

THE INTERNATIONAL RESEARCH GROUP ON WOOD PROTECTION

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IRG SECRETARIAT
Box 5609
SE-114 86 Stockholm
Sweden
www.irg-wp.com

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Section 3

Wood Protecting Chemicals

State of the art of industrial wood protection in Portugal

Lina Nunes^{1,2}, Júlia Carmo³, José Vicente⁴, Bruno Esteves^{4*}

¹LNEC, Av. do Brasil, 101, 1700-066 Lisboa, Portugal [email: linanunes@lneec.pt]

² cE3c - Centre for Ecology, Evolution and Environmental Changes/Azorean Biodiversity Group and Universidade dos Açores, Dep. de Ciências Agrárias, 9700-042, Angra do Heroísmo, Açores, Portugal

³ Carmo Group, Av. Marquês de Tomar, 2 - 4º Piso, 1050-155 Lisbon, Portugal

⁴ESTGV-IPV and CIDETS, Av. Cor. José Maria Vale de Andrade, Campus Politécnico 3504 - 510 VISEU, Portugal

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Lina Nunes^{1,2}, Júlia Carmo³, José Vicente⁴, Bruno Esteves^{4*}

¹LNEC, Av. do Brasil, 101, 1700-066 Lisboa, Portugal [email: linanunes@lneec.pt]

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ABSTRACT

This work intended to give a perspective of industrial wood protection in Portugal. A survey was made of the companies treating wood mainly for use classes 3 and 4 such as autoclave treatments with biocides and wood modification procedures. Currently there are 23 companies with 33 production plants with an autoclave installed for wood preservation by impregnation. There are also two companies producing modified wood by thermal treatment. Most of the plants are located in the central and northern regions of Portugal. The leading preservation chemicals used in Portugal are *Tanalith E* and *Celcure* brands. The main wood species used in all companies is *Pinus pinaster* from local producers. The products commercialized by the treating companies are diverse: pre-fabricated houses, garden furniture and playgrounds, decks, poles, stakes, and sawn wood. Modified wood producers sell mostly decks and cladding. Considerable changes are expected in the next few years due to the requirements of European Directives and the typical constraints of the Portuguese market.

Keywords: Chemicals, market, modified wood, production, wood protection,

1. INTRODUCTION

Wood preservation in Portugal is recent and dates from the early twentieth century (Reimão and Cockcroft 1985). Historically, the first preservative used in the early 1900 was the carbolineum (anthracene oil), followed by copper naphthalene and pentachlorophenol which were applied by brush. Until the Second World War, only railway sleepers and telephone and telegraph poles were treated with 5% solutions of copper sulphate in a few industries in Marinha Grande and Figueira da Foz, using the Boucherie or Bethell methods. All this sawmills were in the “Pinhal de Leiria” area, the main region for maritime pine production.

Later, the Portuguese railway sleepers’ producers began to use creosote in the treatment of the sleepers by the Rueping process. The first treatments of construction timber were done around 1952, also in Figueira da Foz, with mixtures of salts, using a vacuum impregnation process. In the 70^s the use of creosote has been greatly reduced by economic issues. With the development of the double-vacuum treatments in 80^s, with organic solvent preservatives, the preservation industry was extended to a few sawmills and furniture industries.

In 1985 there were fourteen companies, with 26 cylinders installed in 17 locations, including four companies of prefabricated houses. These companies used mostly mixtures of salts, such as the CCA. In Portugal and in most industrialized countries, a large proportion of

these preservatives have been withdrawn from the market. The CCA, which was the most widely used preservative since the 60^s in Portugal, was withdrawn in 2004, being replaced by chromium and copper borate CCB, which is generally viewed as less efficient due to leaching issues. Recently, the formulations with chromium were also withdrawn, and the CCB is no longer used, leading to its replacement by other formulations whose main active ingredient is still copper.

In Europe and North America wood protection has been gradually changing from traditional preservation methods by impregnation with toxic biocides to more environmentally friendly methods, such as wood modification processes. Wood modification improves wood properties, producing a new material, which, at the end of its life cycle, does not present an environmental hazard higher than untreated wood. In addition to the increased durability, these processes also improve dimensional stability, among other properties. The best known processes are thermal modification, acetylation and furfurylation. In Portugal there are two companies producing thermal treated wood but there are no companies producing modified wood by other methods although these are marketed by several companies.

2. RESULTS AND DISCUSSION

In this study, a survey was made of the companies treating or modifying wood industrially. In this survey, twenty three companies with thirty three impregnation plants were identified. All but one of these impregnations plants are used for vacuum pressure treatments. Only one double vacuum plant was identified as being in use for continuous normal production.

The wood preserving companies are mainly located in the central and northern regions of Portugal (Figure 1). This is probably due to the availability of pine wood (*Pinus pinaster* Ait.) that is mainly located north of the river Tagus. The area surrounding the Leiria pine forest is still where more wood preservation companies are located.

