

THE INTERNATIONAL RESEARCH GROUP ON WOOD PROTECTION

Section 1

Biology

**Antifungal activity of wood extractives from
waste products of steam distillation of *Aniba rosaeodora***

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Poster paper prepared for the 43rd IRG Annual Meeting
Kuala Lumpur, Malaysia
6-10 May 2012

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ABSTRACT

Aniba rosaeodora, is a slow growing evergreens of the Lauraceae family which are indigenous over a wide range of the Greater Amazon Region (the Guianas and Venezuela, Brazilian Amazon...). The essential oil obtained from the wood has a characteristic aroma and is a long-established ingredient in the more expensive perfumes. Around the olfactive characteristic of the essential oil is due to the presence of levogyre linalol. The steam distilled wood oil is obtained in a yield ranging around 1% and up to 90% of the oil consists of optically active linalol. This work is focused on the valorization of steam distilled sawdust, waste obtained from extraction of essential oil. After steam distillation, the sawdust was extracted by ethyl acetate and methanolic solvents and the antifungal activity was evaluated against basidiomycetes fungi. The both extracts were active in vitro against white and brown rot fungi and allowed to propose these extractives as wood preservative agent.

Keywords: *Aniba rosaeodora*, antifungal, valorization, wood waste, essential oil

INTRODUCTION

Rosewood, *Aniba rosaeodora* (also known as Rosewood, Pau-rosa and Palo de Rosa) is a slow-growing hardwood (30 m height meter and trunk diameter at breast height of two meters). It is one of about 40 members of the Neotropical genus *Aniba* and occurs in dense primary wet tropical rainforest at medium and high altitudes in Brazil, Colombia, Ecuador, French Guyana, Guyana, Peru, Suriname and Venezuela. *Aniba* species belong to the Lauraceae family and most of them possess aromatic roots, stems and fruits. Rosewood has been extensively felled to harvest its wood which is rich in linalool oil, valued as a fragrance in top-of-the-range perfumes, as a component in a wide range of scents and in aromatherapy (May and Barata, 2003). The oil, which is chiefly extracted from the wood by Hydrodistillation, is rich in linalool, and used as a fragrance in fine perfumes and as a perfume fixative. The essential oil is composed more than twenty molecules but linalol is the major compound (90 % of the mixture, Vial Debas, 1996).

In French Guiana, in the last century (1885 -1975) the industry of rose wood essential oil was flourishing but progressively the activity declined because of the over exploitation of the resource (Bruleaux, 1990). Today, Brazil is the only producer of *A. rosaeodora* essential oil, which is derived almost entirely from natural stands It is declining as well, and a new thought

about rosewood culture and sustainable exploitation could be pertinent. Since 2011, *Aniba rosaeodora* is inscribed on the list II appendix II of Washington Convention on international trade in endangered species of wild flora and fauna. So in French Guiana, several projects are developed to develop essential oil production according to sustainable conditions. Essential oil from French Guiana is well-known for its content of levogyre linalol, so this new approach is an opportunity for French Guiana producers to develop a French rosewood essential oil channel. Wood from *Aniba rosaeodora* is composed with other family compounds like alkaloid, for example anibin (Mors et al, 1957). This family chemical is well-known for its bioactivity; particularly against fungi and insects (Abad et al., 2007). The aim of this paper is to study the fungicidal activity of extracted sawdust in order to propose new way of waste valorization.

METHODOLOGY

A tree of 10 year old was selected (*Aniba rosaeodora*). The wood samples were ground to 0.5 mm of size of the particles in a Retsch ZM 200 mill. The sawdust was subjected to steam distillation for 3 hours using a Clevenger apparatus according to the European Pharmacopoeia (1975). The yield of essential oil was determined (m/m of dried wood). The extracted sawdust was extracted successively with acetate ethyl and methanol (technical grade). The acetate ethyl and methanolic extracts were used to test the fungicidal activity according to Voda (2003). A brown (*Antrodia sp.*) and a white rot (*Coriolus versicolor*) were used to test the antifungal of the acetate and methanolic extracts at three concentrations: 1000; 500 ; 250 mg/ml. A positive (Chorothanolonil, 62,5 µg/ml) and a negative control (DMSO) were used to validated The comparison of the growth rate of methanolic and ethyl acetate extracts with the negative control allowed to calculate the antifungal index (Voda et al, 3003).

RESULTS

The yield of essential oil of the wood tree is equal to 2,28 % ($\pm 0/03$). These results are interesting because the yield is so high than an adult tree (Chantraine and al., 2007). The ethyl acetate and methanolic extracts showed an antifungal activity: no radial growth of the brown and white rot was observed until 250 mg/ml. The threshold activity is under this limit concentration. Further tests will be carry out in order to determine the concentration that inhibited 50% of the mycelia growth (IC50).

CONCLUSION

This study showed that the antifungal effects of ethyl acetate and methanolic extracts obtained from wood waste obtained after Hydrodistillation. This study illustrates, that there is some molecules in the extracted sawdust like alkaloid which constitute new valorization ways of by-products of Hydrodistillation.

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