



## Wood in the Food Industry

### Background

Wood has been a traditional material for many applications in the food industry. But today wood is getting discriminated in many sectors of the food industry - both in utensils, interiors, and buildings as well as in pallets and packaging. The reasons stated are

- wood is a porous material
- risk of splinters
- lack of cleaning or sanitation methods

In order to get more knowledge and a fair base for decisions some studies are done or are going on in several European countries e. g. in Germany, Switzerland and the Nordic countries.

Laboratory results from both Germany and Switzerland show that wood is as good as any other material. In fact these studies show that bacteria have a greater capacity to survive on plastics than on wood. Certain types of wood had superior hygienic qualities over plastics. Field studies in the food industries in Germany showed lower overall microbiologic load on wooden hygiene pallets than on plastic pallets after 6 months.

### Project

Since 1998, a Nordic study financed by Nordic Wood, Nordic Industrial Fund, national funds and wood industries is going on.

The Danish Technology Institute, Icelandic Fisheries Laboratories, The Norwegian Institute for Wood Technology, The Norwegian Institute for Fisheries and Aquaculture, The Swedish Institute for Wood Technology Research and Swedish Wood carry out the research.

Representatives from food surveillance institutions in the Nordic countries are invited to the project meetings and are kept informed about the progress and results of the project.

Pallet manufacturers, sawmills, woodworking industries and users of wooden constructions, pallets and packaging are also involved.

The project will be completed 2002 and all results released.

### Examinations

Both laboratory testing and field tests are carried out. The preliminary results are showing that wood is as good as other material both in pallets and for interiors.

In the laboratory tests the use of high temperature treatment for sanitation is shown to be very efficient and no bacterial growth could be detected afterwards.

High-pressure water treatment has been very efficient as a cleaning method for wooden pallets in the field tests. (See Cleaning Methods).

One promising technique for pasteurising wooden packaging is to use microwaves. The microwave technique has for example been developed for sanitising wooden pallets and corrugated boxes for eggs.

In the Nordic project, the effect of microwaves on wood samples of pine and beech infested with different bacteria and samples of mould infested board material were tested. The results from these preliminary studies showed that there is a good reason to continue to make series of tests to find out the right process for different bacteria.

### Conclusion

Good manufacturing quality, good handling practise and proper sanitation treatments surely make wood a suitable material for most applications in the food industries.

The legislators are requested to study the results in order to review and amend regulations and laws in which the use of wooden materials is prohibited.

## Some of the Results from the Project

### Laboratory Tests

Beneath some sub-results from laboratory tests are stated, in these tests different wood species – ash – beech and oak as well as plastic and steel are inoculated with bacteria.

The results stated in figure 1 reflects the bacteria incidence on wood, which has been in direct contact with meat e.g. chopping boards, tabletops, handles of a knives etc.

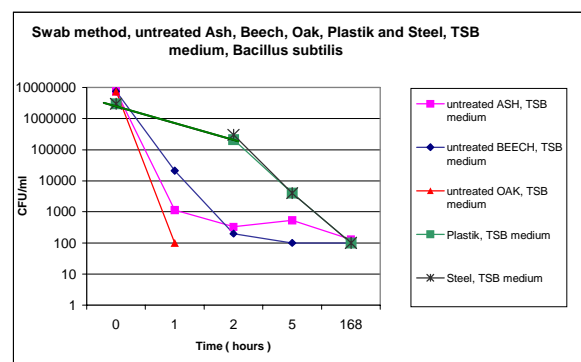


Figure 1. Ash, beech, oak, plastic and steel inoculated with bacteria. It was measured how long the bacteria can survive on the different materials. The test specimens were of planed wood.

Oak and beech have after 2 hours the same bacteria incidence as plastic and steel have after 168 hours.

This laboratory examination thus indicates that bacteria have essentially poorer conditions of life on oak and beech compared with plastic and steel.

In excess, it can be seen that different wood species give different conditions of life for bacteria. Generally, it has been shown that oak does better than beech and ash.

Figure 2 shows that Scotch pine for pallets is a more hygienic wood species to use than Norway spruce.

Not only the wood species but also the wood moisture are decisive for the extent of hygiene in connection with food. Increasing wood moisture implies better conditions of life for bacteria. See figure 2.

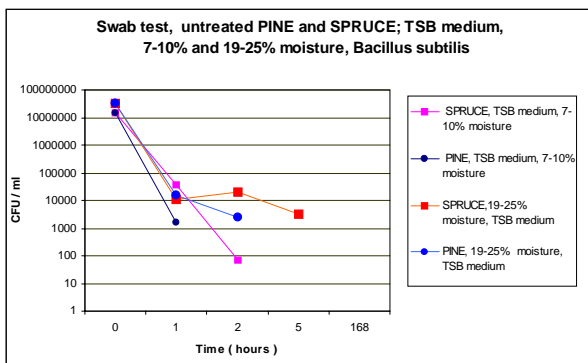


Figure 2. Untreated Scotch pine and Norway spruce inoculated with bacteria on 2 wood moisture levels. The test specimens were of planed wood.

