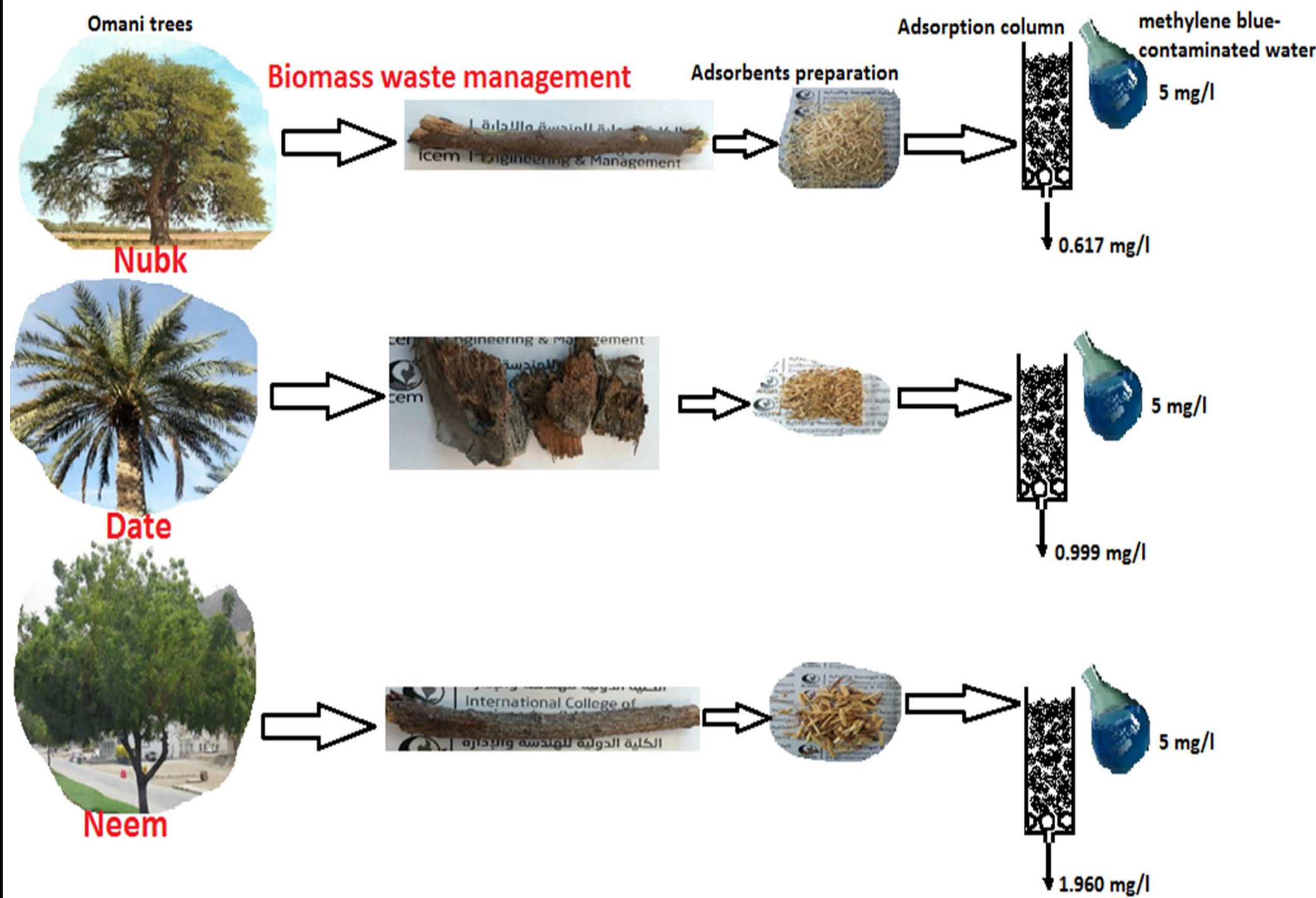


## Graphical Abstract and Problem Statement












Identifying low-cost or free alternative adsorbents to replace expensive synthetic options currently used for dye removal from wastewater.

