GERMAN STUDY
WOOD vs PLASTIC CUTTING BOARDS

COMPARATIVE STUDIES ON HYGIENIC QUALITIES OF WOOD AND PLASTIC CUTTING BOARDS IN A LABORATORY MODEL

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INTRODUCTION AND OBJECTIVES

In order to ensure food safety, food businesses in Europe must comply with national as well as Europe-wide legal hygienic requirements and regulations. For years, the use of plastic as a cutting surface was recommended over wood, as wood was shown to have negative reviews. The main arguments against wood are that it is porous, gets cut easily, and that difficult-to-eliminate germs can easily penetrate the surface. For a while now, however, positive reviews of wood as a viable and hygienic cutting surface for the commercial food-service industry have emerged. The current existing scientific publications are hardly comparable and inconsistent in their statements.

Any current evaluation of the health risks of wood cutting boards compared to those made of plastic must take into account current technological developments with regards to the type of material, the quality, and the design of the board. Therefore, using prototype studies, we compared the hygienic qualities of modern cutting boards made of wood with those made of plastic after their usage, as well as after a subsequent manual cleaning with a household sponge. In order to achieve practical laboratory results, food was repeatedly cut on each of the boards.

At the end of the experiments the hygienic quality of the wooden boards compared to that of the plastic boards was determined, also considering residual waste particles and bacterial content.

TEST PROCEDURE

Using a comparative method, meat and vegetable were cut on the wooden and plastic boards and then manually cleaned and dried until visual cleanliness was reached. The boards were cleaned with a scouring pad and dish soap under warm running water, and dried with paper towels. Before and after cleaning, bacterial presence on the surfaces was tested. An ATP-determination was also carried out in order to quantify the residual debris content. The boards were allowed to dry upright for 15 minutes.

For the studies, NSF-certified maple hardwood cutting boards manufactured by the company John Boos & Co, Effingham USA, were used. These are used professionally in commercial kitchens in the USA. For the plastic cutting boards a professional German product was used: the “Profi-Schneidbrett PE 500” by “cookmax” Pentagast.

The waste particles on the board were derived from chicken breast and lettuce. Only one, and always the same component, ever came in contact with each board. In accordance with the manufacturer's instructions, some wooden boards were also oiled before use. In the meat version, unoiled wooden boards were also included. The quantity of germs on the surfaces was determined by the swab method, and the amount of waste to determine the ATP-content on the experimental surfaces was done using a lumitester. Before conducting the experiments, the ATP-content of the materials was determined by repeated measurements. During the experiments, the ATP-content was detected inside as well as outside the purified cutting area.

Five versions were examined: V1 = oiled wood used for meat, V2 = oiled wood used for lettuce, V3 = non-oiled wood used for meat, V4 = plastic used for meat, V5 = plastic used for lettuce

RESULTS

After extensive tests and calculations it became apparent that, with the exception of version V3, where during almost the entire experimental period, no residual microbes were observed, the bacterial quantity increased on all the other cutting boards after their cleaning, and during their drying. The bacterial quantity was minimal for V1, but for V2, V4 and V5 it increased up to 50 to 100 times compared to the results of the first day of the experiment. In these versions, correlative factors were also strongly positive, demonstrating an increase in germ content despite the cleaning.

When considering the negative results, the unoiled wooden cutting board (V3) used for meat turned out to be the best with respect to the effects of cleaning; the plastic board (V4) used for meat, however, proved to be the worst. The oiled cutting board used for meat (V1) proved to be the second-best option. The wooden board used with lettuce (V2) and the corresponding plastic one (V5) differed only marginally in their micro-biological aspects.

The excellent hygienic qualities of the unoiled wooden board that was contaminated with meat (V1) can be explained by its antibacterial properties. Since it was not treated with oil, the surface was able to dry rapidly due to the lack of surface sealing. Moreover, a superficial sterility is possible due to the transfer of germs into the interior of the wood. It is also possible that the cleaning technique used is suitable and especially effective for the surface structure of wood.

During the four-week experimental period, a significant increase in the quantity of germs was observed from week 1 to week 4, both on the two lettuce surfaces (V2 and V5) as well as on the plastic board used for meat (V4), although on the latter, it was not as extreme. This contradicts the assumption that roughened plastic is easy to clean. However, tbe degree of hygiene success also depends on the cleaning methods used.

Additionally, if one compares the high ATP-value of V4 at the end of the experiment with that of week one, there is a significant increase that is unsurprising after visually inspecting the cutting surface. The high ATP-value of the plastic board, on which meat had been cut, correlates to the strongly scratched cutting area, as well as to the visually detectable residual soiling

CONCLUSIONS

The experiments show that among the cutting boards on which meat was cut, the unoiled wood board exhibited the least amount of residual waste and residual germs. The oiled wood board came close to this result, in second place, and the worst results with regards to hygiene came from the plastic cutting board.

For the two variants of cutting boards on which lettuce had been cut, the oiled wooden board and the plastic board, we could detect an almost comparable residual waste and residual bacterial presence.

Finally, our results can be evaluated as the following: with proper care and cleaning, high-quality hardwood maple cutting boards that are certified do not pose a greater health risk and are equal to or better than plastic ones. In addition, because of its sustainability, the use of wood in cutting boards is also recommended.

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