

ORIGINAL ARTICLES

Assessing the food safety management for bottled water processing premises in Dak Lak Province in 2018Le Thi Chau¹, Tran Thi Tuyet Hanh^{2*}**ABSTRACT****Objective:** To assess food safety management for bottled water processing premises and affecting factors.**Study design:** this was a cross sectional study; applied both quantitative and qualitative methods. This study was implemented in Dak Lak Province in 2019. 105 documents of bottled water processing premises in Dak Lak 2018 and related stakeholders participated in this study.**Results:** the process of certifying premises that met food safety conditions in 2018 was 89.5% being appropriate; 81.0% were certified for food safety knowledge; 76.9% premises violated food safety regulations and 100% of these violated premises received administrative fines.**Affecting factors included:** policies supporting staff working in the food safety sector was inappropriate, the monitoring and inspection activities were not frequent, human resource only achieved 84%, lack of offices, working places and equipment needed, and achieved budget was only accounted for 17.0% of the estimated.**Conclusions:** a number of bottled water processing premises did not maintain adequate food safety conditions after receiving the Certification. The food safety management activities at these premises did not meet requirements. Further investments were needed to improve the management food safety management at bottled water manufacturing premises in the coming years.**Key words:** Food safety management, bottled drinking water, processing premises, Dak Lak.**INTRODUCTION**

Bottled drinking water products are ready for direct consumption, may contain natural or supplemented minerals and be carbonated but are not mineral bottled water and do not contain sugar, sweeteners, flavors and other substances. In 2010, Dak Lak Province had 12 bottled water manufacturing premises and the number increased to 105 premises in 2018. The food safety management at these premises was conducted by the Provincial

Food Safety Agency, including the following aspects: certifying premises those met food safety conditions, managing the quality of products, training and certifying food safety knowledge for workers, inspecting, supervising, and applying fines on bottled water producing premises that did not meet food safety conditions. In general, food safety conditions at the studied premises were quite limited, such as the production areas were quite small and the production procedure did not meet the one-way safety principle.



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The production scales were small or medium sizes (accounted for 38.3% and 58.3%) and 61.5% of water samples did not meet the microbiological quality standard (1). With an increasing number of bottled water producing premises in a large province, a small number of staff in charge of food safety management and limited funding were challenges in managing food safety at these premises. This research was conducted, which aimed to: 1) Assess food safety management for bottled water processing premises in Dak Lak Province in 2018; 2) Analyse some factors affecting food safety management for bottled water processing premises in Dak Lak Province in 2018. Based on the results, recommendations were made for food safety management agency to implement appropriate measures to improve the food safety management situation at bottled water producing premises in Dak Lak Province.

METHODS

Study design

This study applied a cross sectional design.

Time and place of study

This study was implemented from January 2019 to July 2019, in Dak Lak province.

Subjects and sample sizes

The objects of quantitative research were 105 records of the management process of bottled water facilities in 2018 including procedure for certifying premises meet food hygiene and safety conditions; procedure for certifying meeting food safety standard; procedure for certifying food safety knowledge; and inspection records for bottled water facilities. In addition, there were documents related to food safety management such as Human resources, finance,

assets, plans, reports,... Qualitative research subjects included leaders of Food Safety sub-departments, leaders of District Health Department, and managers of bottled water business. Qualitative research themes include assessing the extent to which bottled water facilities carried out policies and regulations, resources for food safety management such as human resources, equipment and funding; evaluate the maintenance of compliance with food safety regulations of production facilities.

Tools and data collection

Data on the status of management and inspection for business establishments were collected from secondary data (archived records) and primary data (interviewed managers through the questionnaire). Information on factors affecting food safety management was collected through in-depth interviews with managers and production facility owners.

Data management and analysis

Quantitative data was encoded, entered into MS Excel software and presented in the form of frequency and scale tables. Qualitative information from voice recorders was typed into Microsoft Word, synthesized together with the handwritten notes, it was then coded and analyzed according to themes.

Evaluation criteria: Assessment was conducted according to the quality of dossiers: Passed if the process applied according to a standard form and all information was filled in the file; failed when using the wrong form and/or missing information in the file. Time-based evaluation of each step: Pass when the number of days of implementation was equal to or lower than the number of days prescribed; fail when the number of days exceeded the given days specified in the regulation.

Ethical approval

The protocol of this study was approved by the Scientific and Ethical Committee in Biomedical Research, Hanoi University of Public Health under Decision number No. 257/2019/YTCC-HD3, dated April 24, 2019. All human subjects in the study were asked for their consent before collecting data, and all had complete rights to withdraw from the study at any time without any threats or disadvantages.

RESULTS

Main characteristics of bottled water production facilities

The study of 105 bottled water production facilities in Dak Lak province showed that the majority of production facilities were small scale. The majority of manufacturing facilities (86.7%) applied manual filling process, while semi-automatic filling only accounted for 10.4% and automatic filling accounted for 2.9%. The production capacity from 1,000-3,000 liters/hour accounted for 81.9%, while there were 12.4% of facilities having production capacity of less than 1,000 liters/hour, and 5.7% over 3,000 liters/hour. Regarding the operation time of facilities, the numbers of establishments operating for less than five years and from 5-10 years accounted for 41.9% and 45.7%, respectively, while only 12.4% of facilities have been operated for over 10 years (Table 1).

