NSW Food Authority

safer food, clearer choices

Snapshot survey on the microbiological quality of kebabs

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Contents

Introduction

Between 2001 and 2004, OzFoodNet reported six incidents of foodborne illness affecting 59 people where kebabs were implicated as the food vehicle (Ashbolt et al, 2002; OzFoodNet, 2003; OzFoodNet 2005). In late 2004, the NSW Food Authority undertook a survey of kebabs sold across New South Wales (Jansson et al., 2008). The survey was a combination of observations made during inspection and microbiological analyses. The results from the survey were assessed against guidelines developed by Food Standards Australia New Zealand (FSANZ, 2001) and less than 12% of samples were found to be unsatisfactory, with the majority failing due to slightly elevated levels of *E. coli*. The detection of *E. coli* in foods is not a direct indication that the food is unsafe but more an indication of potential problems involving the preparing and handling of foods. In all cases follow-up work ensued to ensure any issues were rectified.

In early 2008 a small survey on the microbiological quality of kebabs was undertaken. This survey aimed to provide a follow-up snapshot on the microbiological quality of kebabs sold in NSW.

Method and Material

In the absence of readily accessible data on the kebab industry in NSW (e.g. number of kebab businesses, number of kebabs made) to enable the design of a survey statistically representative of all kebabs sold in NSW, a snapshot survey was undertaken. The survey involved purchasing 48 kebabs from 25 premises across metropolitan Sydney, or 20% of premises visited during the 2004 survey.

Where businesses had closed down since the 2004 survey, kebabs were purchased from another shop in the same area. Similarly, if the business had changed names, kebabs were purchased from the new business.

Samples were transported to the laboratory on ice and tested for:

- *E. coli* using AS 1766.2.4;
- Coagulase positive staphylococci using AS 1766.2.4;
- *Clostridium perfringens* using AS 1766.2.8; and
- *Salmonella* species using AS 1766.2.5.

Results and discussion

Comparison of the microbiological results to the FSANZ microbiological guidelines revealed that 93.7% of samples were within acceptable microbiological limits that is falling in either the satisfactory or marginal (Table 1) categories. Where samples were considered microbiologically unacceptable (falling in the unsatisfactory category within the FSANZ guidelines), this was due to the levels of *E. coli* exceeding 10^2 cfu per gram. No sample contained potentially hazardous levels of bacteria.

Table 1: Assessment of results using the FSANZ microbiological criteria for ready-to-eat foods (FSANZ, 2001)

	Microbiologically acceptable				**Microbiologically unacceptable**		**Potentially hazardous**	
Organism	**Satisfactory**		**Marginal**		**Unsatisfactory**			
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
E. coli	29	60.4	16	33.3	3	6.2	0	0
Coagulase positive Staphylococci	47	97.4	1	2.1	0	0	0	0
C. perfringens	46	95.8	2	4.2	0	0	0	0

A summary of the results for *E. coli*, coagulase positive staphylococci and *C. perfringens* is presented in Table 2. *Salmonella* was not detected in any of the samples tested.

Table 2: Summary of microbiological results for whole doner kebabs

Test	**Mean**	**Median**	**Minimum**	**Maximum**
E. coli (log cfu/g)	0.99	0.48	0.48	5.0
Coagulase positive staphylococci (log cfu/g)	2	2	2	2.3
C. perfringens (log cfu/g)	2	2	2	2.3

A frequency distribution was calculated for *E. coli* results (Figure 1). From the figure it can be seen that the majority of samples contained low levels (< 10 cfu/g or < log 1 cfu/g) of *E. coli*, with levels greater that log 3 cfu/g (1000 cfu/g) only detected in 3 samples. Frequency distributions were not calculated for Coagulase positive staphylococci and *C. perfringens* as the vast majority of results were below the level of detection (100 cfu/g). A low level of

Coagulase positive staphylococci was detected in one sample (100 cfu/g) and two samples contained low levels (100 and 200 cfu/g) of *C. perfringens*.

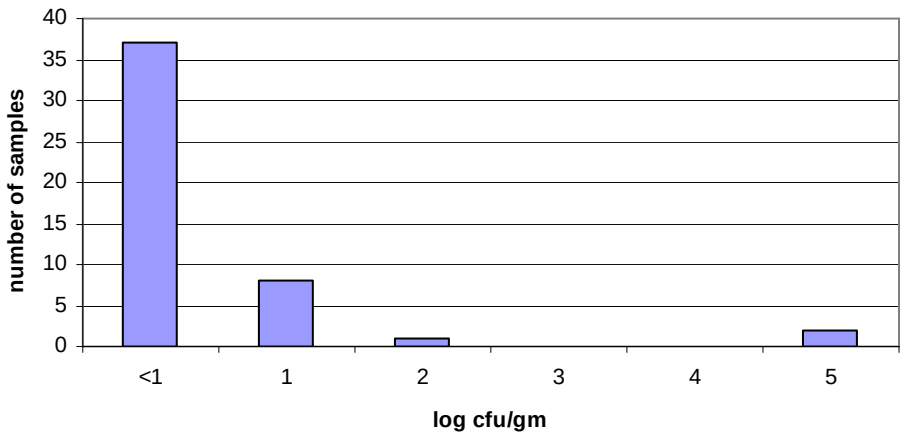

Figure 1: Frequency distribution of *E. coli* for doner kebabs collected from retail outlets

Levels of *E. coli* exceeding 100 cfu per gram are unacceptable and might indicate:

- Poor temperature during the display of raw or potentially hazardous foods (e.g. shredded lettuce, sauces) included in kebabs;
- Poor handling during the preparation of kebab components prior to display with or without poor temperature control; or
- Poor personnel hygiene (Hocking, 2003).

Caution must be taken when comparing these results to the previous survey because for both surveys knowledge of the number of kebabs produced in NSW, what is representative of a batch and the throughput of individual NSW businesses that enable a sound statistical design and comparison are not available. Taking this into account, when compared to the results obtained from the 2004 survey, the current snapshot showed a slight improvement in the number of samples falling within acceptable microbiological limits; 93.7% in 2008, 88.6% in 2004. However, there were more samples with borderline or marginally acceptable results than observed in the previous survey. For this reason, the NSW government issued a media release advising industry of the observation and encouraging them to focus on food handling controls, http://www.foodauthority.nsw.gov.au/mr-Mar-08-kebab-shop-owners-put-on-notice.asp.

The presence of low levels of *E. coli*, Coagulase positive staphylococci or *C. perfringens* may be due to a variety of factors including:

- Low level contamination on vegetables used raw in kebabs (e.g. tomato, lettuce, onion):
- Incidental contamination during the handling and preparation of the kebab; and
- The presence of low level on bacteria in ingredients such as herbs and species used in sauce served on the kebab (e.g. homous, garlic sauce)

The presence of bacteria due to the above factors is not unexpected and would not normally constitute a safety risk provided proper temperature control in maintained after preparing

kebab ingredients and the final kebab is not kept for a long period (> 2 hours) at room temperature prior to eating.

Conclusion

The majority (93.7%) of kebabs surveyed were within acceptable microbiological limits. Where results were unacceptable, appropriate action was taken. The survey revealed a slight trend of more samples with borderline, albeit microbiologically acceptable, results than in the previous survey. This highlights the need for industry to remain rigorous in applying appropriate food handling controls.

References

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