proposal to amend dh scedule in annex 1 of ispm 15

*(last updated 01 October 2014)*

1. International Standard for Phytosanitary Measures (ISPM) 15: *Regulation on wood packaging in international trade* was first adopted in March 2002. This initial standard included two approved phytosanitary treatments in an annex to the standard; namely a heat treatment (56oC for 30 minutes) and a fumigation schedule using methyl bromide.
2. As part of efforts to reduce the use of methyl bromide, a call was made by the IPPC Secretariat in 2007 for treatments of wood packaging material that were not ozone depleting and could be used as alternatives to methyl bromide. While a number of treatments were submitted, the most promising were dielectric heating (DH) and a fumigation schedule using Sulfuryl fluoride (SF).
3. While DH was not widely used at the time of the submission, further research supported the general high efficacy of the heating schedule against pests associated with wood packaging in international trade. In March 2013, annex 1 of ISPM 15 was amended to include a heat treatment schedule that could be achieved using DH. As this schedule was developed based on research using microwave technologies, the limitations applied to the use of the treatment matched the parameters of the treatment as it was applied to demonstrate its level of efficacy against the target pests.
4. The research undertaken using microwave technologies had used wooden planks (boards) no greater than 20cm in the thinnest width, resulting in a restriction on the width of the wood to 20cm in the schedule included in annex 1 of ISPM 15.
5. It was also apparent that in all cases the schedules applied in the research heated the wood to the target temperature within 30 minutes of the microwaves being applied. While there was little evidence that heating up time at the temperatures being applied had any overall effect on treatment efficacy, research had not been provided to show that extended heating up times did not allow pests to develop greater tolerances to the target temperature of 60oC.
6. Since 2012 further research has been undertaken on the use of DH on wood, in particular the versatility of using longer frequency radio waves (RF) rather than microwaves. This research has demonstrated the following:
7. - The technical and mathematical aspects of how depth of penetration is influenced by frequency (wavelength) for MW and RF in wood have been studied. These data and the mathematical equations for depth of penetration show that RF penetrates wood far beyond 20 cm.
8. - Wood is heated by microwaves and RF both directly and through heat dissipation like that of conventional heating. Research has shown that as wood thickness increases, the time taken to achieve the target temperature throughout the wood increases more for microwaves than RF. This is because RF penetrates further than microwaves and therefore relies less on dissipated heat in thicker wood. Therefore both microwaves and RF can heat to the target temperature wood greater than 20cm in thickness; however microwaves may take longer to do so than RF.
9. - RF kills 100% of pinewood nematodes according to the required temperature with treatment times of 1-4 minutes. The statement currently in the annex that "*Only microwave technology has been proven to date to be capable of achieving the required temperature within the recommended time scale*" has now been demonstrated to be incorrect.
10. - The 30 minute time limit to complete the treatment would significantly impact the economic viability of dielectric heating, especially for RF. Commercial RF equipment developers have indicated that the only cost effective way to implement this technology is to be able to bulk treat stacks of wood or larger material such as dunnage. For commercial bulk treatment the only way this could be done in 30 minutes would be to use a generator capable of providing VERY high power. Because 50% of the cost of the equipment is the generator, the capital investment would be beyond the means of most treatment providers in most countries.
11. The Technical Panel for Phytosanitary Treatments (TPPT) recently reviewed these research results when considering the inclusion of DH schedule under ISPM 28[[1]](#footnote-1). The TPPT made the following observations regarding the DH schedule:
12. - The 20 cm dimension limit is unnecessary because whether using microwave (MW) or radio frequency (RF), a minimum temperature of 60 °C for 1 minute through the profile must be achieved regardless of the size of the material. Evidence that this is the case must be demonstrated by using temperature probes to verify the treatment has met the required temperature for 1 minute.
13. - That pests are unlikely to become more tolerant to heating temperatures as high as 60oC. The TPPT considered that evidence of heat tolerances in insects exposed to heating is only relevant to much lower temperatures (e.g. 47oC).
14. The TPFQ reviewed the current text of ISPM 15 and identified the following text amendments (additions and deletions) would be required under the DH schedule in Annex 1 of the standard:

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| **Heat treatment using dielectric heating (treatment code for the mark: DH)**  Where dielectric heating is used (e.g. microwaves and radio waves), wood packaging material ~~composed of wood not exceeding 20 cm~~~~4~~ ~~when measured across the smallest dimension of the piece or the stack~~ must be heated to achieve a minimum temperature of 60°C for 1 continuous minute throughout the entire profile of the wood (including its surface). ~~The prescribed temperature must be reached within 30 minutes from the start of the treatment~~~~5~~~~.~~  ~~4 The 20 cm limit is based on the efficacy data currently available.~~  ~~5 Only microwave technology has been proven to date to be capable of achieving the required temperature within the recommended time scale.~~ |

Based on the information and analysis provided above, the TPFQ:

1. *(1)* *invites* the Standards Committee to consider amending the DH schedule in Annex 1 of ISPM 15 to remove the restrictions on wood dimensions and heating up time.

1. Report of the 2014 meeting of the TPPT in Bali, Indonesia: <https://www.ippc.int/publications/2014-june-tppt-meeting-report-bali-indonesia> [↑](#footnote-ref-1)