

The role of extractives on the fire performance of *Tectona grandis* L.f. (teak) woodSanmitra Dan¹, Kamal Mishra¹, Ritesh Kumar¹¹Wood Properties & Processing Division, Institute of Wood Science and Technology, Bengaluru, 560003, Karnataka, India

INTRODUCTION & AIM

Teak (*Tectona grandis* L.f.) is highly valued timber species. Owing to its high natural durability, aesthetic appearance and outstanding physical and mechanical properties, the wood finds its application for range of uses including heavy construction, furniture and cabinets, railway sleepers, decorative veneer, joinery etc. (1). However, Teak, like other timbers has a drawback in that it is susceptible to catching fire due to its flammable nature (2).

Extractives play a major role in imparting the durability to teak wood along with several other benefits. The presence of extractives can also impact the calorific value, which in turn affects the flammability of the material (3). Although wood having higher cellulose and lignin content shows better thermal stability, studies indicate the extractives removal considerably enhances its thermal stability (4,5).

However, there is a limited amount of information available on how wood extractives impact the burning performance of wood. In this endeavor, the present study was initiated to investigate the role of heartwood extractives on burning characteristics of teak wood.

METHOD

Material:

- In the present study, specimens of dimensions 100 mm (length) × 12.5 mm (width) × 12.5mm (thickness) were prepared from heartwood portion of *Tectona grandis* L.f. wood.

Methodology:

- A visual representation of the procedure followed during the present study is shown in figure 1.

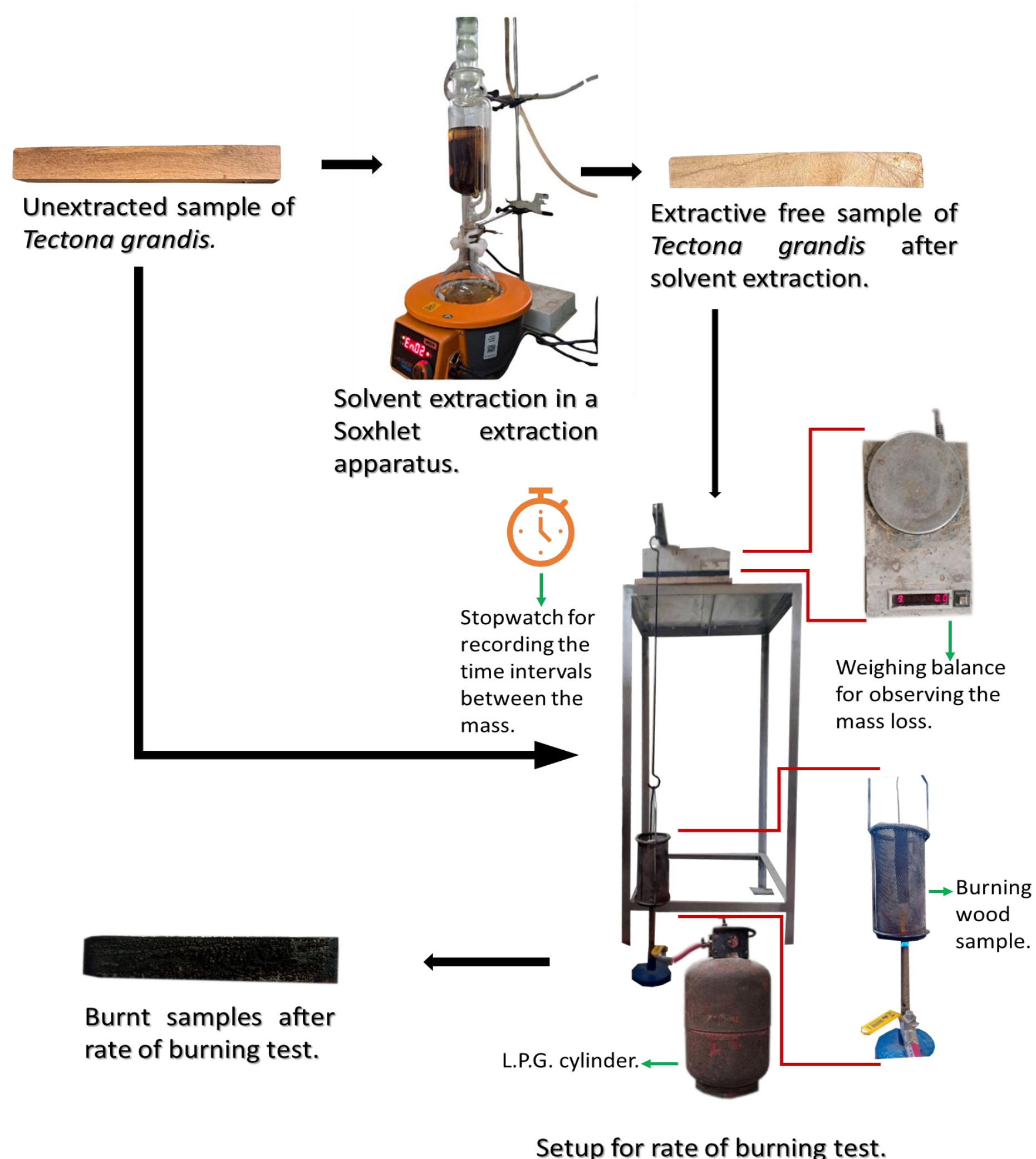


Fig.1: Schematic diagram of the experiment processes.

