

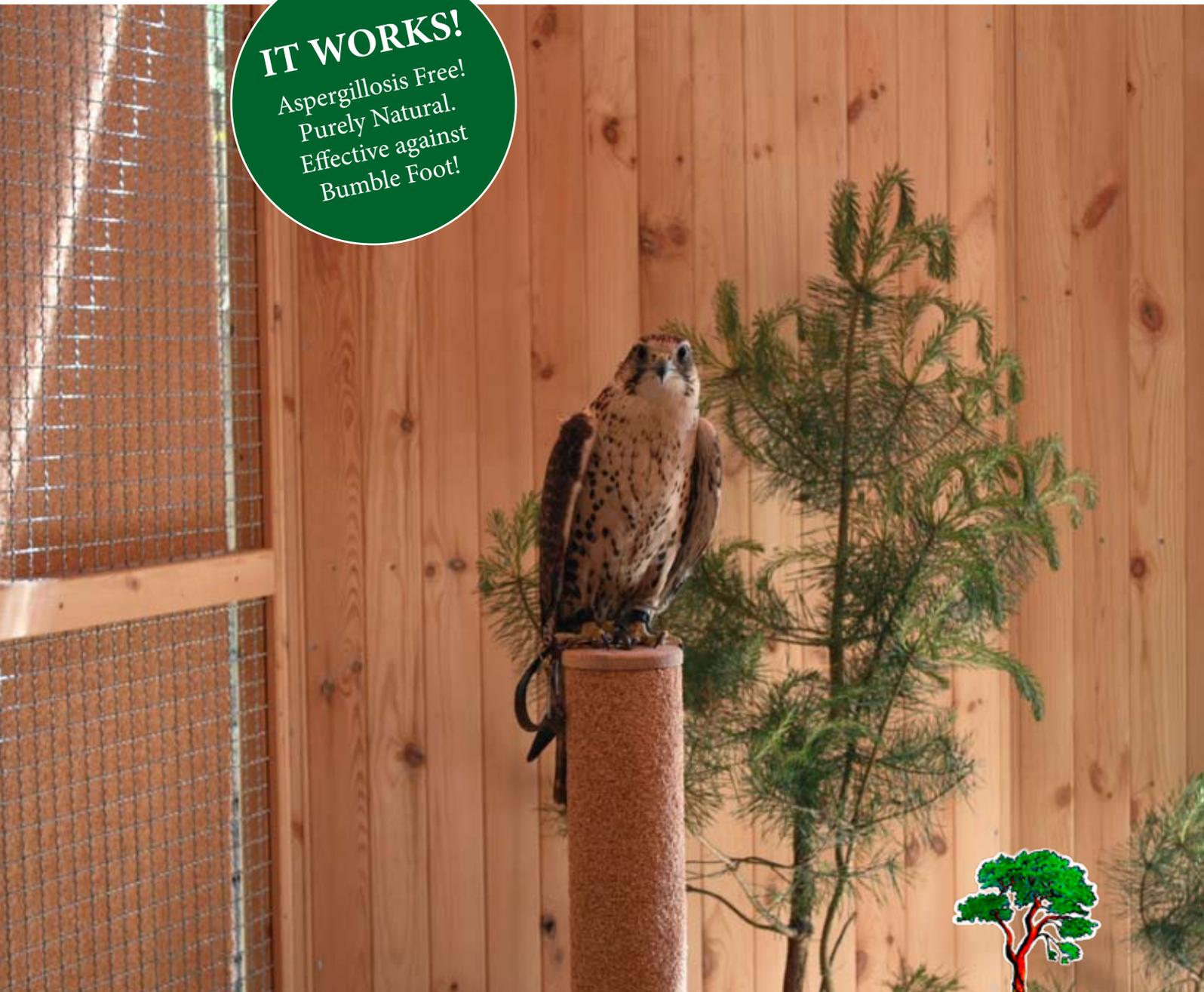
Wilms® ORGANIC FALCON COUNTRY HOUSE

Falcon Health Through Pine Heartwood.

The first 100% natural, antibacterial, antifungal falcon environment!

IT WORKS!

Aspergillosis Free!
Purely Natural.
Effective against
Bumble Foot!



Foreword

More than pretty and practical.

Many appreciate wood for its beauty, aesthetic appeal and the pleasant, warm atmosphere that it creates. Others see the static and practical properties of wood in the foreground. Few, however, agree on the health properties of wood. In particular the unprecedented and still largely untapped health properties of pine heartwood.

The long-living Bristlecone Pines of California live up to 4,000 years and older. They are older than the pyramids and reach an altitude of 3,300 meters. "Paradoxically, the pines get so old because they continually cope with the adverse growing conditions," said Patti Wells, a botanist with the U.S. Forest Service. Pine wood is very resinous and thus good protection against fungi and insects. But even insects use this plant's defensive advantage. Swiss researchers found evidence that ants arm themselves with small pieces of resin for protection against bacteria and fungi, greatly increasing their survival rate. Birds and bees also use the resin to seal their nests.

Just as it's used in nature, this wood can be used for falcons.

Development of a Healthy Living Environment

Based on these health effects, Wilms has developed various products for falcons using the antibacterial, antifungal properties of the wood.

The Hygienic Wood falcon aviary reduces pathogens - bacteria, germs, fungi and viruses. It also reduces Aspergillus (fumigatus, flavus) and the E. coli bacteria within a short period of time.

Wilms® PineFauna - the natural pine extract makes the defensive power of heartwood available for animals.



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1. What is Hygienic Wood?

Hygienic Wood uses the power of nature - it uses the health-promoting properties of pine heartwood. Recent studies show that, in particular pine heartwood reduces bacteria, germs, fungi and viruses within a short period of time. In our Hygienic Wood, these properties are intensified through a patented, non-chemical process.

Moreover, the natural ingredients of pine heartwood have a positive effect: The ingredients lower pathogen levels and increase body regeneration leading to better health, day after day!

2. Hygienic Wood Aviary

Hygienic Wood aviaries are a novel concept based on the health effects of pine heartwood. The construction and furnishings of the aviary are made of specially constructed pine heartwood logs and chip mats ensuring hygienic conditions.



Pine heartwood has a positive influence on the daily recovery process, leading to greater vitality.

The Advantages of the Organic Falcon Country House:

- Healthy indoor environment - effective against Aspergillus
- Natural air filtration - through the Wilms® Hygienic Wood chip mats
- Naturally hygienic perches – effective against Pododermatitis
- Naturally antibacterial flooring with additional replaceable Hygienic Wood chip mats
- Individually handmade, high-quality production - Made in Germany



2.1 Special Features of the Hygienic Wood Aviary

Healthy indoor Environment

- actively fights *Aspergillus* in falcons

As proven by a recent study carried out by the German Institute of Food Technologies, pine heartwood is effective against germs, bacteria, viruses and fungi, particularly *Aspergillus*. More details are available in the research section of this kit. The antibacterial properties of the wood also improve the quality of the air. The walls are made of Hygienic Wood chip mats. With thousands of chips, the filtering surface is increased, improving circulation and regulating humidity.



