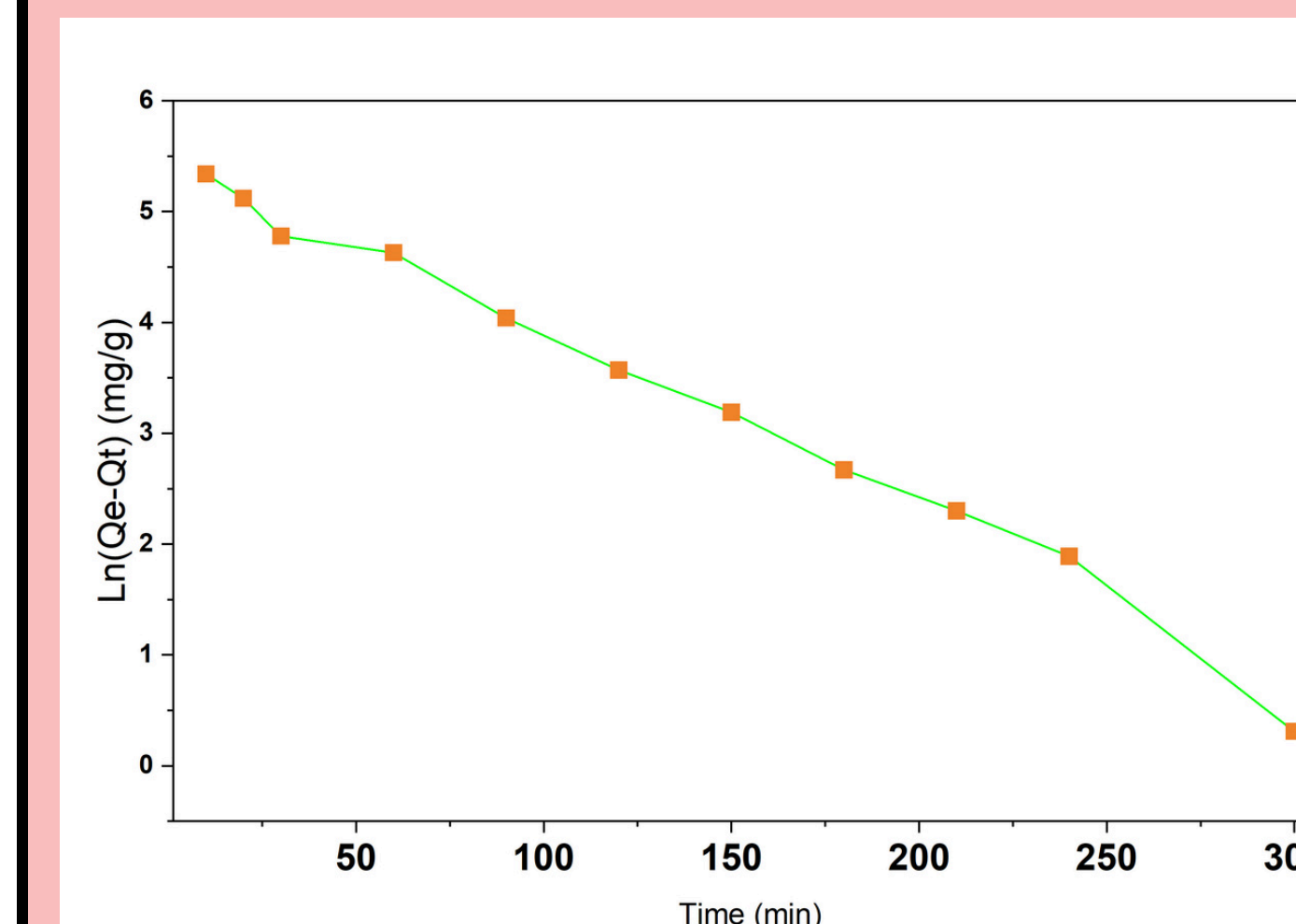
Biochar Amount - 15 grams

Kinetics of Adsorption

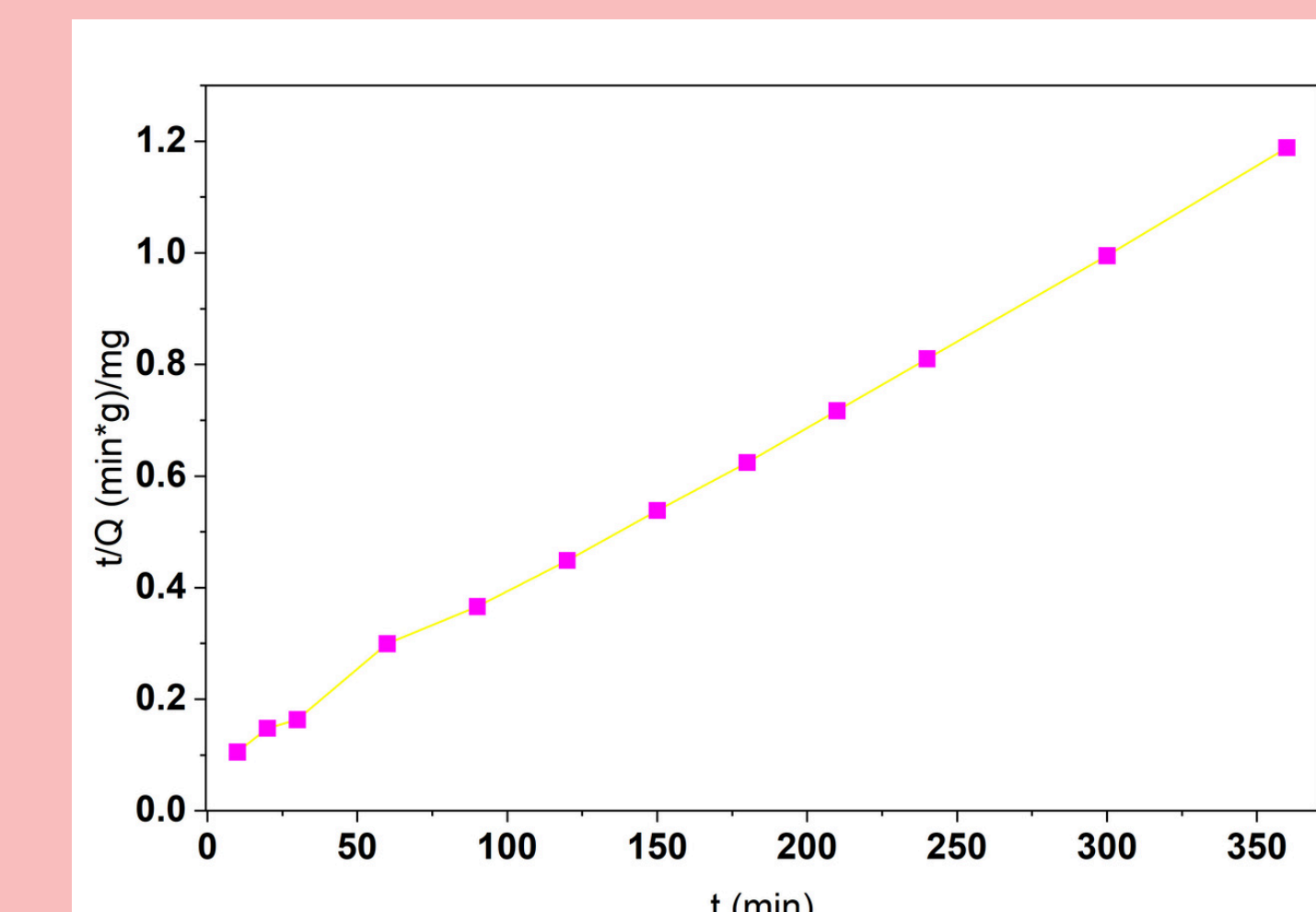


0-180 Mins - Faster rate due to available sites
180-360 mins - Equilibrium and saturation, plateau observed

