

Colour changes of Brazilian *Pinus* wood by natural weathering and accelerated aging

Patrícia S. B. Dos Santos¹, Roberto L. Pereira², Aline K. Soares²,
Silvia H. F. da Silva¹, Jalel Labidi¹, Darci A. Gatto².

¹ Chemical and Environmental Engineering Department, University of the Basque Country, Plaza Europa 1- 20018 San Sebastian, Spain - patricia.bilhalva@hotmail.com;

² Engineering Center, Federal University of Pelotas, Pelotas, Brazil

Introduction

Wood is a natural, versatile and renewable material used worldwide for different uses. The use of wood in different ambient of exposure (indoor and outdoor) how in architecture and construction, particularly in outdoor spaces. This study was aimed to characterise the colour changes of Brazilian *Pinus* wood exposed to the action of natural weathering and accelerated aging.

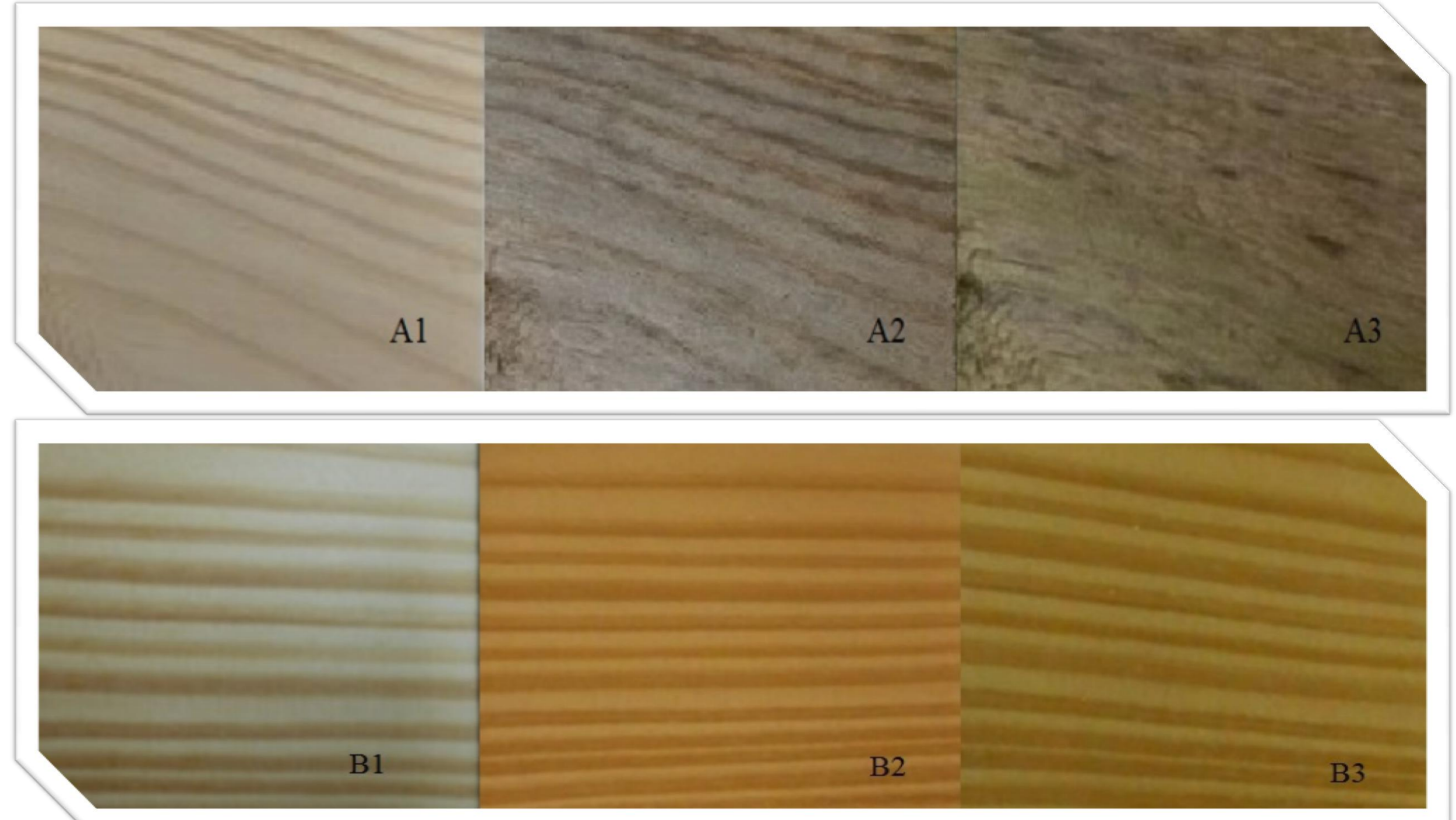


Figure 1- Effect of colour changes of Brazilian *Pinus* wood exposed to natural weathering (A) with time of 0, 90 and 270 days respectively and accelerated aging (B) with time of 0, 120 and 240 hours respectively.

Materials and methods

The accelerated aging was carried out in a chamber Bass Model UUV - MP - SPRAY, according to ASTM G 154, measurements of colour were performed every 30 hours for a period of 240 h. For the action of natural weathering, the colorimetric measurements were performed every 90 days during a period of 9 months. The colour test to obtain the parameters L^* , a^* , b^* , C^* and h^* by CIE Lab standard.