Particularly natural environment: No plastic, almost 100% wood

Natural Air Filtration through Wilms® Hygienic Wood chip mats

The germ-reducing effect of the wood has already been demonstrated in many cases. Hygienic Wood eliminates microorganisms within a short period of time. An investigation by the German Institute of Food Technologies specifically focused on the use of Hygienic Wood for filtering the air. Conclusion: There is a significant reduction of airborne pathogens when using Wilms® Hygienic Wood as an air filter.

Small Chips, Big Impact

Hygienic Wood chips, used in the form of mats, enlarge the effective surface area of the wood greatly. On this surface microorganisms are absorbed into the wood and are quickly destroyed. The air is cleaned and microorganisms are kept from entering the falcon's environment.

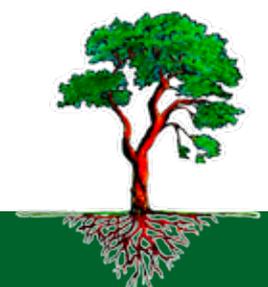
Natural Climate Control

The wood chips also balance the climate in the aviary. The mats have an insulating effect to keep temperature fluctuations under control. The hygroscopic properties of the wood also regulate the humidity, again keeping fluctuations in check.

This uniform climate adds to the pleasant atmosphere that is so important for the stable state of health for a falcon.

Reduces the Transmission of Bird Flu

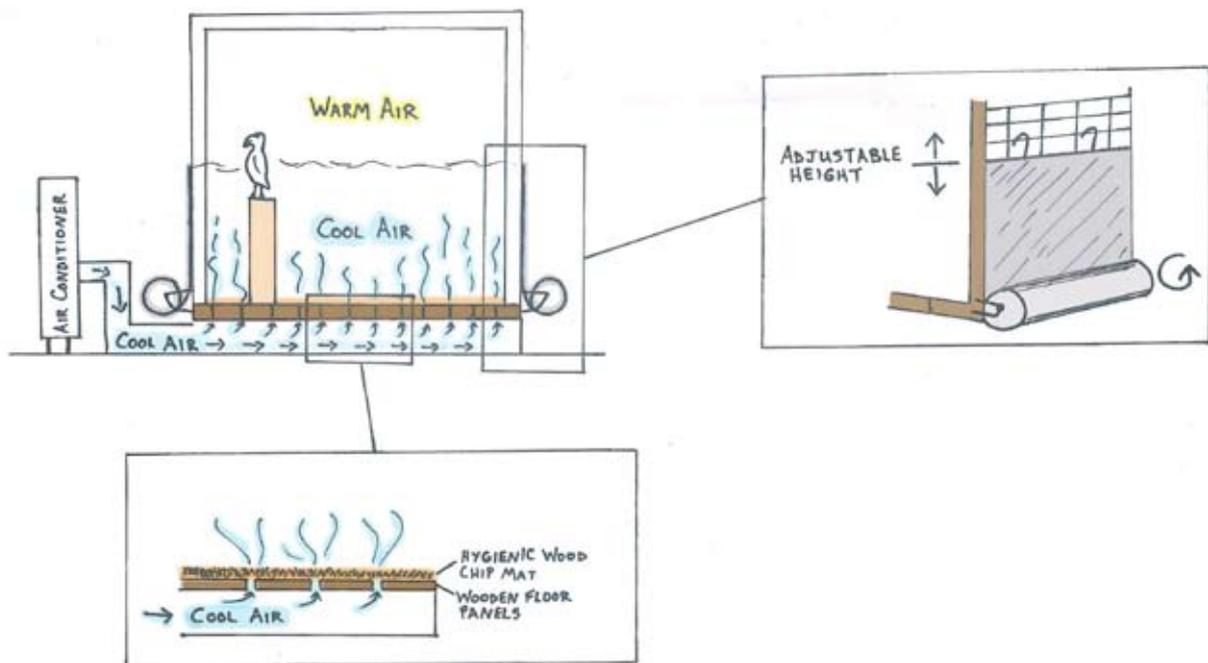
It is scientifically proven that the bird flu virus is transported as tiny particles in the air. Therefore, in order to minimize the risk of animal infection, the air needs to be filtered. The risk of spreading the disease is lowered by an increased water content in the air which the Hygienic Wood mats can provide. By keeping the mats moist, they will slowly increase the humidity of the room, lowering the number of pathogens in the air.



Indoor Climate Control Even in Extreme Heat

The walls of the aviary are in principle, an insulation: A chip mat on the inside of the wall serves as antibacterial and also insulating material. Then a balancing layer of air and a second outside Hygienic Wood chip mat makes up the outer layer.

The main structure and the Hygienic Wood mats form an effective and ecological isolation of the aviary.



Decrease the temperature inside the aviary through use of the Hygienic Wood air conditioning system.

Unique Air Conditioning Technology

The aviary can also be air conditioned. To do this, we have developed a unique cooling system. This ensures not only a pleasantly cool environment, but also enhances the germ-reducing characteristics of the wood which reduce the risk of disease. The cool air flows in from below the chip mats on the floor of the aviary. To make this possible, the boards of the subfloor have small gaps between them where the cool air from the air conditioner is introduced. The cool temperature on the ground accelerates germ reduction since germs multiply under warm, moist conditions.

Temperature Regulation

Through a modified wall structure, the temperature of the air can be controlled. Using a device resembling window shades mounted outside to the bottom of the aviary, the temperature of the air reflects the adjustment of the height of the shade. If the shades for example are extended to about half the height of the aviary, the lower half of the space inside will be cool while the upper half will be a bit warmer but still have fresh air circulation.



Cleaning the chip mats

The ingredients of the wood naturally keep the wood sanitary on a microbial level. For things such as feces, the mats can simply be brushed or wiped off. The mats on the floor can also be easily removed and shaken out.

It is also recommended to sprinkle Hygienic Wood chips on the mats making up the floor. This allows for easy cleanup of feces.

Since the mats are not attached to the floor, they can easily be rotated and flipped.

Durability of the Wood

Due to the high resin content and the active ingredients of the pine heartwood, which we use exclusively, the entire construction of the aviary is extremely weather resistant. Rotting of the wood is nearly impossible. This phenomenon is well illustrated by wood that has been stored for a long period of time. While the outer portion of the tree is affected, the heartwood remains healthy!



Pine heartwood - weather resistant and durable.



Especially resistant due to the breathable fabric.

Durability of the Mats

Not only the wood makes the mats durable, but also the inner material. Unlike particleboard, the wood chip mats can not swell up due to the breathable fabric. As the wood itself swells and shrinks, it does not disturb the construction of the mat.

The inner mesh material of the mat will not rot.

Antibacterial Effect

The antibacterial effect of the wood was tested over a span of 41 months. In this time, the mats consistently held their antibacterial effect. The wood guarantees longevity and effectiveness of the material and the construction of the aviary.

