

Comparison of ATP Values on Vegetables Cutting Boards before and after Alcohol Disinfection

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Abstract

Sanitary control of cutting boards in the kitchen is important to prevent food poisoning. To preventing secondary and tertiary contamination of food poisoning bacteria, it is necessary to know the hygiene status of cooking utensils. Therefore, in this study, we compared the values after cooking, washing, and spraying 70

Index terms— ATP wiping test, cutting board, hygiene education, double wash.

1 Introduction

are should taken when cleaning vegetable cutting boards, as compared to meat and fish cutting boards, it may not be possible to wash them carefully due to the lack of sliminess 1) . In this study, we used the ATP test and microbial test to compare the ATP value and the number of microbial bacteria immediately after cooking, washing, and spraying 70% alcohol on cutting boards for vegetables. The ATP value is preferably 100 or less, and the number of microbial bacteria is preferably free. We reported the results of the actual ATP test and the microbiological test.

2 II.

3 Materials and Methods

4 a) Kitchen vegetable cutting board

The twelve vegetables cutting board prepared in the kitchen were stored in the sterilization storage the day before cooking. Cooking done in two places, and six cutting boards used for each.

5 b) ATP inspection procedure

Each of the twelve cooks carried a vegetable cutting board for the vegetable of their work and brought it to the cooking table. Still, the inspector always performed an ATP inspection before using vegetables with a cutting board. Then, each cook finished the work, washes the cutting board firmly with detergent and sponge, rinse with running water for 30 seconds or more. Then, each cook repeated this process twice (as same as the last report 1)). The inspector performed an ATP inspection after using vegetable with a cutting board, again. Then, each cook sprayed 70% alcohol on the cutting board after washing. At last, the inspector performed an ATP inspection after using vegetables with a kitchen cutting board. The ATP test kit used manufactured by KIKKOMAN.

6 c) Stamp test inspection procedure

Five types of stamp test (General bacteria, Staphylococcus aureus, Escherichia coli, Salmonella, Vibrio parahaemolyticus) used. The stamp test conducted by the inspector at the same time as the ATP. The stamp test was colony-counted after culturing in an incubator at 38 degrees for three days. The stamp test by MISSUI.

7 d) Statistical processing

The results obtained compared using statistical methods. The data statistically processed, was subjected to an F test to determine whether to use a parametric test or nonparametric test. When there is no difference in the F test, the presence or absence of a significant difference confirmed using the student t-test with or without a correspondence. If there was a difference in the F test, the presence or absence of a significant difference was confirmed using the Wilcoxon test with a pair or the Mann-Whitney test without correlation.

III.

8 Results

a) ATP value results before and after alcohol disinfection Tables ?? and 2 show the results of ATP wiping tests on vegetables cutting board before and after alcohol disinfection. The ATP value was statistically significantly lower after washing than after cooking. However, the ATP value did not fall below 100. The ATP value after 70% alcohol spraying was 100 or less. The ATP value was statistically significantly lower after 70% alcohol spraying than after cooking.

9 b) Stamp test results before and after alcohol disinfection

Tables 3,4,5,6,7,8,9,10,11 and 12 show the results of ATP wiping tests on vegetables cutting board before and after alcohol disinfection. The result of common bacteria, *Staphylococcus aureus* and *Vibrio parahaemolyticus* was that microorganisms could be present on the cutting board even after 70% alcohol spraying. However, the number of microorganisms reduced compared to after cooking. In the case of *E. Coli* and *Salmonella*, the number of microorganisms decreased statistically significantly after spraying with 70% alcohol.

10 Discussion

On cutting boards for vegetables, hygiene tests performed on the ATP value and the number of microorganisms. For the microbiological test, a selective medium of general bacteria, *Escherichia coli*, *Staphylococcus aureus*, *Salmonella*, and *Vibrio parahaemolyticus* used. The ATP level and the number of microorganisms decreased after washing as compared with after cooking. Furthermore, after alcohol spraying, the ATP level, the number of *E. Coli*, and the number of *Salmonella* bacteria decreased statistically significantly. However, the bacteria did not disappear. Microorganisms are more likely to grow if they are moist, at the right temperature, and have nutrients. If the cutting board is left unattended after cooking, it may be necessary to wash repeatedly and spray it with alcohol before use. The ATP test can show invisible microorganisms on the spot with visible numbers 1,2,3,4). Therefore, it is used in many places and is useful for hygiene education and food poisoning prevention 5,6,7,8). Although it takes time, it is useful for hygiene education to know the condition of food poisoning bacteria by conduction microbiological tests.