Results and discussion

The results of the accelerated aging showed a gradual darkening of wood samples until 120 hours of exposure with decrease of the L^* parameter followed by a stabilisation until the end of the study (240 hours) (Fig. 1 and 2). The parameters (a^* and b^*) increased, with a stabilisation after 120 hours. As for the natural aging test showed a significant change with reduction of parameters a^* , b^* and L^* in the first 180 days followed by a stabilisation the parameters until end of the study. The total colour change (ΔE^*) observed in accelerated aging was 17.5, while for the natural weathering being greater than 31.8. The higher value of ΔE^* during the test, the greater was the change in colour. Both methods exhibit noticeable colour variations observed by eyes for the same parts without exposure.

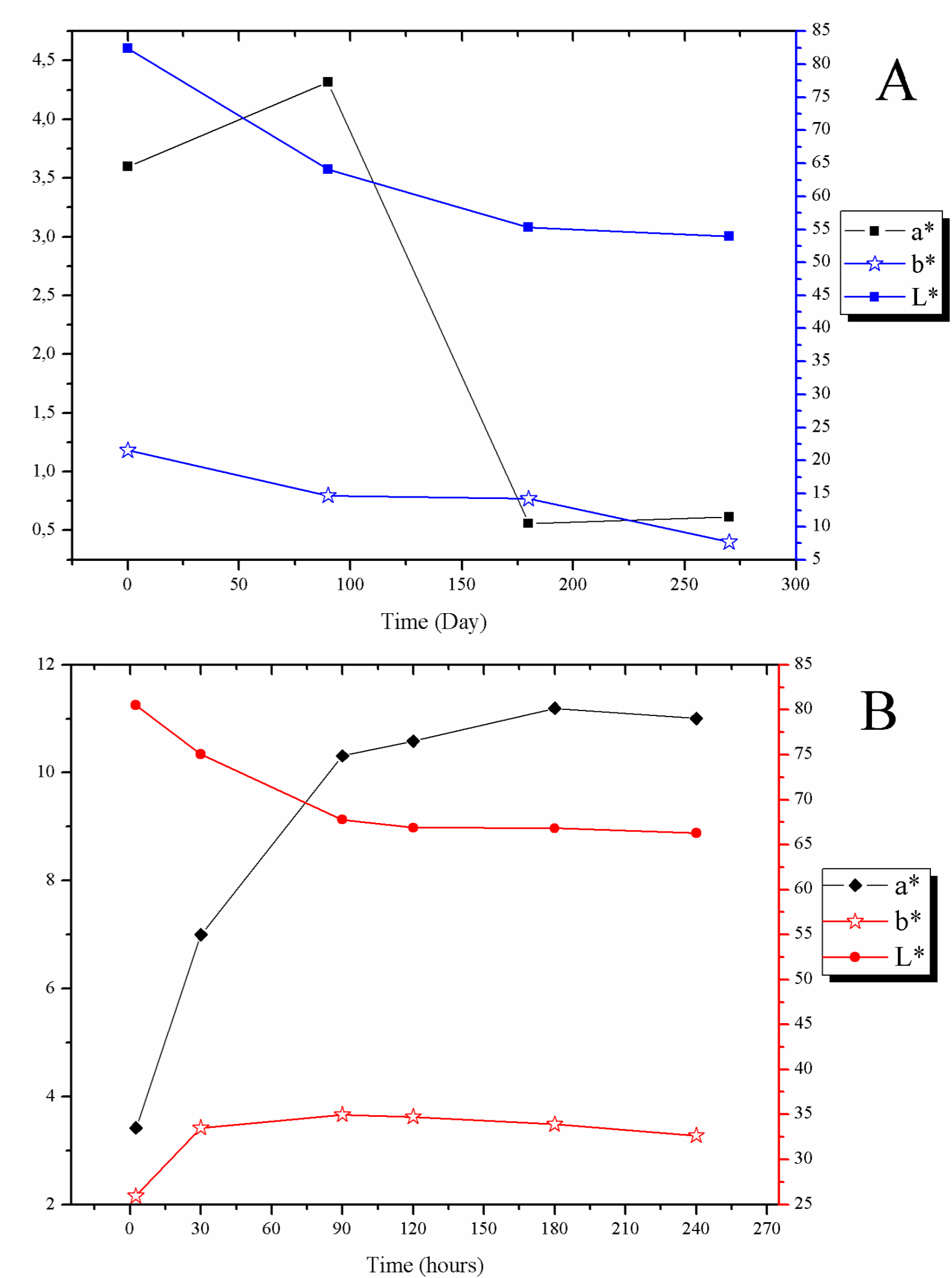


Figure 2- Effect of changes of different parameters of colour in Brazilian *Pinus* wood exposed to natural weathering (A) and accelerated aging (B).

Conclusion

Exposure in both methods are responsible for significant colour change of the wood, resulting in a greyish colour as a function of exposure time. The results were very similar to the natural exposure test, despite the reduced time. This is due to high intensity UV light reflecting in large discoloration of wood. The accelerated aging method is very effective to evaluate the colour of the wood in outdoor service.