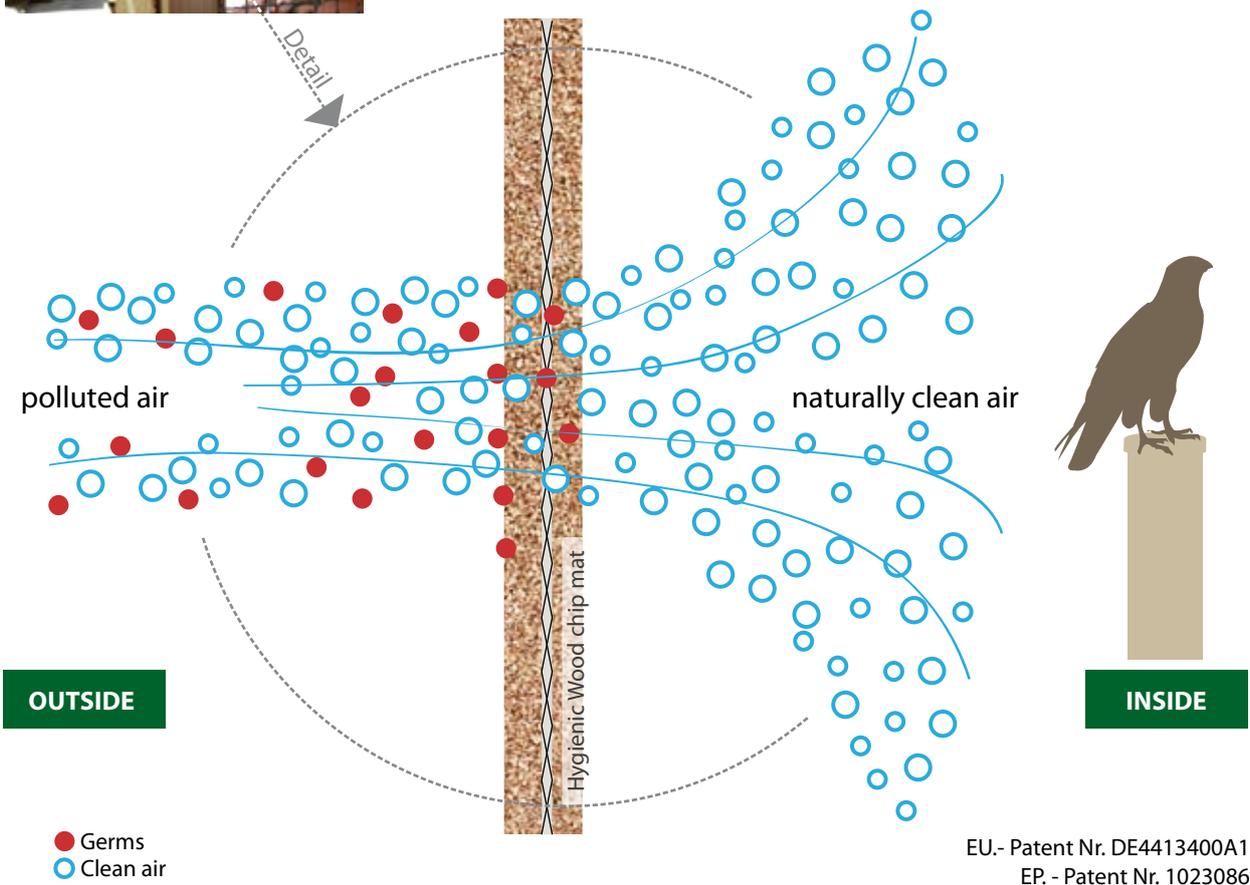




Germ-Reducing Walls

The walls, which are made of Hygienic Wood chip mats, serve as a constant air filtration system due to the antibacterial, antifungal effect of the wood.

Because of this, Aspergillus and other airborne pathogens are significantly reduced, greatly lowering the chance of falcons (and other animals) becoming infected.



Balanced humidity
Natural temperature control
Germ-free air filtration for clean air

Healthy environment – a pure & natural balance





*antibacterial and antifungal perch -
made from Hygienic Wood chips.*

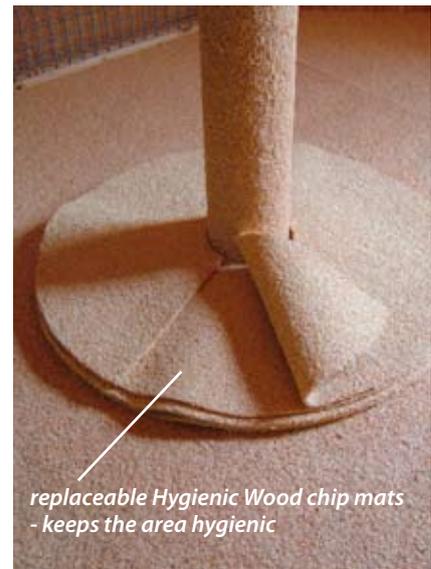
Naturally Hygienic Perches – effective against Pododermatitis

The specially made perches are not only ergonomically shaped but also allow the properties of the wood to keep the feet healthy. As was proven in a scientific study, the wood is effective against Pododermatitis and keeps the balls of the feet in good condition. Read more about this in our research section.

Naturally Antibacterial Flooring

The bottom of the aviary is made up of Hygienic Wood chip mats. This ensures the quick absorption of moisture, and thereby rapid elimination of pathogens, such as those in feces.

The wood ensures a hygienic environment as it absorbs the moisture allowing the ground to dry quickly. Under the perches fecal matter tends to accumulate quickly. For these areas we recommend individual, interchangeable Hygienic Wood mats. The flooring underneath the mats is also Hygienic Wood creating a completely antibacterial, antifungal (Aspergillus-free) environment.



*replaceable Hygienic Wood chip mats
- keeps the area hygienic*



Wood - a sustainable material - 100% biodegradable and CO2-neutral

Individual, handmade, high-quality production - Made in Germany

The aviaries are custom made and adapted to best fit the local conditions.

The aviaries are created in Germany and built up on location to ensure maximum quality.



3. Wilms® PineFauna

Wilms® PineFauna is a new care product which uses the natural power of pine heartwood to improve animals' health. PineFauna is the extract of pine heartwood and retains the naturally effective ingredients of the wood.

For external application (when used as a spray), the extract strengthens plumage and removes mites.

For internal application (when added to drinking water), it naturally eliminates the E. coli bacteria and other germs, viruses and fungi.



Healthy Inside and Out - through the pine heartwood extract

Through the use of the extract, the health properties of the wood are transferred directly to the animal.

Bacterial diseases such as E. coli septicaemia can be reduced as well.

Through use of the extract in a falcon's bath, mites on the feathers will be reduced.

Composition and Application

Wilms® PineFauna is a purely natural product. It consists of pure water from the Wiehen Mountains in Germany combined with the ingredients of pine heartwood. In a patented procedure, the active ingredients of the wood are transferred to the water. This combination is suitable for the care of sensitive skin, plumage and fur.

When used in a spray can, Wilms® PineFauna can target specific areas where it's needed.

For drinking and bathing, the larger container is recommended.