In relation to modified wood producers, at the moment, there are only two companies producing modified wood by heat treatment. Wood treated by acetylation or furfurylation is commercialized but not produced in the country. The wood modification plants are located in the central region of Portugal. The first company to produce heat treated wood in Portugal was Santos & Santos, located in Febres-Cantanhede that started the production in 2012 and the second company, Palser from Sertã, which started recently in 2015.

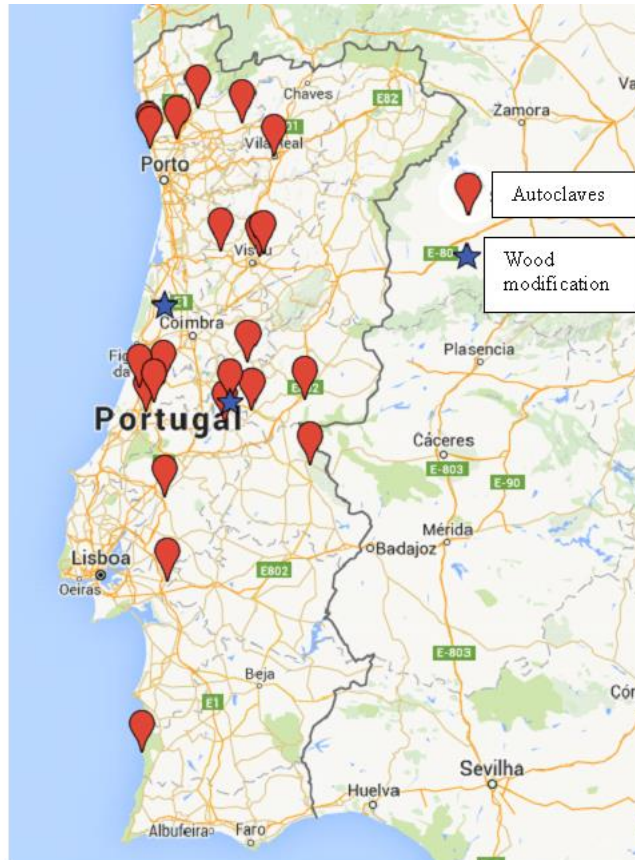


Figure 1. Location of companies that produce treated or modified wood in Portugal.

The following Fig. 2 shows the approximate percentage produced by each of the wood treating companies (with autoclaves) in relation to the national total in the year 2015 that was estimated around 84.300 cubic meters.

The main Timber preservation company in Portugal is Carmo SA, which was founded in 1955, with the name *Anglo-Portuguesa de Produtos Químicos* and started its activity in wood preservation in 1980, currently consisting of seven companies, with 3 production units in Portugal, and having two companies in Spain (Iberian and Portray) and one in France (France). Carmo exports its products to several markets, notably Italy, Greece, Morocco, Germany, Belgium, England and Tunisia. Three production units in Portugal produce approximately 34.000 m³/year (Carmo 2016), which corresponds to about, 40% of total annual production in the country.

MTL with three industrial units is currently the second largest company in the field, producing about 20.000 m³/year (Bentham 2016), approximately 24% of national total. All the other companies have produced, in 2015, significantly smaller quantities of treated wood (Figure 2). Nevertheless the companies David Calaveiras, Madeiras Afonso and Pinhal Nova give a significant contribution to the market.

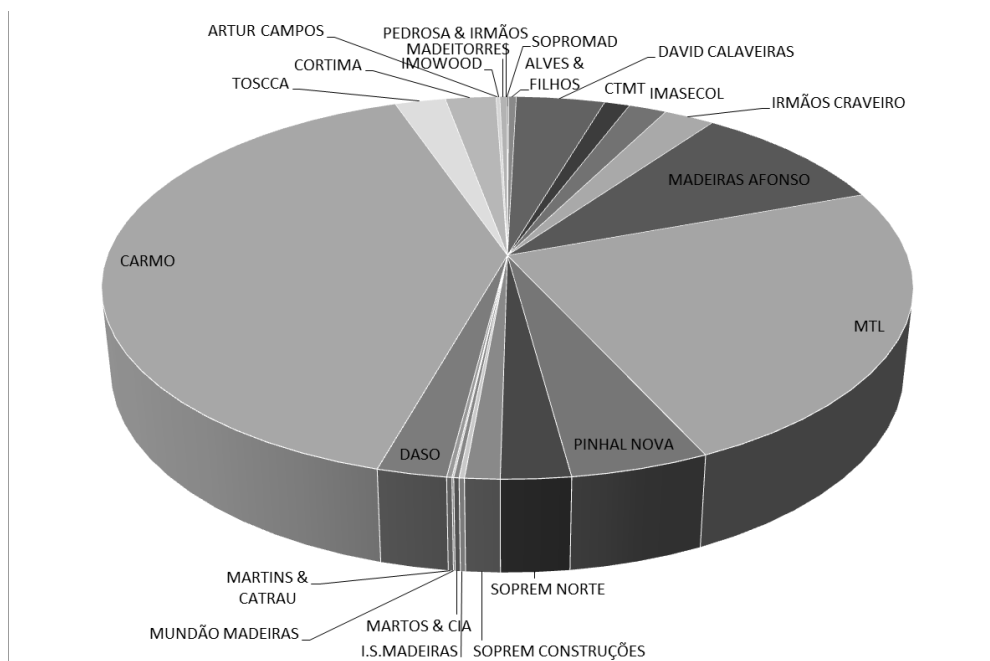


Figure 2. Annual production of treated wood in autoclave.

