

# Weathering behaviour of wood-faced construction materials

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## Abstract

The aim of this work is to optimize panels produced by the company PRODEMA S.A., improving their resistance to ultraviolet (UV) radiation together with other required qualities such as resistance to the weathering caused by exposure to rain, temperature variations, etc., as well as structural resistance. Photostabilizers and films were used for the protection of wood panels. In the presence of the additives, mechanical properties and adhesion were unchanged, while a better protection of the surface was obtained with films.

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## 1. Introduction

Wood is widely applied as industrial raw material for construction production, but deteriorates on continued exposure to sunlight or outdoor conditions. In recent years, the growth of the wood products industry has been accompanied by a significant expansion in the outdoor application of these materials, which has drawn attention in research for the protection of the appearance of the wood and the physical properties of the surface from weathering reactions.

Therefore, to a large degree, the working life span of exterior wood panels is dictated by the ability of the material to resist degradation from heat, humidity, chemicals, and UV light. The durability of the material with respect to these items is dictated by numerous factors, including coatings and additives.

Climatic resistance for wooden sheets has been typically obtained by thermosetting resin and thermoplastic coating in such products. Coating formulations consist of various components enabling the technological process and are

mandatory to achieve the expected protective and decorative properties and durability [1].

Many additives possess absorptive characteristics in regions of the UV spectrum and are added to the formulations of the coatings to maintain a good appearance, which is essential when formulating materials for exterior applications to assure stable products. To prevent wood from attacking by UV radiation photostabilizers are used. These additives contribute to polymer protection by more than one mechanism. Mostly, the inherent chemical efficiency of the stabilizer and of its transformation products is decisive for the final effect.

Because of the complexity of species that have to be deactivated in photodegrading processes, a complex protection requires a proper combination of stabilizers in order to inhibit or at least reduce photodegradation. The ultraviolet absorbers (UVA) lightfastness can be increased by addition of hindered amine light stabilizers (HALS), so that a better effectiveness in protection can be obtained using combination of UVA with HALS, which contribute to polymer protection by different activity mechanisms [2,3]. UVA compounds have high absorption coefficients in the UV part of the solar spectrum. They protect against photoinduced damages by absorbing the harmful solar radiation, and so the formation of excited chromophoric

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