Wilms® PineFauna is available as a 50ml spray bottle for when you're on the road, as a 500ml bottle for home use and as 5L/10L canister for greater needs.





Wilms in the World's Largest Falcon Hospital

In April of 2009 a delegation of Wilms GmbH journeyed to the world's largest falcon hospital in Abu Dhabi to get a clear idea of the needs and problems of falcons.

This one-of-a-kind clinic was built 17 years ago in the middle of the desert by the royal family. The technical equipment is state of the art with an X-ray station, an operating room, three ambulances for emergencies and a large laboratory. Doctor Rempel, a veterinarian from the U.S.A., leads a team of 26 employees - veterinary assistants, laboratory assistants, zoologists and many others.

„Through the expertise of this falcon hospital, we received valuable information that we used in the development of our Hygienic Wood Falcon Aviary,” said Heiner Wilms.

„In the Arab world, falconry is a special tradition which is why it was important for us to get a view of their practices. The exchange of ideas that we had with physicians and falconers has helped us greatly in our new development concepts.

The effect of pine heartwood is a tremendous opportunity for falconry.”



CEO Heinrich Wilms and Dr. Steinkamp (German Institute for Food Technologies) visit the Abu Dhabi Falcon Hospital



Presentation of PineFauna, the pine heartwood extract, for the treatment of falcon ailments



4. Wilms® Hygienic Wood

Wilms® Hygienic Wood uses the power of nature found in the heartwood of pine trees. At the center of the tree is where the antibacterial and germ-free ingredients are located. Through a patented process the Wilms company reinforces these natural defense properties. The result: Wilms® Hygienic Wood.

4.1 Health Through Wood

Pine trees have been in our forests for 10,000 years. It is a symbol of resurrection, persistence and perseverance.

Pine is an extremely resilient and strong tree. This is reflected by the areas in which they grow. They are often located in places that are difficult for trees to flourish.

They are found in forests but are also seen growing on bare rock. This shows that pine wood needs highly efficient heartwood properties.



Pine as a remedy

Early on, pine wood was often used in home remedies. The resin, for example, was used for the softening of ulcers, and the bark of pine was smoked and used for women's diseases. The bark and needles of pine were later used in medicine as ointments or baths. Pine was also used for people with rheumatic and lung diseases. In the 12th century people used pine for coughing or kidney/bladder ailments.

These early applications over time have been studied and many, scientifically confirmed.

For topical application, pine helps with fatigue, insomnia, nervousness, wounds and skin diseases, rheumatism and circulatory disorders.

The wood itself also rids pathogens. In recent years, numerous studies have confirmed that the wood effectively kills germs, bacteria, viruses and fungi. The studies showed that in particular the core of pine wood has exceptional defense forces.

Wilms® Hygienic Wood is processed pine heartwood. Through a patented procedure the Wilms company has reinforced this natural defense. This non-chemical process strengthens the absorbability of the wood so that bacteria and germs are quickly transported into the wood where they are eliminated. Wilms® Hygienic Wood products improve the living environment of people and animals in a natural way. ■



4.2 Frequently Asked Questions

What exactly is Hygienic Wood?

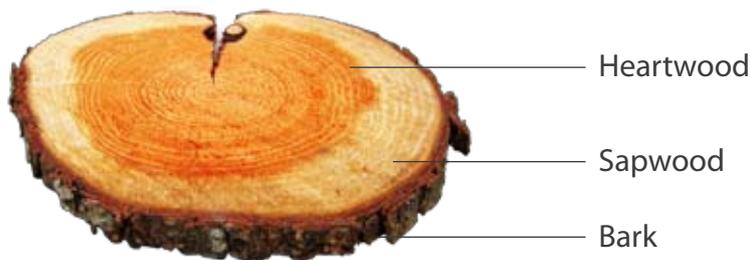
As the name suggests, Hygienic Wood is an extremely pure, antibacterial wood. It uses the contents of pine heartwood as its strength. The core of the pine has special ingredients which are proven to be resistant to bacteria and germs. Through a patented procedure, this natural protection of the pine wood is strengthened.

What does Hygienic Wood consist of?

Hygienic Wood is made exclusively of pine heartwood. Pine wood, especially the core (heartwood), has been proven to have an antibacterial effect.

What is pine heartwood?

Heartwood forms at the center of the trunk. With pine, heartwood is recognizable by its dark coloring. This part of the tree is particularly resistant to germs, bacteria and fungi.



Cross section of a pine tree trunk

What is the difference between pine heartwood and Hygienic Wood?

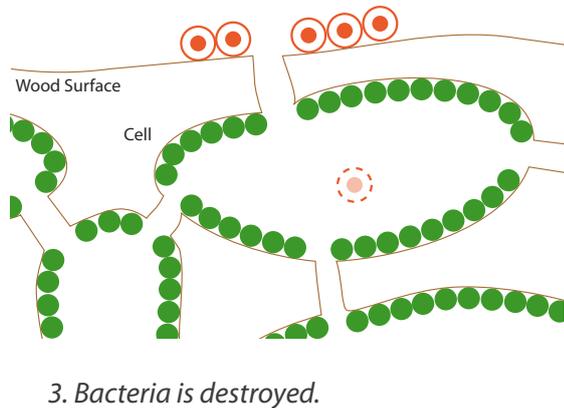
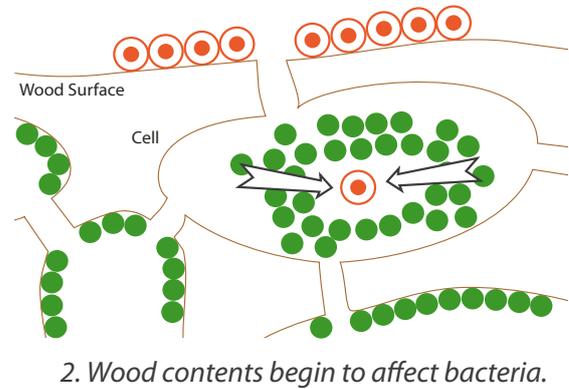
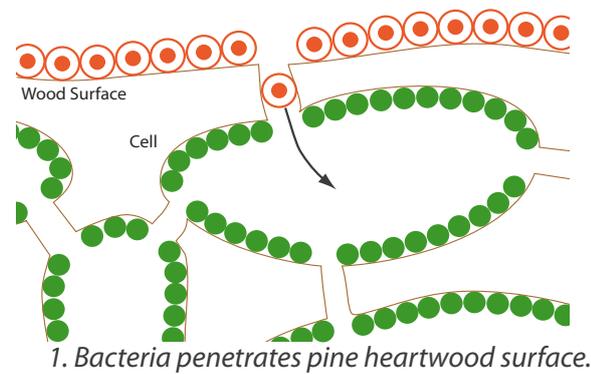
Hygienic Wood is pine heartwood that has gone through the Wilms patented treatment procedure. This procedure intensifies the antibacterial power of the heartwood.

During this procedure the wood becomes more absorbent so that germs and bacteria are quickly transported into the wood where they are killed. →



How does Hygienic Wood work?