Extractive extraction procedure:

- Solvent extraction with acetone: ethanol: toluene (1:1:4 v/v) using a Soxhlet extraction apparatus, followed by an extraction using only ethanol and finally, extraction using distilled water to remove water soluble extractives.

Rate of burning test:

- Test according to BIS IS: 1734 (Part 3) – 1983.

RESULTS & DISCUSSION

The extracted samples of teak wood has shown a change in visual appearance as compared to the unextracted samples (figure 2.). The extracted samples appeared more light and pale in color which may be attributed to the removal of extractives.



Fig.2: a) Unextracted Teak wood samples. b) Extracted Teak wood samples

The burning characteristic of extracted and unextracted oven-dried wood in terms of mass loss with time is given in figure 3.

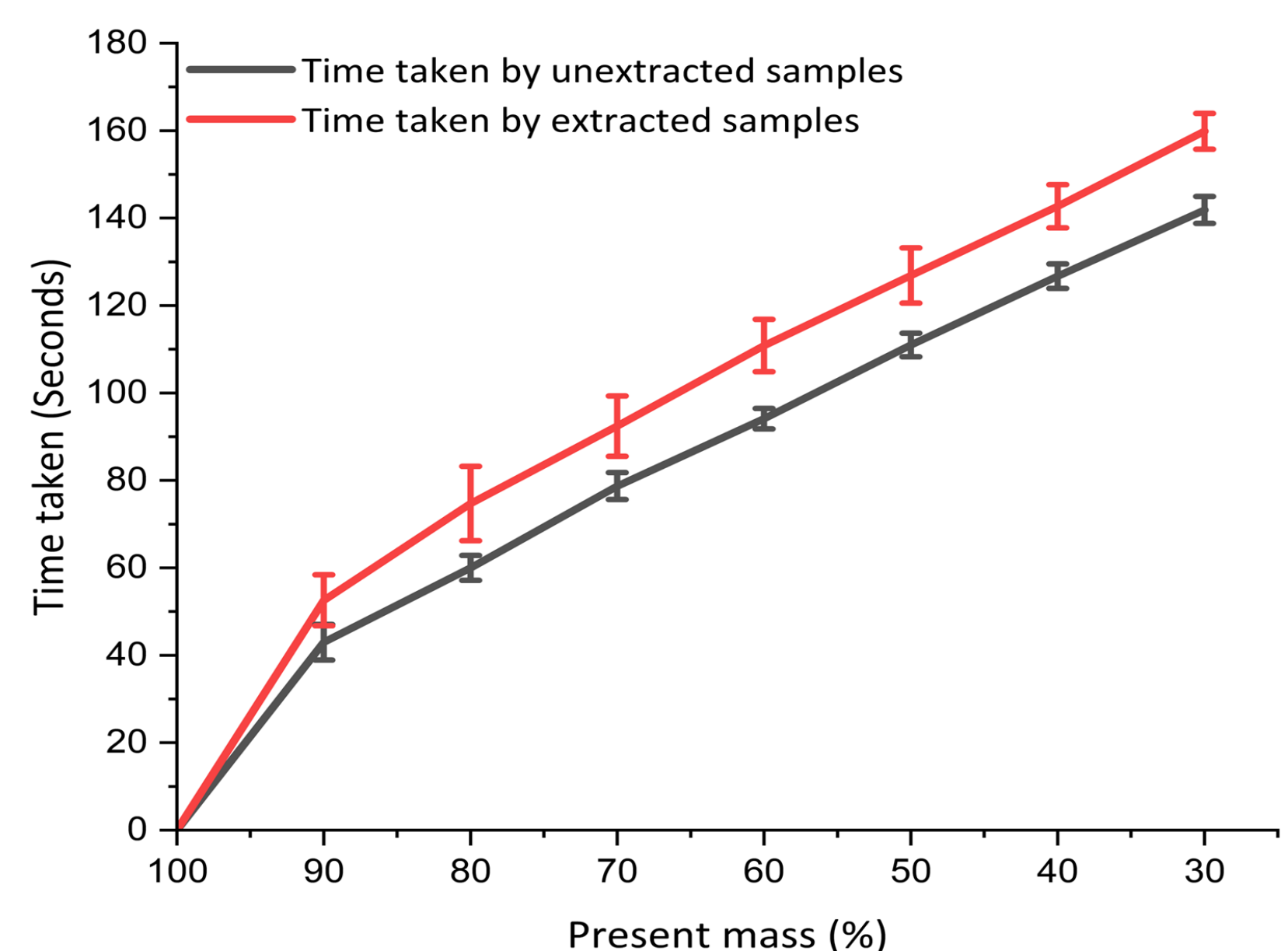


Fig.3: The results of rate of burning test.

The findings suggest that in order to achieve the same amount of mass loss, the extracted samples required less time to burn compared to the unextracted samples. The results of the present study are in agreement with results reported by (4), who reported that the removal of extractives have a positive influence towards enhancing the thermal stability of wood.

CONCLUSION & FUTURE WORK

The results of present study indicates that the extractive removal has a profound influence on improving the burning characteristics of teak wood. Further comprehensive research is required to figure out in detail how various wood extractives, soluble in a range of polar and non-polar solvents affects the burning characteristics of wood.

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