## Hypothesis Statement

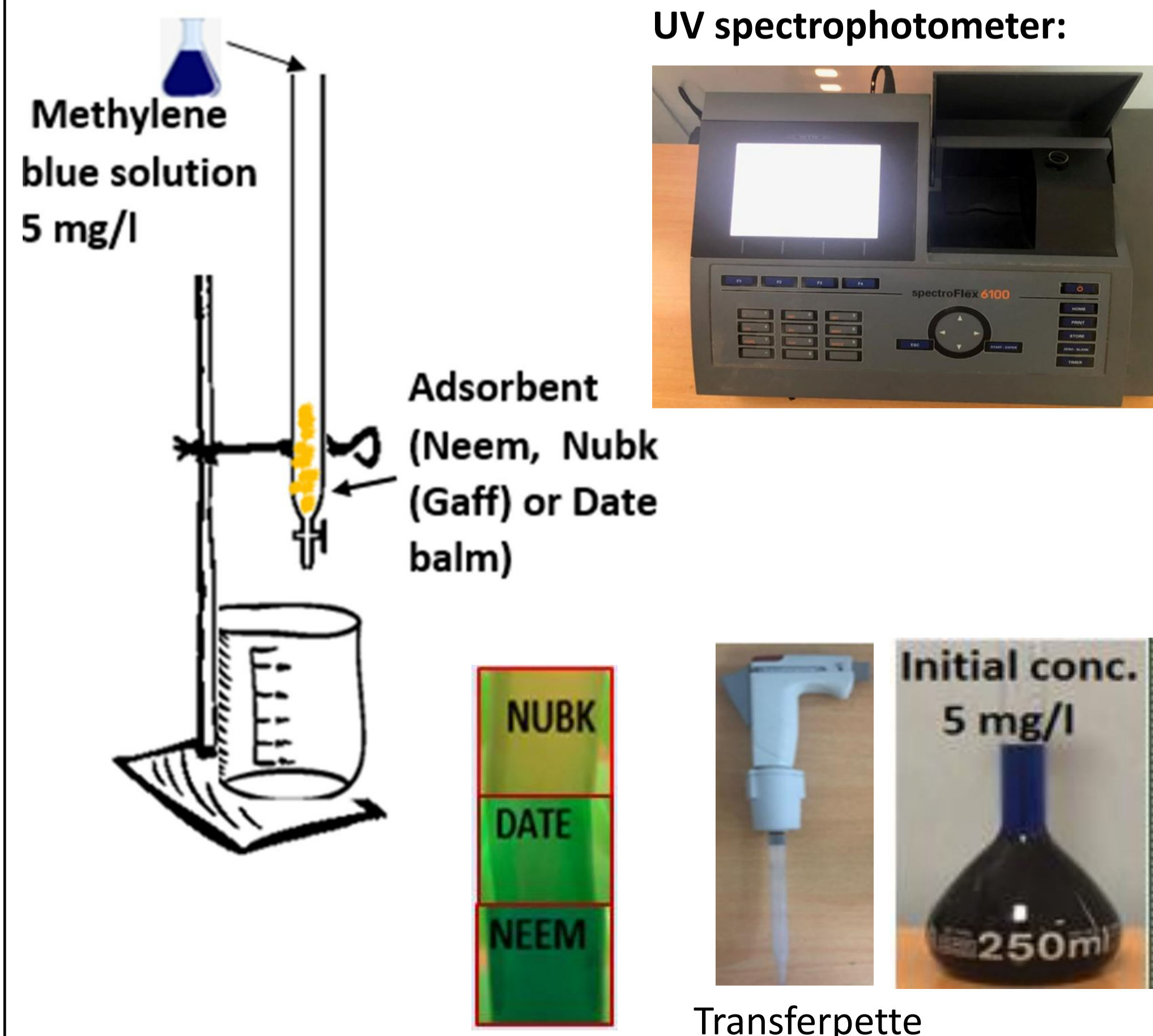
Natural adsorbents derived from biomass waste of date palm, nubk, and neem trees, commonly found in Oman, can effectively remove methylene blue from water through the biosorption process, providing an efficient method for water contamination removal.