Because the wood is a porous and hygroscopic material, it deprives the bacteria of the moisture needed for activity and reproduction. This, in conjunction with the contents of the wood, kills off any bacteria that the wood may have come in contact with. Two particularly effective contents of the wood are Terpenes and Pinosylvin. The speed of germ reduction and the antibacterial effect of wood depend on how fast the bacteria and other pathogens enter the wood.



What distinguishes Hygienic Wood?

The special contents of the wood:

- Are demonstrably effective, durable, antibacterial and germicidal;
- Have a positive impact - the essential ingredients calm the body and promote well-being.

How long do the hygienic properties of the wood remain effective?

The germicidal effect is permanent - remaining even after several years.

Even though the scent of pine wood will diminishes over time, the hygienic effect remains. ■



4.3 From the Research

4.3.1 Influence of Wilms® Hygienic Wood bedding material on the health of broiler chickens

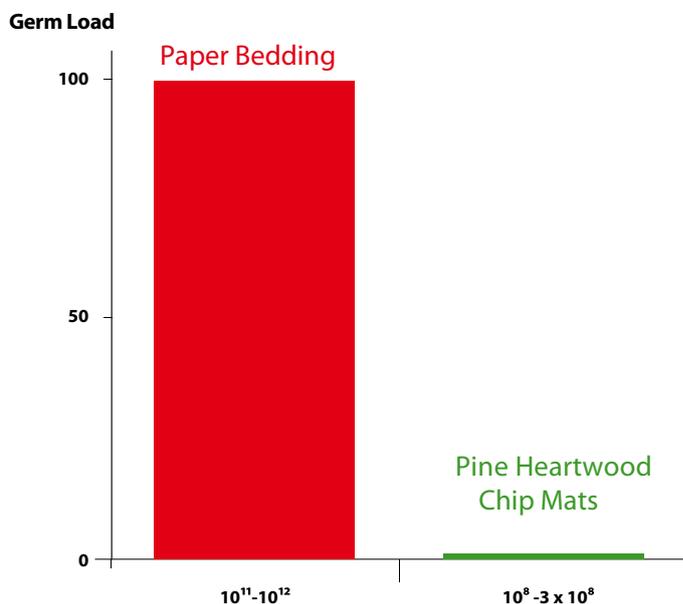
Objective

To what extent can Wilms® Hygienic Wood bedding impact the chickens' health?

Procedure

Compare pine heartwood mats to common paper bedding materials used for raising chickens. The paper bedding and pine heartwood mats were used in separate cages with 25 adult broiler chickens each. After one day, the TH Hannover Aussenstelle Bakum examined the chickens.

The investigation was carried out at a chicken-breeding farm in Wall Horst-Lechtingen, Germany.



Comparison of totals 1

Results

The bedding made of pine heartwood has more than two powers of ten less bacteria than the bedding made of the conventional paper bedding.

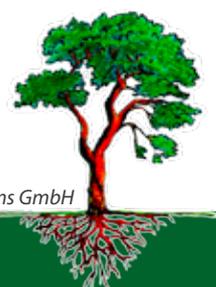
Conclusion

Using Wilms® pine heartwood for bedding and for surfaces where the animals walk, makes a significant impact on the health of the animals. Besides the reduction of bacteria, fungi and mites, the wood influences the environment of the pet stalls in a positively by absorbing moisture and eliminating odor. Due to the considerably improved health of the animals, they often need less medication.



Implementation

German Institute for Food Technologies,
Professor-von-Klitzing-Str. 7, 49610 Quakenbrück, 2003.



Data: German Institute of Food Technologies (2003): Research project on the use of wood chips in chicken stalls; Graphics: Fa. Wilms GmbH

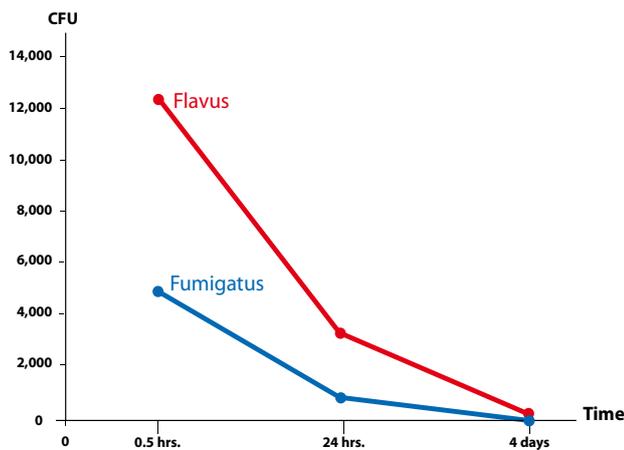
Wilms® Hygienic Wood Useful against Aspergillosis in falcons?

Objective

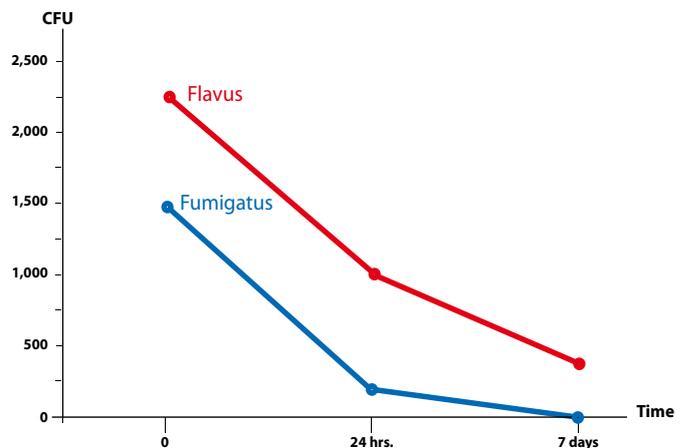
Are Hygienic Wood and Hygienic Wood mats able to reduce the mold *Aspergillus fumigatus* and *Aspergillus flavus* (primarily responsible for Aspergillosis in falcons)?

Procedure

This study sought to determine the survival of fungal organisms on a flat Hygienic Wood surface as well as on Hygienic Wood chip mats. Samples were taken for measurement at specific time intervals and the germ populations were documented.



Fungi reduction on Hygienic Wood chip mats¹



Fungi reduction on flat Hygienic Wood surfaces¹

Results

After half an hour, the mold organisms *Aspergillus fumigatus* and *Aspergillus flavus* were already reduced by almost 50%. On both the flat Hygienic Wood surface as well as on the Hygienic Wood chip mats, it took four days to reduce the fungus by 90%.

Conclusion

The results show that Wilms® Hygienic Wood provides a hygienic living environment which is almost completely free of *Aspergillus fumigatus* and *Aspergillus flavus*. This ensures a significant reduction in the risk of aspergillosis disease.

Implementation



German Institute of Food Technologies,
Professor-von-Klitzing-Str. 7, 49610 Quakenbrück, 2009.