Pseudo-First and Pseudo-Second Order Kinetics

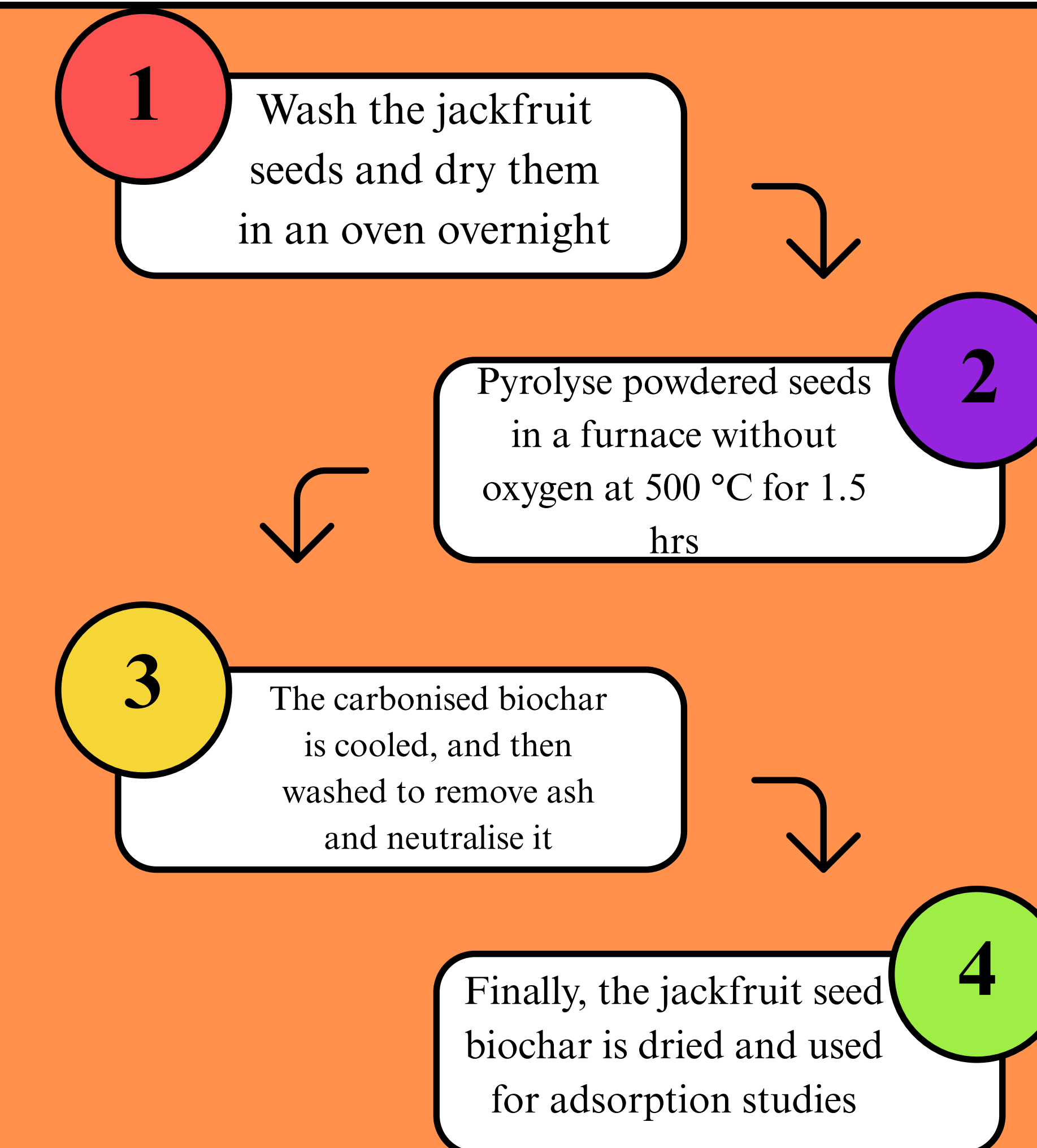


Pseudo-First
 $Q_{max} \text{ (mg/g)} = 268.26 \text{ mg/g}$



Pseudo-Second
 $Q_{max} \text{ (mg/g)} = 328.95 \text{ mg/g}$

Preparation of Jackfruit Seed Biochar



Conclusion

- The maximum adsorption capacities of 268.26 mg/g and 328.95 mg/g from two models indicate that jackfruit seed biochar would efficiently work for iodine removal.
- With an renewable feedstock and simpler procedure, this adsorbent can work excellently in purifying nuclear wastewater,