

Results of Hygiene Education of Kitchen Knife by using ATP Inspection -Comparison of Handle and Blade

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Abstract

In Japan, the number of food poisoning cases and the number of patients have been gradually decreasing in the last ten years. However, from the Japanese Ministry of Health, Labor and Welfare, the number of bacterial food poisoning cases has been approximately 41

Index terms— gender; ATP test, the handle of the knife, the blade of the knife, hygiene education, double wash.

1 Results of Hygiene Education of Kitchen Knife by using ATP Inspection -Comparison of Handle and Blade

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2 I. Introduction

In Japan, the number of food poisoning cases and the number of patients have been gradually decreasing in the last ten years (2009-2018). The reduction of bacterial food poisoning is implementation. Thorough hygiene management at food manufacturing plants is carried out and increased awareness of hygiene, such as hand washing at home. According to statistical data on food poisoning from the Japanese Ministry of Health, Labor and Welfare, the number of bacterial food poisoning cases has been approximately 41% of the total number in the past five years, which is still high (2014-2018). Some hospitals have already conducted hygiene tests using

10 C) VEGETABLE KNIFE: ATP RESULTS OF BEFORE HYGIENE EDUCATION I. VEGETABLE KNIFE HANDLE AND BLADE

ATP test kits, and the results have been reported 1,2) . Throughout the hospital, surface wiping test using ATP test kits have shown effectiveness in hygiene education. Because microorganisms are invisible, it is hard to work hygienically. However, the hygiene test using the ATP test kit allows seeing the number of bacteria with our eye, thus improving the hygiene condition on the spot. The control of microorganisms at the cooking site is becoming more and more stringent due to the need to comply with HACCP 3,4) . Japan is a super-aged society. Therefore, there is a need for hygiene management and hygiene education in nursing homes. Especially, hygiene education for cooks in the kitchen emphasized. Reports on educational achievements have also made in recent years 5) . Therefore, in this study, using the ATP test kit, we focused on the kitchen knife most touched by the cooks in the kitchen before and after the hygiene education. The inspection results obtained for both the kitchen knife handle and blade, and for both vegetables and meat.

3 II. Materials and Methods

4 a) Kitchen knife

The 12 kitchen vegetable knives and 12 kitchen meat knives prepared in the kitchen were stored in the sterilization storage the day before the start of cooking.

5 b) ATP inspection procedure

Each of the 24 cooks carried a kitchen knife for vegetables or meat at the start of their work and bring it to the cooking table. Before the education of hygiene, the work start time depends on the working conditions of the cooks. Still, the inspector always performed an ATP inspection before using vegetables or meat with a kitchen knife. Then, each cook finished the work, washed the kitchen knife by himself, and they inspected the ATP inspection by the inspector again. The value of ATP recorded. In the same way, after the education of hygiene, the work start time depends on the working conditions of the cooks. Still, the inspector always performed an ATP inspection before using vegetables or meat with a kitchen knife. Then, each cook finished the work, washed the kitchen knife by himself, and they inspected the ATP inspection by the inspector again. The value of ATP recorded.

6 c) Hygiene education procedure i. Cleaning instruction

While showing the ATP result before the hygiene education to the cook, ATP inspector wash both the knife handle and the blade firmly with detergent and sponge, wash with water for 30 seconds or more. Then, the inspector washes again both the knife handle and the blade carefully with detergent and sponge, and rinse again with water for 30 seconds or more. The cook tries to do it as same as the inspector dose. Then, the cook tries to do it next cooking. That ATP result of the after education recorded.

7 ii. Statistical processing

The results obtained compared using statistical methods. The compared data 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 was 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.

8 III. Results

9 a) Meat knife: ATP results of before hygiene education i. Meat knife handle and blade

The ATP inspection result of the knife handle and blade before hygiene education shown in Table 1 and Table 2. Despite the completion of cooking and washing, the knife blade had a higher ATP average value than before using it. Since both ATP data did not fall below 100 even after cleaning, it can see that selfflow is insufficient for washing. The ATP inspection result of the kitchen meat knife handles and blade after hygiene education shown in Table 3 and Table 4. Meat knives after hygiene education had lower average ATP values for both handle and blade than before cooking. In particular, the knife blade had an ATP value of less than 100. It cleaned well.