¹ Data: Dr. rer. Nat. M. Timke (Dipl. biologist) (2009); Graphic Composition: Fa Wilms GmbH



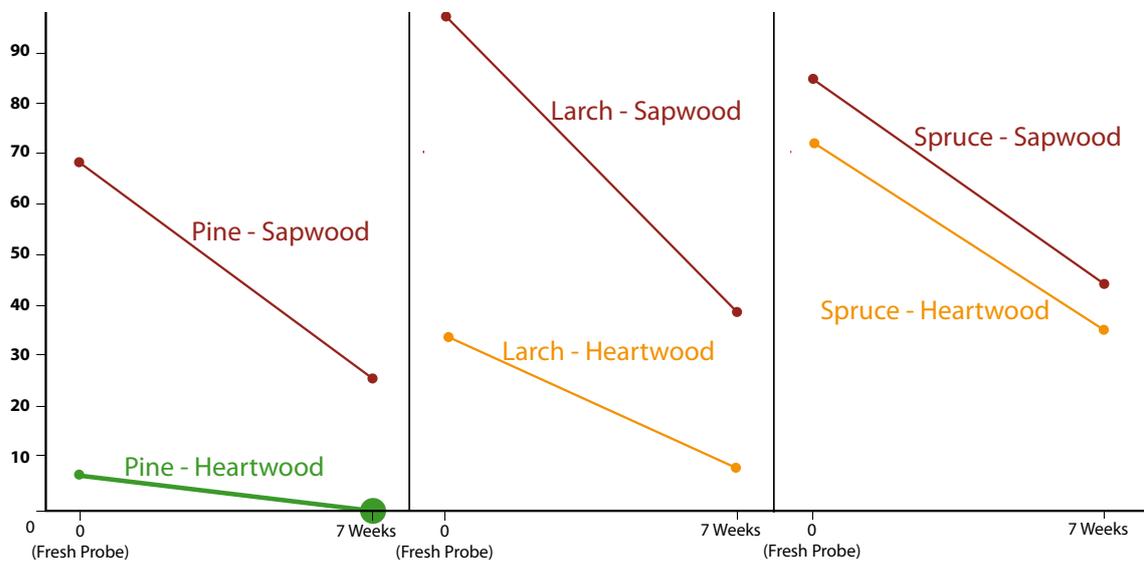
4.3.3 Hygienic and phytosanitary properties of wood and wood products¹

Objectives

Does wood have antibacterial properties? And if so, does the wood species and different factions make a difference?

Approach

The test materials were 1×10^6 cfu / cm² (total number of bacteria live per sq. cm) infected with the E.coli bacterium. The development of bacterial populations was during a 7-week storage period, and is seen in the graph shown below.



Germ load on different sapwoods and heartwoods¹

Result

The results clearly show that when assessing the germ- and bacteria-killing effects of wood, the differentiation between not only the species of the tree is important, but which section of the tree is also crucial.

Conclusion

Germes are most rapidly decreased and killed on pine heartwood.



Implementation

Annett Schönwälder, Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Pflanzenvirologie, Mikrobiologie und biologische Sicherheit, Messeweg 11/12, 38104 Braunschweig, 2000.



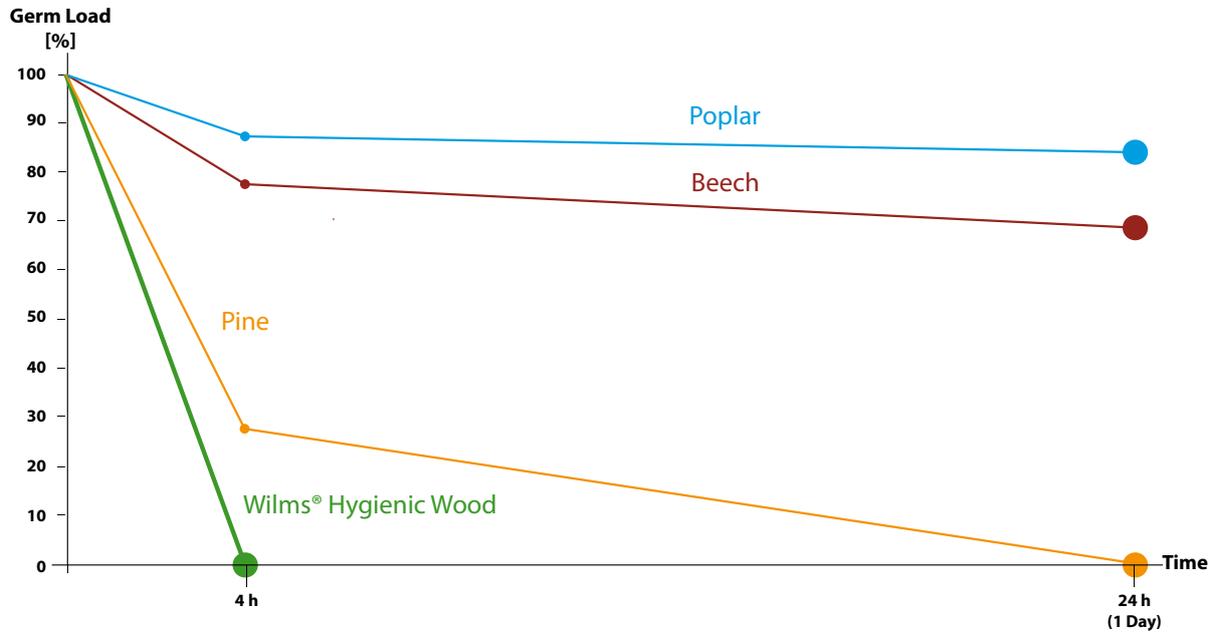
¹ Data: Schönwälder, Annett (2000), S. 17; Graphical composition: Fa. Wilms GmbH

Objectives

Can germs live inside of the wood or will they be reduced/eliminated?

Approach

The test materials were 1×10^6 cfu / cm² (total number of bacteria live per sq. cm) wood infected with the E.coli bacterium. The development of bacterial populations was tested 1mm deep after 4 and also 24 hours. The results are shown in the following diagram.



Germ load inside the wood¹

Result

When tested after four hours, the Wilms® Hygienic Wood had no germs left.

Conclusion

Bacteria is soaked into the Wilms® Hygienic Wood, where it is actively fought and killed.



Implementation

Annett Schönwälder, Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Pflanzenvirologie, Mikrobiologie und biologische Sicherheit, Messeweg 11/12, 38104 Braunschweig, 2001.

