

NATURAL PLANT POLYPHENOL EXTRACTS IN BIO-COMPATIBLE FORMULATIONS AGAINST SUBTERRANEAN TERMITES AND WOOD-BORING BEETLES

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Abstract It is of great economical importance to ascertain the efficacy of preservatives against wood decay organisms in order to extend wood products service life. However, due to environmental and health sanitary pressure, it is imperative to find environmentally-friendly alternative to synthetic chemical treatments. The insecticide efficacy of Groupe Berkem's new generation of polyphenol-containing formulations was investigated against the deterioration of Scots pine (*Pinus sylvestris*) sapwood by three subterranean termite species and by a house longhorn beetle. Determination of the efficacy of our phenol-extract formulations against *Coptotermes gestroi*, *Prorhinotermes canalifrons* and *Reticulitermes santonensis* was tested on *Pinus sylvestris* sapwood specimens according to the NF EN 117 procedure. After 1 to 3 months of exposure to the termites, all the treated specimens showed a total protection against the three species, with 100% mortality. The effectiveness of polyphenols was higher against *P. canalifrons*. With *R. santonensis* lethal concentration of the formulations was obtained at 11% (w/w) and retention in wood of about 60 kg/m³. The toxic value of the preservative formulation was determined on recently hatched larvae of European house longhorn beetle *Hylotrupes bajulus* (L.) according to NF EN 47. Dried Scots pine wood specimens were impregnated by low-pressure vacuum at various concentrations over a period of more than 24 weeks. The mortality of larvae surviving the treatment was determined at various times (4, 12 and 24 weeks, respectively) and the lethal concentration ascertained. The formulation was efficient at concentration as low as 3.1% (w/w) and retention of 16 kg/m³. Similar results by surface application were obtained according to NF EN 1390 (remedial treatment). These results show that the incorporation of plant polyphenol extracts in insecticide formulations was an effective alternative to controlling termite species and woodboring beetles. They underscore the interest of polyphenol extract for the control of wood decaying insects.

Key words *Coptotermes gestroi*, *Prorhinotermes canalifrons*, *Reticulitermes santonensis*, *Hylotrupes bajulus*, polyphenol extracts