10 c) Vegetable knife: ATP results of before hygiene education i. Vegetable knife handle and blade

The ATP inspection result of the kitchen vegetable knife handles and blade before hygiene education shown in Table 5 and Table 6. Despite cleaning after cooking, the knife handle had a higher average ATP value than before cooking. It turned out that self-washing was not hygienic. The knife blade after cleaning was lower than that before cooking, but it did not fall below 100. It is not thoroughly washed.

11 Vegetable knife handle and blade

The ATP inspection result of the kitchen vegetable knife handle and blade after hygiene education shown in Table 7 and Table 8.

Vegetable knives after hygiene education had lower average ATP values for both handle and blade than before cooking. In particular, both knife handle and blade had an ATP value of less than 100. It was cleaned well more than a meat knife.

12 IV. Statistical Processing Results

13 a) Comparison of ATP test values of meat knife handle: before and after education

The results of the statistical comparison of meat knife handle before and after hygiene education shown in Table 7. It can be seen that, in the handle of the meat knife, there is no statistically significant difference in self-washing between before cooking and the cleaning of after cooking. However, there was a statistically significant difference in ATP test values between before cooking and the cleaning after cooking after hygiene education.

14 b) Comparison of ATP test values of meat knife blade: before and after education

The results of the statistical comparison of the meat knife blade before and after hygiene education shown in the Table 8. Both before and after hygiene education, the knife blades washed before and after cooking had a statistically significantly lower ATP value.

However, the ATP value shows that the cleaning effect is more effective after hygiene education. The results of the statistical comparison of vegetable knife handle before and after hygiene education shown in the Table 9. It can be seen that, in the handle of the vegetable knife, there is no statistically significant difference in self-washing between before cooking and the cleaning of after cooking. However, there was a statistically significant difference in ATP test values between before cooking and the cleaning of after cooking after hygiene education. In particular, after hygiene education, the knife handle had an ATP value of less than 100. It cleaned well more than before cooking.

15 d) Comparison of ATP test values of vegetable knife blade: before and after education

The results of the statistical comparison of vegetable knife blade before and after hygiene education shown in the Table 10. It can be seen that, in the blade of the vegetable knife, there is no statistically significant difference in self-washing between before cooking and the cleaning after cooking. However, there was a statistically significant difference in ATP test values between before cooking and the cleaning of after cooking after hygiene education. In particular, after hygiene education, the knife handle had an ATP value of less than 100 (less than 20). It cleaned well more than before cooking.

16 V. Discussion

Hygiene control points that should be observed at the cooking site are three principles to prevent food poisoning: to prevent bacterial, to be fussy, and to kill. In this study, bacteria that cannot be seen with the naked eye are expressed by visible numbers by detecting ATP 6), and by providing hygiene education, it becomes possible to handle knives most accessible to humans in a hygienic manner. The ATP wiping test has been widely used for hygiene management in hospitals and has produced results 7). Even during cooking, it is expected that the hygiene education effect will be high because the bacteria test result can show to the cook as an ATP value within one minute 8). This time, 24 cooks had kitchen knives for vegetables and meat and had the inspectors measure the ATP value after cleaning the knives before and after cooking. As a result, when the cooks washed their kitchen knives, the ATP value could be lower or higher, and there was no statistically significant difference in the handle of the knives. While showing the results to the cooks on the spot, they showed how to wash the kitchen knife handle and blade with a detergent, and repeated the method of cleaning with running water for 30 seconds twice. After this hygiene education, the cook again cooked using the same kitchen knife and asked the inspector to perform an ATP inspection on the kitchen knife that had washed before and after cooking. After the hygiene education, the handle and blade of vegetable knives and the handle and blade of meat knives all had statistically significantly lowered ATP values, and hygienic cleaning was possible. However, since the handle of the kitchen knife for meat did not have an ATP value of less than 100 even after washing, it was found that more careful washing is necessary. Further guidance to cook is needed.