¹ Data: Schönwälder, Annett (2001), S. 62; Graphical composition: Fa. Wilms GmbH



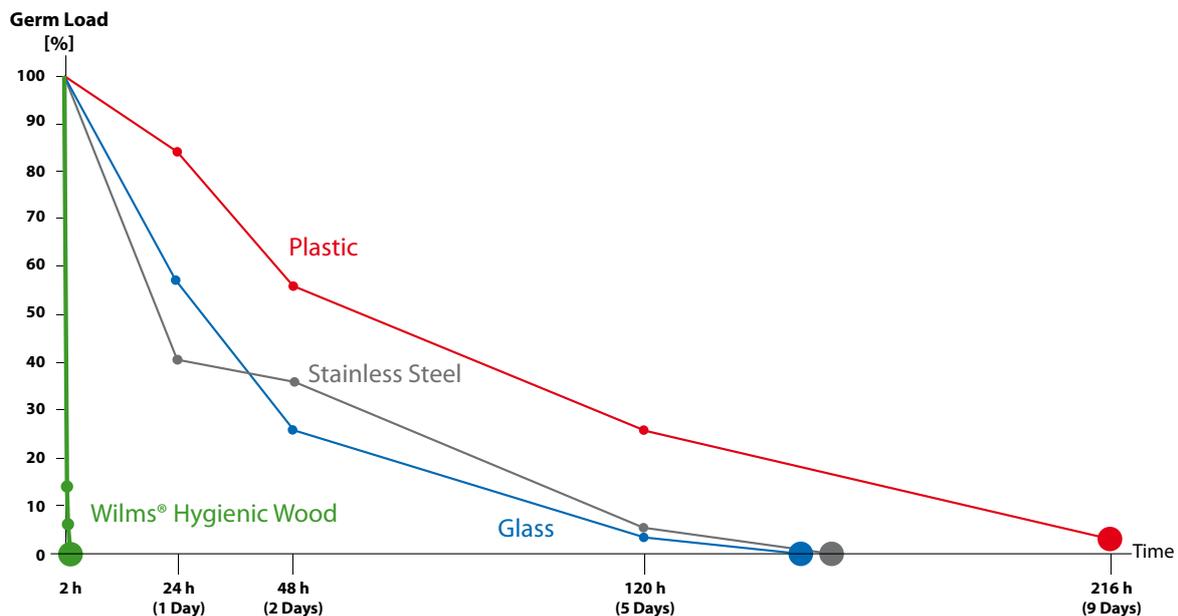
4.3.4 Germ reduction by Wilms® Hygienic Wood compared to other materials

Objectives

What are the antibacterial properties of Wilms® Hygienic Wood compared to other materials such as glass, stainless steel and plastic?

Approach

The test materials were each infected with 1×10^6 cfu / cm² (total number of bacteria live per sq. cm) of the E.coli bacterium. The development of bacterial populations was over a period of nine days, and is seen in the following chart.



Germ load on Wilms® Hygienic Wood, glass, stainless steel and plastic ¹

Result

Particularly significant is the rapid destruction (2 hours) of all micro-organisms by Wilms® Hygienic Wood, while the other materials still had bacteria after 120 hours (polyethylene after 216 hours).

Conclusion

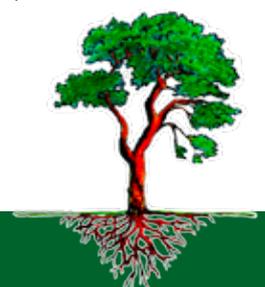
On Wilms® Hygienic Wood bacteria are reduced significantly faster than on glass, stainless steel and plastic.



Implementation

Annett Schönwälder, Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Pflanzenvirologie, Mikrobiologie und biologische Sicherheit, Messeweg 11/12, 38104 Braunschweig, 2001.

¹ Data: Schönwälder, Annett (2001), S. 66; Graphical composition: Fa. Wilms GmbH

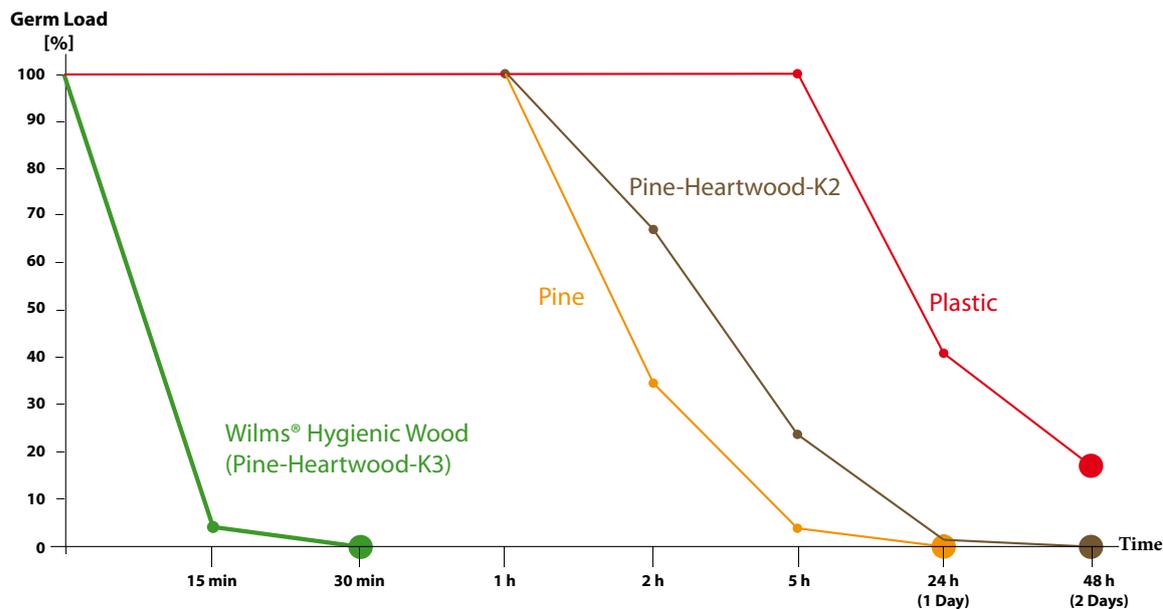


Objectives

Is it possible the hygienic properties of pine heartwood can be increased?

Approach

Samples of pine heartwood were processed differently and then each 1×10^6 cfu / cm² (total number of bacteria live per sq. cm) were infected E.coli bacterium. The development of bacterial populations was observed during a 48 hour period and is shown in the following diagram.



Germ load on Wilms® Hygienic Wood, Pine-Heartwood-K2, Pine und Plastic ¹

Result

After a washing and drying procedure „K3“ the pine heartwood killed germs far faster than the other wood. This method improves the hygroscopic properties of the wood so that the wood is able to absorb liquids much faster. Test organisms that are located in the liquids are therefore more in contact with the contents of the wood. This patented procedure (EP-Nr. 1005964) is used for Wilms® Hygienic Wood.

Conclusion

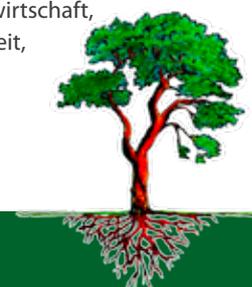
The Wilms® patented washing and drying procedure greatly improved the hygienic properties of pine heartwood.



Implementation

Annett Schönwälder, Biologische Bundesanstalt für Land- und Forstwirtschaft, Institut für Pflanzenvirologie, Mikrobiologie und biologische Sicherheit, Messeweg 11/12, 38104 Braunschweig, 2000.

¹ Data: Schönwälder, Annett (2000), S. 51; Graphical composition: Fa. Wilms GmbH



4.4 Environmental Responsibility

Wilms® Hygienic Wood is committed to maintaining a responsible attitude toward the environment.

