

Controlled atmospheres, heat and ISPM15

Jonathan Banks

Two technologies – controlled atmospheres
and heat treatment.

Applications, now, to avoid the use of methyl
bromide.

- Free of residue and toxic gases
- Local adaptation

Controlled atmospheres

CA – low oxygen systems for elimination of insect and rodent infestations in cereal grains and other dry stored products. Improved quality retention.

Typical gas - <1% oxygen in nitrogen or nitrogen/CO₂ mixtures.

Possible alternative to phosphine, particularly where resistance is present or close to people.

Related to hermetic storage, also a useful technology.

We live in an atmosphere that is mostly nitrogen. Just take the oxygen out and you have an insecticidal storage atmosphere.

Oxygen removal processes:

- Membranes
- PSA systems
- Air separation
- Biological respiration
- Burners

A little slower than phosphine for complete disinfestation

Commercial CA disinfestation of durables, replacing MB

Examples:

- Grain – China – PSA
- Grain – Australia – Air separation
- Dates – Tunisia – Membrane
- Cocoa – Cote d'Ivoire – Burner
(discontinued)
- Grain – Ruanda – Hermetic storage

Hermetic storage



Maize, outdoor storage in CocoonsTM, Philippines, 2008 (left), 1050 tonne MegaCocoonTM, Sudan, 2009 (right) (Villiers et al. 2010).

ISPM 15

At present ISPM15 standard for treatment of solid wood packaging allows only 2 treatment options:

- Methyl bromide
- Heat – 56C for 30 mins core temperature

ISPM15 is often the sole use of MB in some developing countries, but there are simple heat treatment facilities that can meet the standard instead.

Heat Treatment System for ISPM 15

- Central to the system is the use of an insulated chamber where the material to be treated, such as pallets, are placed and the chamber sealed.



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The heat is circulated rapidly in the chamber with the aid of fans



Heat is produced with LPG natural gas (or other fuels)



One objection to use of heat for ISPM15 is that it uses scarce fuel resources.

In many countries, the required heating can be obtained using solar heating.

Solar kiln under development - Fiji



Wood Packaging treatment in containers

- Quarantine and Pre-shipment treatment with **Heat technology** (HT).
- Quarantine and Pre-shipment treatment with **combination of HT and CA (EcO₂ QPS[®] Treatment)**.
- QPS Treatment is based on a combination of Controlled Atmosphere and Heat.
 - Heat (56C) to treat packaging materials inside the container; full pallets, stacked big bags or other packaging constructions according to the ISPM 15 norm.
 - Low oxygen to protect the goods from oxidation.

Worldwide Service Centres

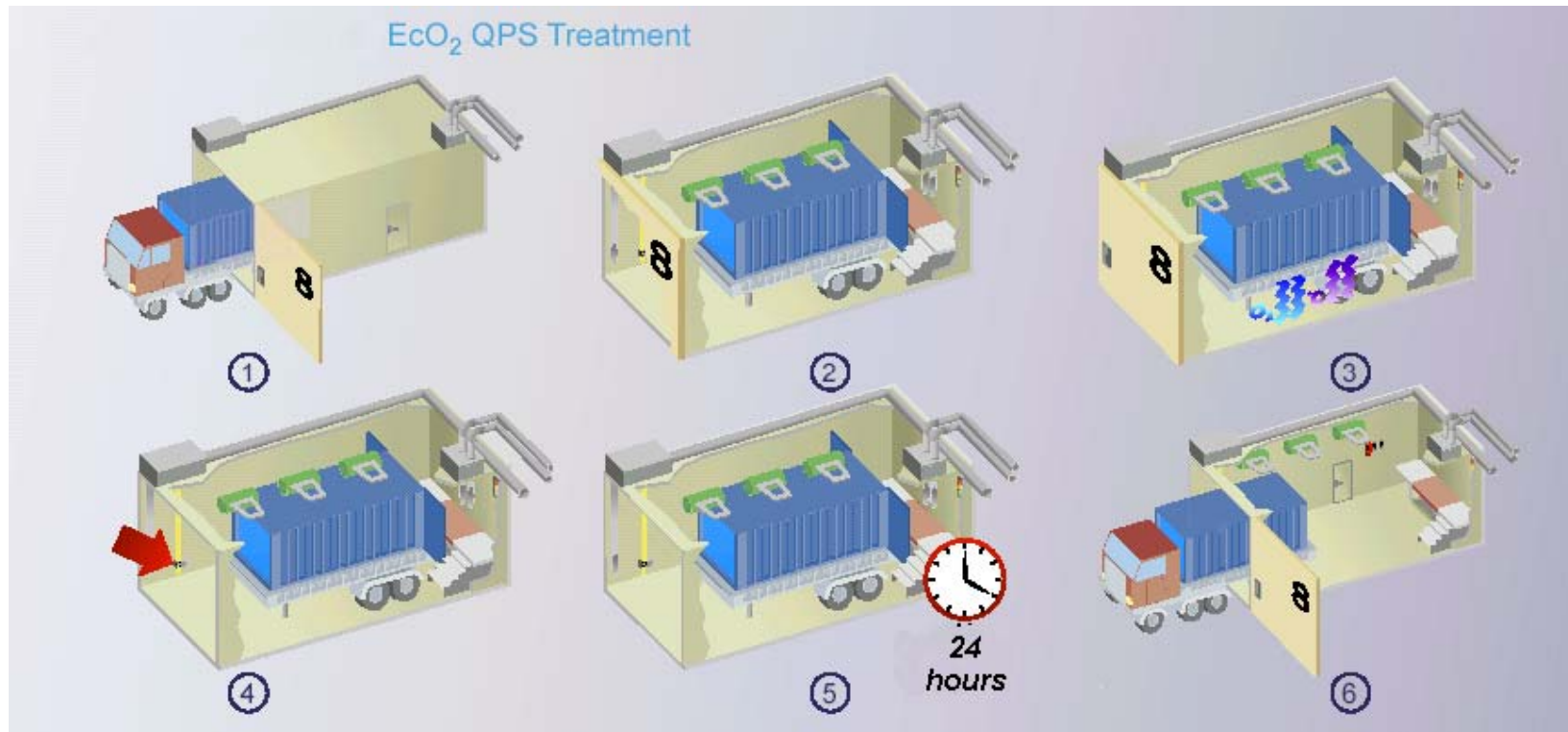
offering CA, HT & QPS treatment



Eco2 - 2010

- **The Netherlands** (12 locations)
- **Belgium** (2 locations)
- **Great-Britain** (7 locations)
- **Germany** (1 location)
- **Turkey** (2 locations)
- **Greece** (2 locations)
- **Vietnam** (1 location)
- **India** (2 locations)
- **China** (1 location)
- **Thailand** (1 location)
- **Singapore** (1 location)
- **Uganda** (1 location)
- **Bolivia** (1 location)

Container treatment system



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