These laboratory examinations and results can be read in report no. 10 (see the reverse side).

### Pallets

Beneath the bacteria incidence on wood and plastic pallets used in the food industry is stated.

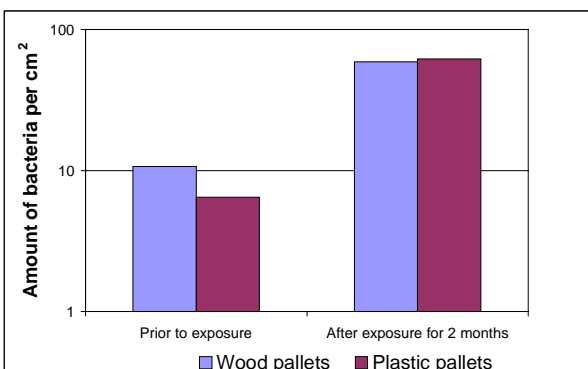


Figure 3. Average amount of bacteria per cm<sup>2</sup> on wood pallets and plastic pallets respectively prior to exposure and after exposure for 2 months to salted fish. The pallets have been stored and used in a humid and cold environment (85% RH and 0-3°C.)

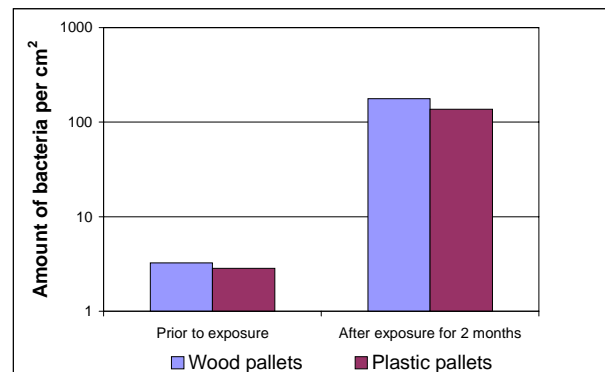


Figure 4. Average amount of bacteria per cm<sup>2</sup> on wood and plastic pallets respectively after exposure for 0 and 2 months in the distribution chain for supermarkets. The pallets have been stored and used in a dry and warm environment (28% RH and 16°C)

This examination shows that the incidence of bacteria on wood and plastic at different climates is on the same level.

A description in detail of these results can be read in reports nos. 8 and 9 (see reverse side).

### Cleaning Methods

Cleaning of pallets can be as effective on wood as on every other material – beneath the efficiency of pallets high-pressure treated with cold water is stated.

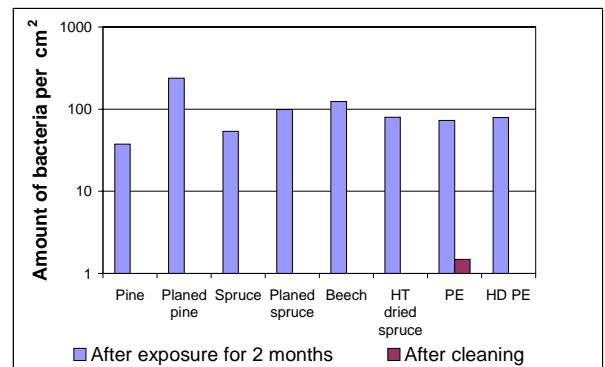


Figure 5. The incidence of bacteria on wood and plastic pallets prior to and after cleaning with high-pressure treatment with cold water

It was impossible to track bacteria on the wood pallets after high-pressure treatment with cold water. On the plastic pallets the incidence of bacteria was hardly detectable.

A description in detail of these results can be read in report 8 and 9 (see reverse side).

## Reports of the Project

### Report No 1.

Literature review on the suitability of materials used in the food industry, involving direct or indirect contact with food products.

### Partial report No 2

Wood in food. Measuring methods (to control the hygienic status of wood in the food industry)

### Draft part report No 3

Legislation on foodstuffs.

### Draft part report No 4

In Danish. Spørgekemaundersøkelse vedrørende bruk af træ i Norden til levnedsmiddelformål.

### Draft part report No 5

Short report from a pilot study regarding wood treatments and hygienic properties of wood.

### Partial report No 6

Hygienic limits and cleaning procedures.

### Partial report No 7

Wood, waxed wood, plywood, polyethylene and stainless steel - a comparison of hygienic properties.

### Partial report no. 8

Wood in the food industry - guidelines for handling wooden pallets and packaging.

### Draft part report no. 9

Hygienic properties of wood – Field studies on wooden pallets and wooden constructions.

### Draft part report no. 10

Wood, plastic and steel – a comparison of hygienic properties.

## Participants

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