

RAPID AND NON-DESTRUCTIVE ASSESSMENT OF WOOD NATURAL DURABILITY FROM PLANTATION FOREST WITH DIFFERENT SILVICULTURAL PRACTICES



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1. INTRODUCTION

Wood susceptibility to biodegradation (insects, decay fungi, mold and bacteria) determine their application and protective preservatives treatment. Some wood, such as chengal (*Neobalanocarpus heimii*) is able to withstand degradation (i.e. natural durability) mainly due to the extractives content that act to protect and deter attack from these wood-inhibiting organisms. However, variability in natural durability existed even between the same species, specifically in the reduce durability on planted trees compared to trees from old-growth and secondary forests. One of the important factors affecting the wood quality is the silvicultural practices such as fertilizer treatments. This poster will discuss the preliminary results of different fertilizers and age during planting to chengal's growth, and the upcoming works on application of FT-IR for rapidly sorting chengal's durability to decay fungi.

2. AIMS

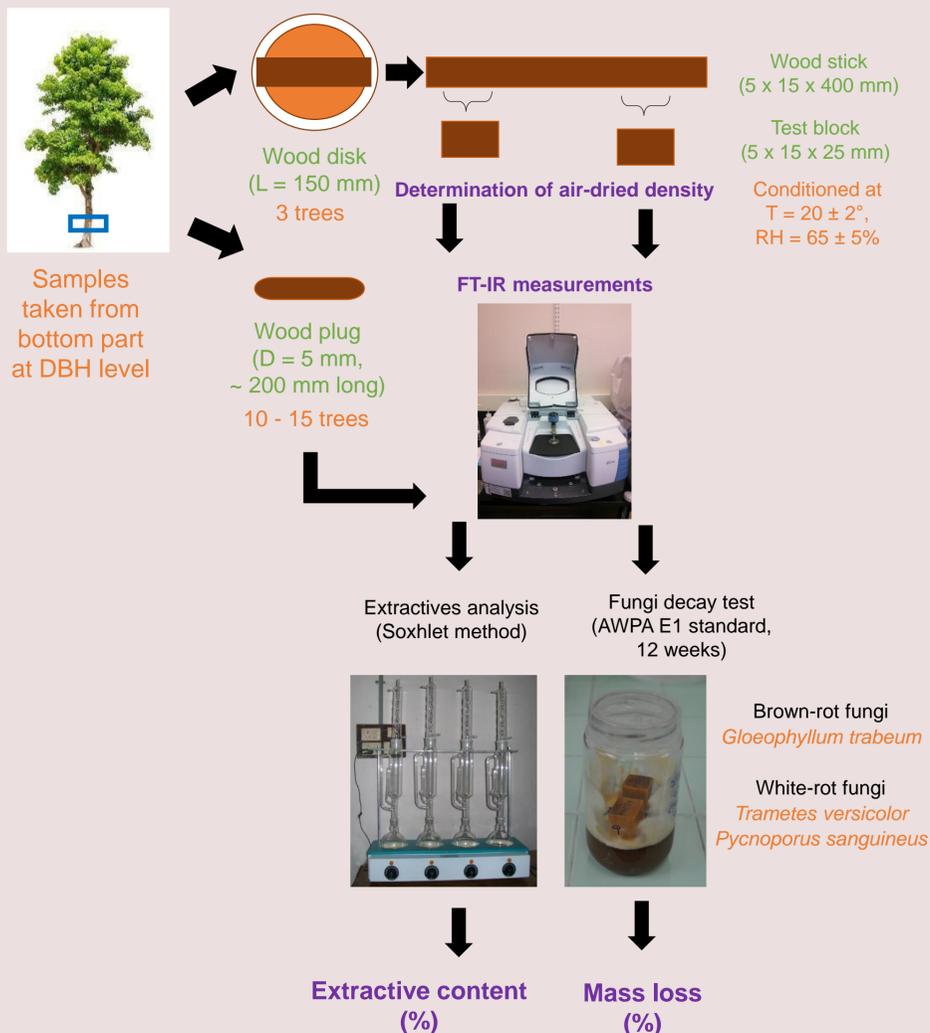
- Determine relationship between different silvicultural practices to trees growth and wood properties (extractives, lignin content).
- Develop a rapid, non-destructive technique for sorting chengal's durability using FT-IR and chemometrics analysis.

3. METHODS

Study site. Tekai Forest Reserve, Pahang; Chengal planted in 2009 using innovative planting technique

Treatment	
Age	6 months, 1 year 8 months
Fertilizer	Slow release fertilizer (SRF) Organic (Goat dung) SRF + Organic

Sampling and sample preparation

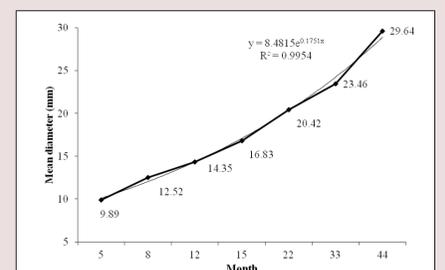
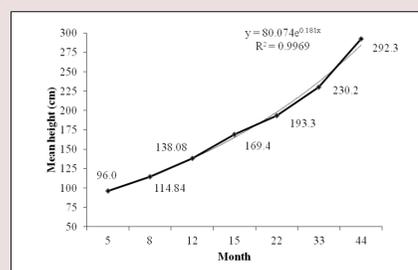


4. PRELIMINARY RESULTS

Tree Growth With Different Treatment (Age x Fertilizer)



0-month and 44-month chengal's seedlings post-planting. Sampling for 144-month (12 years) post-planting will be done in June 2021.



Mean annual height (left) and diameter (right) of chengal planted in Tekai FR from 0 to 44 months post-planting

	Fertilizer	Height (cm)	Diameter (mm)
5 month	SRF	96.18 ± 2.78 b	9.96 ± 0.49 b
	Organic	93.94 ± 5.27 c	9.70 ± 0.53 c
	SRF + Organic	97.89 ± 3.77 a	10.02 ± 0.48 a
	Mean	95.97 ± 4.39	9.89 ± 0.52
22 month	SRF	184.87 ± 12.58 b	20.13 ± 0.42 b
	Organic	175.18 ± 4.49 c	19.55 ± 0.82 c
	SRF + Organic	189.22 ± 9.57 a	21.49 ± 1.36 a
	Mean	183.32 ± 11.18	20.42 ± 1.25
44 month	SRF	299.42 ± 13.38 b	30.25 ± 0.48 b
	Organic	265.99 ± 6.22 c	26.45 ± 0.85 c
	SRF + Organic	311.48 ± 21.39 a	32.23 ± 2.09 a
	Mean	292.26 ± 24.58	29.64 ± 2.77

Mean height and diameter of chengal seedlings in the field according to different fertilizer treatments

- Planting chengal stands of different **age** group and **fertilizer** application in logged-over forest gave significant results on its survival and growth performance.
- Older and bigger stands** applied with combined **SRF + organic fertilizer** showed greater survival as well as growth of height and diameter throughout 44 months after planting.

5. FUTURE WORKS

- Growth for the stands after 12 year of planting will be evaluated and relationship with the wood quality will be assessed, particularly durability to decay fungi.
- This information will be used to develop a rapid and non-destructive technique for accessing wood durability using FT-IR spectroscopy and chemometrics analysis.
- Results from this study will be a baseline for selecting ideal treatments for tree plantation for producing high quality timbers.

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