V.

11 Conclusions

As a result of the ATP test and microbiological test performed on the cutting board for vegetables, there are surviving bacteria that even after spraying 70% alcohol, so spray 70% alcohol firmly, and the cutting board left for a while is washed repeatedly and sprayed with alcohol before cooking. We think it's better to use it.

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Table1. ATP test value and statistical processing result of cutting board 1.

		No alcohol treatment			
For vegetables		Before washing	After washing	After washing	After alcohol
1		176205	863		
2		909793	68		
3		6543	39		
4		15	42		
5		38244	283		
6		14200	5790		
Average value		190833.3	1180.8		
Year	??	Student-t*	F test	Wilcoxon	F test
2020		Student-t*	F test	Student-t*	358322.3
2	Wilcoxon				P0.046*
Volume	For vegetables	Before washing	After washing	After washing	After alcohol
XX		1	9194	2630	2630
Is-		18	2	1103	
sue					
XIII					
Ver-					
sion					
I					
D D	Student-t*	Wilcoxon			P=0.028*
D D					
)					
(*Paired Student-t test * P<0.05, ** P<0.01
Medical					
Re-					
search					
Global	For vegetables	Before washing	After washing	1	298
Jour-				110	2
nal				8	10
of				3	22
				3	4
				50	0
				No alcohol treatment	
	5		7	42	
	6		8	1	
	Average value		65.5	27.7	
	??		115.1	43.3	
	F test		P=0.016*		
	Student-t*				
	Wilcoxon		P=0.249		
	F test			P=0.0001**	
	Student-t*				
	Wilcoxon			P=0.046*	
				*Paired Student-t test * P<0.05, ** P<0.01	

Figure 1: Table 3

4

For vegetables	No alcohol treatment		Alcohol treatment	
	Before washing	After washing	After washing	After alcohol
1		14	3	0
2		3	3	2
3		6	1	0
4		23	0	0
5		30	30	0
6		3	0	0
Average value		13.2	6.2	0.3
??		11.3	11.8	0.8
F test		P=0.463	P=0.0001**	
Student-t*		P=0.110		
Wilcoxon			P=0.043*	
F test			P=0.0001**	
Student-t*				
Wilcoxon			P=0.028*	

*Paired Student-t test * P<0.05, ** P<0.01

Figure 2: Table 4

5

For vegetables	No alcohol treatment		Alcohol treatment	
	Before washing	After washing	After washing	After alcohol
1		7	1	0
2		0	0	0
3		21	11	0
4		16	4	4
5		200	0	0
6		60	0	0
Average value		50.7	2.7	0.7
??		76.1	4.4	1.6
F test		P=0.0001**	P=0.0001**	
Student-t*				
Wilcoxon		P=0.043*	P=0.075	
F test			P=0.0001**	
Student-t*				
Wilcoxon			P=0.043*	

*Paired Student-t test * P<0.05, ** P<0.01

Figure 3: Table 5

6

Year 2020
15

Figure 4: Table 6

9

Year 2020
2

Figure 5: Table 9

7

Comparison of ATP Values on Vegetables Cutting Boards before and after Alcohol Disinfection		
	No alcohol treatment	
For vegetables	Before washing	After washing
1	378	0
2	3	2
3	8	0
4	25	0
5	1	5
6	43	0
Average value	76.3	1.2
??	148.6	2.0
F test	P=0.0001**	
Student-t*		
Wilcoxon	P=0.075	
Table 11 Number of Vibrio parahaemolyticus on cutting board 1. and statistical Student-t* Wilcoxon *Pair		

			processing result											
			No alcohol treatment											
For vegetables	Before washing	After washing	After washing	After alcohol	1	11	15	15	0	2	0	1	1	1
					3	20	0	0	0	4				

Table 12 Number of Vibrio parahaemolyticus on cutting board 2. and statistical

			processing result																			
For vegetables	Before washing	After washing	1	192	31	2	40	0	3	0	0	4	0	40	5	0	100	6	28	3	Average value	43.3
??	Student-t*	F test	Wilcoxon	F test	Student-t*	74.8 *Paired Student-t test * P<0.05, ** P<0.01 38.8																
			Wilcoxon																			

Figure 6: Table 7

10

Figure 7: Table 10

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