17 VI. Conclusions

The purpose was to utilize the ATP test, which used for hygiene tests in hygiene education in the kitchen. An ATP wiping test performed on the kitchen knife handle and blade. Comparison of ATP test values before and after hygiene education in both meat and vegetable knives. As a result of averaging 12 ATP values for each data, and comparing them, before hygiene education, before and after cooking, we compared the handle of the kitchen knife and the blade of it, but it is not said that sufficient cleaning can be done. However, after the hygiene education, the handle and blades of knives had a statistically significant lower ATP value than the handle and blades of knives, which had washed after cooking. However, the handle of the meat knife had a higher ATP value than the blade, and it did not become less than 100. On the other hand, the kitchen knife for vegetables has an ATP value of 100 or less after washing both the handle and the blade after hygiene education, confirming the sufficient washing effect. It found that the knife for meat needs to be washed more thoroughly than the vegetable knife. Cautions in future hygiene education.

1

	before cleaning instruction			before cleaning instruction	
Meat knife handle	before	after	Meatknife blade	before	after
Handle 1	22	550	Blade 1	52	71
Handle 2	222	576	Blade 2	0	90
Handle 3	16464	706	Blade 3	61	91
Handle 4	4268	731	Blade 4	84	170
Handle 5	6438	783	Blade 5	48	291
Handle 6	723	845	Blade 6	400	322
Handle 7	4769	980	Blade 7	116	433
Handle 8	1335	1219	Blade 8	48	610
Handle 9	1407	2432	Blade 9	1982	924
Handle 10	581	2438	Blade 10	101	1208
Handle 11	5448	3084	Blade 11	40	1468
Handle 12	4807	8123	Blade 12	5	11680
Average	3873.6667	1872.25	Average	244.75	1446.5
Standard deviation	4581.2532	2147.5009	Standard deviation	557.010221	3255.4904
Median	2837.5	912.5	Median	56.5	377.5
Maximum	16464	8123	Maximum	1982	11680
Minimum	22	550	Minimum	0	71

Figure 1: Table 1 :

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[Note: ATP test result of the meat knife blade before cleaning instruction b) Meat knife: ATP results of after hygiene education i. Meat knife handle and blade]

Figure 2: Table 2 :

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	after cleaning			after cleaning	
	instruction			instruction	
Meat knife handle	before	after	Meat knife blade	before	after
Handle 1	2	13	Blade 1	9	0
Handle 2	436	37	Blade 2	28	6
Handle 3	38	38	Blade 3	232	6
Handle 4	81	39	Blade 4	232	6
Handle 5	45	61	Blade 5	332	6
Handle 6	146	61	Blade 6	49	11
Handle 7	4642	66	Blade 7	804	13
Handle 8	2045	94	Blade 8	208	28
Handle 9	1221	97	Blade 9	208	28
Handle 10	61	158	Blade 10	2994	46
Handle 11	887	363	Blade 11	155	55
Handle 12	3546	540	Blade 12	104	68
Average	1095.8333	130.5833	Average	446.25	22.75
Standard deviation	1549.1016	159.0469	Standard deviation	829.19952	22.474733
Median	291	63.5	Median	208	12
Maximum	4642	540	Maximum	2994	68
Minimum	2	13	Minimum	9	0
	before cleaning			before cleaning	
	instruction			instruction	
Vegetable knife handle	before	after	Vegetable knife blade	before	after
Handle 1	343	248	Blade 1	71	49
Handle 2	88	324	Blade 2	84	57
Handle 3	575	424	Blade 3	96	59
Handle 4	472	545	Blade 4	85	124
Handle 5	867	559	Blade 5	38	142
Handle 6	1352	763	Blade 6	219	159
Handle 7	4119	903	Blade 7	9	201
Handle 8	2581	1210	Blade 8	19	238
Handle 9	569	1769	Blade 9	17942	239
Handle 10	98	3002	Blade 10	68	800
Handle 11	402	6856	Blade 11	205	1072
Handle 12	5163	19136	Blade 12	135	3582
Average	1385.75	2978.25	Average	1580.9167	560.166667
Standard deviation	1678.5821	5416.3923	Standard deviation	5152.8196	1003.56572
Median	572	833	Median	84.5	180
Maximum	5163	19136	Maximum	17942	3582
Minimum	88	248	Minimum	9	49

Figure 3: Table 3 :

4

Figure 4: Table 4 :

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Figure 5: Table 5 :

6

: ATP test result of the vegetable knife blade
before cleaning instruction

Figure 6: Table 6

7

Figure 7: Table 7 :

8

Figure 8: Table 8 :

7

Year 2020
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Figure 9: Table 7 :

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Figure 10: Table 8 :

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Figure 11: Table 9 :

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Figure 12: Table 10 :

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