Background

In the treatment of individual trees, trunk injection is the most certain method of delivering an effective dose of phosphite, but rate of uptake can be very slow. Trunk injection is labour intensive, and the long term (decadal or longer) effect of trunk damage as a result of repeated treatments has not been established. Basal Bark Application (BBA) of phosphite has been used to treat *Quercus* sp. against *Phytophthora ramorum* (1). The time taken to treat trees by BBA is independent of tree physiology, therefore the cost of labour may also be reduced. In two experiments, we compared the efficacy of BBA application of phosphite with established application methods in some important tree species from south-western Australia.

Results

![Figure 1. Experiment 1, results.](image1)

**Legend: Experiments 1 & 2**
- C = control (- phosphite, + Phyt.)
- I = trunk injection
- BBA = basal bark application
- S = foliar spray

Means of treatments with the same letter are not significantly different (p > 0.05; Duncan's multiple range test).

n = mean foliar phosphate concentration [mg/kg d.w., youngest fully expanded leaves (YFEL) at time of shoot harvest; n = 4 trees per treatment and species].

Error bar = 1 standard error.

![Figure 2. Experiment 2, results.](image2)

**Main Findings & Discussion**

In *Banksia* spp., Basal Bark Application of phosphite was at least as effective as other methods of phosphite application (Figure 1).

Basal Bark Application of phosphite was ineffective in Jarrah. Foliar phosphite analysis indicates very poor uptake of phosphite in BBA treated trees (Figure 2). Future sampling and PO4 analysis of leaves will reveal whether accumulation of an effective amount of phosphite occurs in the long term.

In *Banksia* spp., foliar phosphite concentrations in BBA treated plants were up to 12 times higher than for other effective treatments (Figure 1). It may be possible to reduce the amount of phosphite applied by BBA, and still provide protection against *Phytophthora*.

For an equivalent basal application time for BBA was 26-43% that for other treatments. However, the cost of the carrier made BBA treatment 1.5-1.8 times more expensive than other methods.

Materials & Methods

**Experiment 1. Vegetation type & species:** *Banksia* woodland: *Banksia attenuata* (slender yellow banksia) & *B. menziesii* (firewood banksia). **Treatments:** (1) Trunk injection, 1 ml of 50 g/l a.i. phosphite per cm trunk circumference (50 mg phosphite/cm; at 1 m; Sidewinder® backpack hydraulic injector). (2) Basal Bark Application; 200 g/l a.i. phosphite + 25 ml Pentra-Bark™ organosilicone surfactant, sprayed to near run-off (to 2.5 m of trunk from ground level). (3) Low volume foliar spray; 5 g/l a.i. phosphite + BS 1000® alcohol alkoxylate surfactant, sprayed to run-off, and (4) negative control. **Assessment:** In situ stem inoculation with *Phytophthora cinnamomi* MP125, four weeks post treatment. Stem sections plated to selective medium (NARPH (pH 5.0)) two weeks post inoculation. **Experiment 2. Vegetation type & species:** Rehabilitatedmine site (1992), *Eucalyptus marginata* (Jarrah) **Treatments:** (1) Trunk injection; as for experiment 1. (2) Basal Bark Application; as for experiment 1, and (3) negative control. **Assessment:** Inoculation of excised stems, otherwise as for experiment 1.

References:
3. Acknowledgements: Australian Research Council, ALCOA World Alumni, Wesleys Alumina and Jandakot Airport Holdings for financial assistance and/or access to field sites. Technical assistance by Emma Groves, Damian Cancila, Janet Box, Dianne White & Karen Paton.