Currently, the most widely used treatment products are ACQ type, mainly, *Celcure C4* and *Celcure VS725* manufactured by Koppers, *Korasit K2* manufactured by the company, Kurt Obermeiner in which the active compounds are mainly quaternary ammonium salts known as "Quats" and copper, *Tanalith E 8001* from Arch Timber Protection with active compounds: propiconazol, tebuconazol, Baramine, and copper and *Corpol Premium* from the company Química de Munguía s.a. (Quimunsa) with the main active compounds, propiconazol and copper.

From the survey conducted it was found that fifteen of the twenty three existing companies are using the *Tanalith E 8001*, two are using *Celcure C4* or *VS725*, four are using *Korasit* and two are using *Corpol Premium*. Since *Celcure* is used in two of the main wood preservation companies this product shares with *Tanalith E* the leadership of the market with *Korasit* and *Corpol* products representing only a marginal amount.

As stated before, the main species treated in the Portuguese wood impregnation plants is maritime pine. In accordance to Bentham (2016) maritime pine represents about 70% of total production, followed by Scots pine (*Pinus sylvestris*) with around 10%. Nordic pine trees are often used because they have a straight trunk, ideal for the production of poles. The national maritime pine shows often a large curvature which makes it unsuitable for this type of product. In recent years, however, the prices of Nordic pine wood had a significant increase giving rise to a higher use of the national pine.

A general list of commodities sold by wood preservation companies is presented in table 1. Sawn construction wood and vineyards stakes are sold by most of the companies. The outdoor furniture that is sold by several companies includes mostly tables, chairs and benches while garden equipment include fences, gates, pergolas, garbage bins, compost boxes, flower pots, etc. Decks and claddings are marketed in various types and wood species. There are also several companies that acquire the treated wood logs and use it for the production of various types of

structures, such as bridges, sheds, etc. Several companies can supply other products, by request. The companies producing modified wood sell mostly decks and cladding.

Table 1. Main products marketed by wood preservation companies in Portugal (Bentham 2016)

	Outside Furniture	Gardens	Decks	Houses	Poles	Stakes	Wood logs	Sawn wood children/Leisure parks	Other
CTMT						x	x	x	
SOPROMAD	x	x	x					x	x
ALVES & FILHOS								x	x
DAVID CALAVEIRAS	x	x	x			x	x	x	
IMASECOL						x		x	
IRMÃOS CRAVEIRO			x					x	
MADEIRAS AFONSO				x	x	x	x	x	
MTL	x	x	x		x	x	x	x	
PINHAL NOVA	x					x		x	
SOPREM NORTE	x	x	x			x	x	x	
SOPREM CONSTRUÇÕES	x	x	x			x	x	x	
I.S.MADEIRAS						x	x	x	
MARTOS & CIA	x	x	x					x	x
MUNDÃO MADEIRAS						x		x	
MARTINS & CATRAU	x	x	x	x		x	x	x	
DASO						x	x	x	
CARMO	x	x	x	x	x	x	x	x	x
TOSCCA	x	x	x	x	x	x	x	x	x
CORTIMA					x	x			
ARTUR CAMPOS						x	x	x	
IMOWOOD									x
MADEITORRES						x		x	
PEDROSA & IRMÃOS					x	x	x	x	
Total	10	9	10	4	6	18	13	21	5

3. CONCLUDING REMARKS

The Portuguese industrial wood preservation market has been long dominated by the production of posts, poles and stakes for agricultural applications mainly in vineyards. Due to some major flaws in the performance in ground contact of some alternative formulations to CCA that happened between the years 2006 and 2008, overall market confidence in the value of treated wood has considerably decrease with an obvious reduction on produced volumes of treated wood. End users of treated wood have been increasingly turning to alternative materials like iron, concrete or plastic, which are generally view as good alternatives and, particularly in the case of iron, also cost competitive.

Another question is the potential increase in the importation of treated wood from countries of Eastern Europe that will disturb the market because these products are treated in accordance to the standards of their own country of origin, which are in general compatible with the

requirements of European Directives, but not necessarily suitable for the much different characteristics of the soils, climates and biological risks found in Portugal.

The construction market has been under a lot pressure due to the economic situation of the country but the already clear increase on the investment on the rehabilitation side of that market is potentially very positive for the industrial timber protection industry including treated and modified wood.

Considerable changes are thus expected in the next few years both due to the requirements of European Directives that will lead to changes of active ingredients and formulations and the typical constraints of the Portuguese market.

4. ACKNOWLEDGMENTS

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5. REFERENCES

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