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#### GeneralComments

AltIdentityAndProp Having reviewed the alternatives to Boric Acid on the active substance list for Product Type 8 under the Biocidal Product Regulations, other than the other boron based actives (boric oxide, boric acidisodium octaborate tetrahydrate and the various hydrates of disodium tetraborate) no other single active substance is an appropriate alternative. Only by combining other fungicides - e.g. IPBC with either propiconazole or tebuconazole - would offer a similar fungicidal spectrum to boric acid. The addition of either permethrin or cypermethrin, would be necessary to incorporate the insecticidal properties of boric acid.

TechFeasibility A number of products have been approved under BPR containing alternatives to boric acid. These products contain multiple active substances in order to achieve the same spectrum of efficacy as boric acid. Formulating with multiple active substances brings additional complexities that are not present when working with a single active. The changes in the availability of co-formulants would be detrimental to these products as they have limited water solubility, whilst boric acid formulations are simple by comparison.

EcoFeasibility Indirect costs are hard to quantify, but would include: Loss of historic timbers - the unique ability of borates to penetrate deeply into timber allows timbers in historic buildings to be retained which would otherwise have to be cut out and replaced. This would not only cost more money, but would result in a loss of historic Authenticity.

HazAndRisks Fungicidal Alternatives - Propiconazole is a reproductive toxin 1B, an acute toxin if swallowed, a skin sensitizer and is under assessment as an endocrine disruptor. It is also toxic to aquatic life with long lasting effects. It is under assessment to be a candidate for substitution. Tebuconazole is a reproductive toxin 2, an acute toxin if swallowed and is toxic to aquatic life with long lasting effects. It is under assessment to be a candidate for substitution. IPBC is a skin sensitizer, an acute toxin if inhaled or swallowed, causes eye damage and damage to the larynx. It is under assessment as an endocrine disruptor. IPBC is also toxic to aquatic life with long lasting effects. It is under assessment to be a candidate for

substitution.

Insecticidal Alternatives -

Permethrin is a skin sensitizer and an acute toxin if inhaled or swallowed. It is also toxic to aquatic life with long lasting effects.

Cypermethrin is toxic if swallowed, or inhaled, may cause damage to organs through prolonged or repeated exposure, is harmful in contact with skin and may cause respiratory irritation. It is very toxic to aquatic life with long lasting effects. It is under assessment to be a candidate for substitution.

By comparison Boric Acid is considered a reproductive toxin 1B.

Availability

The alternatives are currently available, but future availability cannot be relied upon due to the possibility that the regulatory issues outlined in section 4 may cause manufacturers to withdraw from the market.

AltSuitAvailConcl

Products containing alternative active substances to boric acid are currently on the market. However, the process of switching to these products would constitute enormous investment from a SME.

The active substances for the fungicidal properties are all under assessment to be candidates for substitution. They also constitute a broader range of hazards, including skin sensitisation and environmental hazards compared to boric acid.

Of the active substances for the insecticidal properties, cypermethrin is under assessment to be a candidate for substitution.

In order to achieve the fungicidal and insecticidal properties of boric acid, it is necessary to use multiple actives, including two fungicides that are under assessment as candidates for substitution.

The use of multiple actives, which are under assessment as candidates for substitution, puts the products at high risk of their place on the market being restricted. This would entail further costs for retraining, labelling and formulating. Boric acid by comparison results in a relatively simple formula and so a lower risk financially.

OtherComments

An essential property of boron is that wood-degrading fungi do not build up resistance to boron.

Boric acid / Disodium tetraborate dehydrate diffuse, which means that they penetrate the wood and reach moist wood where wood-degrading fungi are found.

Since boron is an element, it does not degrade in nature. Heartwood diffusion, only preservative that penetrates heartwood.

Treatment of refractory species such as spruce.

Low cost and low mammalian toxicity and no risk in normal handling and use.

Also good in end of life planning as it is an essential micronutrient used in agriculture, e.g. you can chip it

and use for mulch or add to crops. Or burn for energy recovery or make biochar.  
There are no other active ingredients that have these properties

SubstanceName	Boric acid
ECNumber	233-139-2
CASNumber	10043-35-3
CompetentAuthority	The Netherlands
CommentRegarding IntendedUse	8 Boric acid acts a fungicide and insecticide; and is used for industrial, professional, and non-professional users as a preventive and curative wood preservative for wood and construction timbers in Use Classes 1, 2, 3 and 4a according to CEN 335-1 standard. Products are applied by vacuum pressure, dipping, injection, spraying/deluge, or brushing