## Research Method Used

### Sieve analysis:

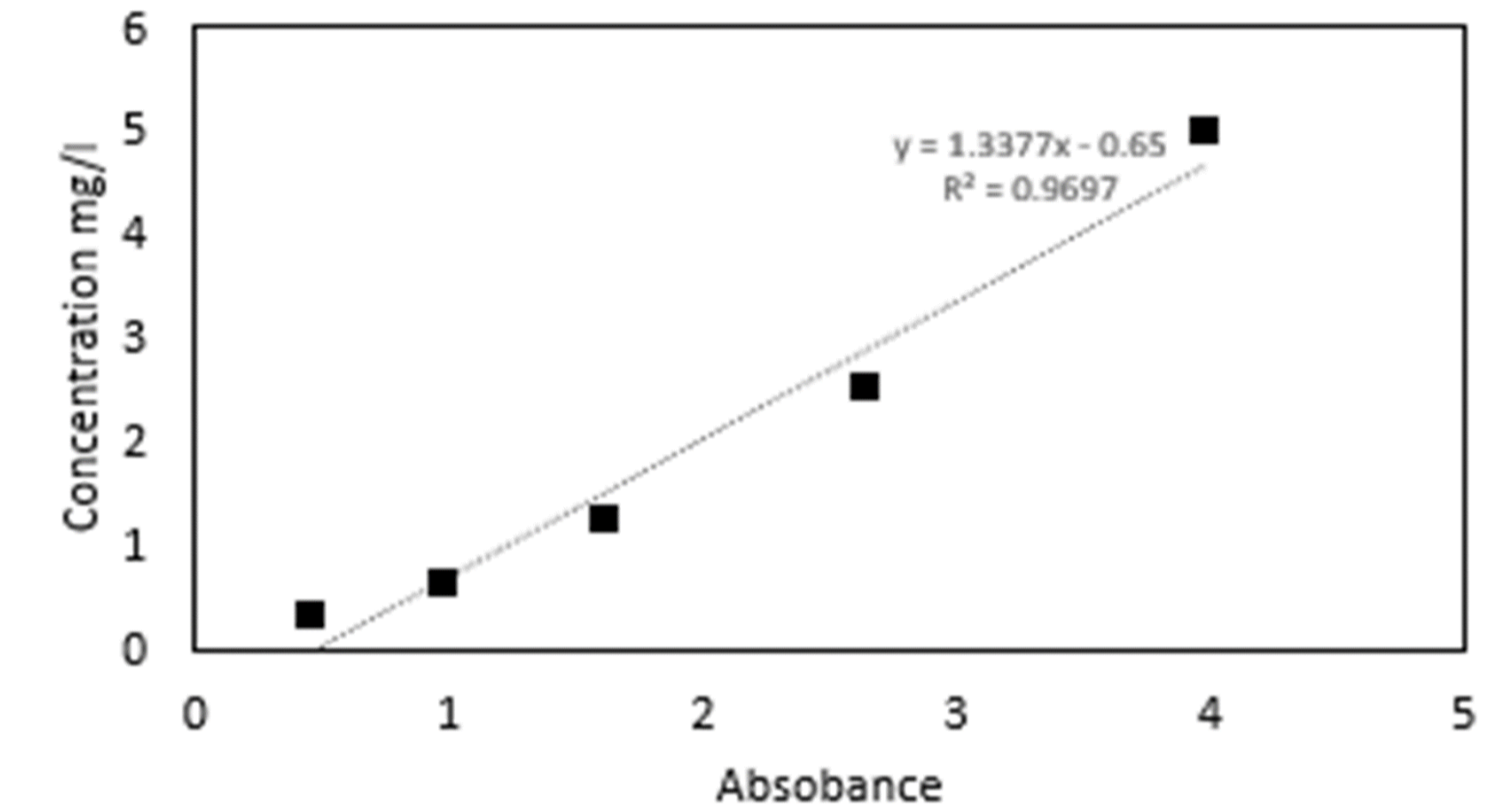
Size\ Type	Neem	Nubk	Date
>2.36 mm			
>1.25 mm <2.36 mm			
>300 mic			

## Experimental setup



## Results and discussions

calibration curve or standard curve



**Adsorbents removal efficiencies  $\epsilon$  =**

$$\frac{\text{initial concentration} - \text{effluent concentration}}{\text{initial concentration}} \times 100$$

$$\epsilon(Nubk) = \frac{5 - 0.617}{5} \times 100 = 87.6\%$$

$$\epsilon(Date) = \frac{5 - 0.999}{5} \times 100 = 82.0\%$$

$$\epsilon(Neem) = \frac{5 - 1.960}{5} \times 100 = 60.8\%$$

## Conclusion

The trees were selected based on their high availability throughout Oman. The experimental results indicate that Nubk has the highest removal efficiency for methylene blue.

## References

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3. Ardejani FD, et al. Adsorption of Direct Red 80 dye from aqueous solution onto almond shells. *J Hazard Mater*. 2008;151:730–7