We strive to protect natural resources and the environment - especially in the processing of natural raw materials such as wood. We are obliged to take care of nature to ensure a healthy environment for future generations and to make certain that we leave the natural habitat intact.

Therefore, we make every effort to make environmentally friendly decisions:

■ Wood from sustainable forestry

Wilms uses the heartwood of pine trees that come from PEFC certified forests. We obtain wood from companies that operate under sustainable forest regulations. This means that they plant more trees than they cut down.



■ No tree is cut especially for Wilms® Hygienic Wood

We use the core of the wood that is leftover from wood veneer manufacturers since it can only be peeled into strips up to a certain diameter. This inner portion is round with a diameter of about 8cm. This is our valuable raw material. **No trees are cut down for our Hygienic Wood products.**



■ Efficient energy use

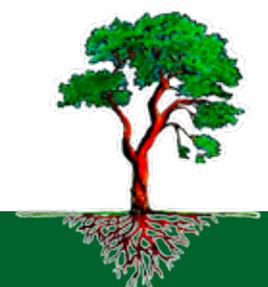
Our innovative production guarantees optimally utilized energy - economically and above all environmentally friendly.

Wood - CO₂ Neutral

Products made of wood lead to an important environmental advantage. The extraction and processing of wood requires significantly less energy than other materials. Everywhere wood products can replace those made of other materials that require high energy to be produced, the result is an ecological advantage - especially for example, our wooden cutting boards.

Material of the Future

Our Hygienic Wood is antibacterial and non-chemical. This is definitely the way of the future. With its diverse health-promoting properties, Hygienic Wood plays an important role in the field of natural health. ■



5. The Wilms Company



The goal of the Wilms® company is to improve the living environment of people and animals in a natural way. We make the positive effects of nature available to people and animals through ideas, development of new products and through continuous research.

5.1 Our History

The Wilms company was created in 1893 as a private firm. Since that time, it has been passed down and still remains run by the Wilms family. The enterprise is an open commercial company under the leadership of Heinrich and Katharina Wilms. The company's focus is wood packaging although in the last 10 years, a special focus has been put on the thorough research of the antibacterial effects of the pine heartwood.

The Wilms company currently employs approximately 115 people at two locations, with about 20 of these employees concentrating solely on Hygienic Wood.

5.2 The Story of Wilms® Hygienic Wood

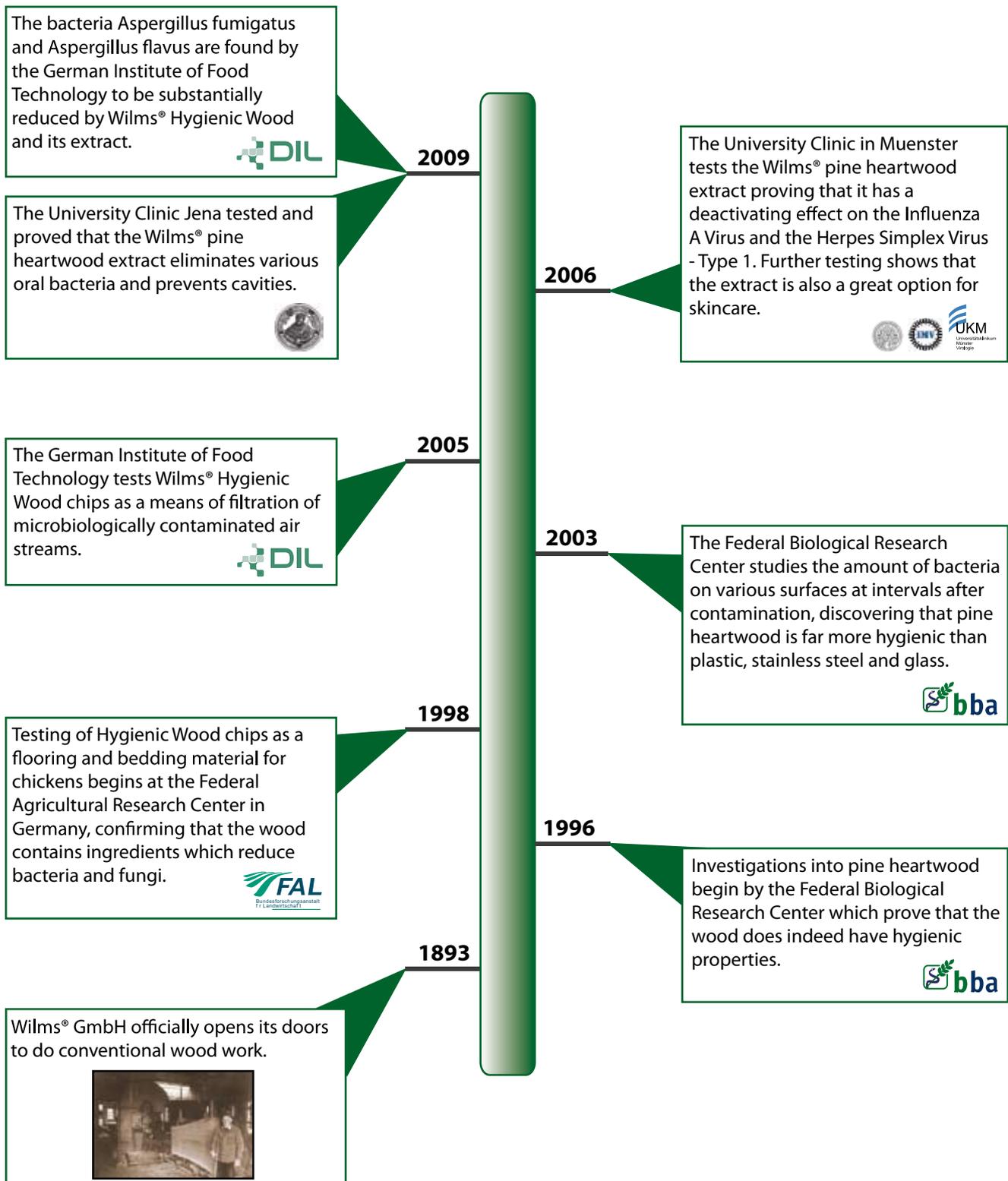
Pine heartwood's hygienic properties were originally discovered when used in an agricultural setting. After some wood chips were used in animals' stalls, the animals had a very noticeable decrease in sickness. Since there had been no other changes to their environment, this pine wood became the subject of investigation.

The Wilms began trials and experiments over the next few years hoping to find a way to use the natural benefits of the wood. During this phase in the company's history it was discovered that the heartwood of the pine contained extraordinary antibacterial effects.

Using this effect in conjunction with the Wilms patented washing and drying procedure, the heartwood is now used to make a variety of products giving people and animals a naturally healthy environment.



Development of Hygienic Wood



5.3 Contact Info

For more information, please contact us.

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Come visit us in our new show room/sales center in Melle-Buer, Am Nordring 19, Germany.

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5.4 Orders

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