Table 1. The scale of bottled water production facilities (n=105)

| | Characteristics | Frequence (n) | Percentage (%) |
|-------------------------------------|-------------------------|---------------|----------------|
| Filling process | Automatic filling | 03 | 2.9 |
| | Semi-automatic filling | 11 | 10.4 |
| | Manual filling | 91 | 86.7 |
| Production capacity | < 1000 liter /hour | 13 | 12.4 |
| | 1000 – 3000 liter /hour | 86 | 81.9 |
| | > 3000 liter /hour | 06 | 5.7 |
| Number of years of operation | < 5 years | 44 | 41.9 |
| | 5-10 years | 48 | 45.7 |
| | >10 years | 13 | 12.4 |

Assessing the implementation procedure of management agencies of bottled water

The process of issuing a certificate of Food Hygiene and Safety

Table 2. The process of issuing a certificate of Food Hygiene and Safety

| No. | Steps | n | Numbers of dossiers | | processing time | | Mean of processing time (days) | Evaluation | |
|-----|--------------------------|------------|---------------------|-------------|-----------------|-------------|--------------------------------|------------|-------------|
| | | | Pass | % | Pass | % | | Pass | % |
| 1 | Receiving dossiers | 105 | 102 | 97.1 | 105 | 100 | 01 | 102 | 97.1 |
| 2 | Evaluation dossiers | 105 | 102 | 97.1 | 105 | 100 | 1.87 | 102 | 97.1 |
| 3 | Evaluation at facilities | 105 | 102 | 97.1 | 100 | 95.2 | 4.67 | 100 | 95.2 |
| 4 | Issue certificate | 105 | 100 | 95.2 | 94 | 89.5 | 01 | 94 | 89.5 |
| | Evaluation | 105 | 100 | 95.2 | 94 | 89.5 | 8.54 | 94 | 89.5 |

The results in Table 2 show that the percentage of dossiers made satisfactory at the stage of receiving dossier was 97.1% (the average processing time was 01 day); at the stage of evaluation dossiers was 97.1% (mean 1.87 days); at stage of the facility evaluation reached 95.2%, (mean 4.67 days); issuing the certificate of eligibility reached the lowest rate (89.5%) with the average implementation time was 1 day. The overall percentage of the process of issuing a certificate of compliance with food safety regulation was 89.5% with an average time of the total process was 8.5 days, reaching the provisions of the law (≤ 15 days).

Procedure for certifying meeting food safety standard

100% of dossiers at the receiving stage met the criteria, with an average processing time of 0.9 days. At the evaluation stage, the percentage of dossiers meeting standards accounted for 95.2% (the mean processing time was 3.6 days). The percentage of dossiers eligible for certification was 90.5% (mean 0.8 days). Regarding the implementation of the whole process of granting Certificate, the percentage of dossiers meeting the standard was 90.5% (mean 5.3 days) and the remaining 9.5% of dossiers did not meet the requirements of time and the content including: unsuitable product labels, copies of testing cards kept in product dossiers, which have not been notarized according to regulations (Table 3).

Table 3. Procedure for certifying meeting food safety standard

| No. | Steps | n | Numbers of dossiers | | Processing time | | Mean of processing time (days) | Evaluation | |
|-----|---------------------|------------|---------------------|-------------|-----------------|-------------|--------------------------------|------------|-------------|
| | | | Pass | % | Pass | % | | Pass | % |
| 1 | Receiving dossiers | 105 | 105 | 100 | 105 | 100 | 0.9 | 105 | 100 |
| 2 | Evaluation dossiers | 105 | 101 | 96.2 | 102 | 97.1 | 3.56 | 100 | 95.2 |
| 3 | Issue certificate | 105 | 101 | 96.2 | 98 | 93.3 | 0.81 | 95 | 90.5 |
| | Evaluation | 105 | 101 | 96.2 | 98 | 93.3 | 5.3 | 95 | 90.5 |

*Process of issuing Certificate of training in knowledge about food safety and hygiene***Table 4. Process of issuing Certificate of training in knowledge**

| No. | Steps | n | Numbers of dossiers | | Processing time | | Mean of processing time (days) | Evaluation | |
|-----|--------------------|------------|---------------------|-------------|-----------------|-------------|--------------------------------|------------|-------------|
| | | | Pass | % | Pass | % | | Pass | % |
| 1 | Receiving dossiers | 105 | 101 | 96.2 | 105 | 100 | 0.78 | 101 | 96.2 |
| 2 | Test the knowledge | 105 | 105 | 100 | 85 | 81.0 | 7.9 | 85 | 81.0 |
| 3 | Issue certificate | 105 | 105 | 100 | 90 | 85.7 | 2.5 | 90 | 85.7 |
| | Evaluation | 105 | 101 | 96.2 | 85 | 81.0 | 11.18 | 85 | 81.0 |

Table 4 shows that at the receiving stage, 96.2% of dossiers met the criteria which took an average of 0.78 days to process. There were 81% of dossiers that passed at the stage of a test of knowledge (mean time 7.9 days). In terms of issuing the certificate, the percentage of dossiers passed was 85.7% (mean 2.5 days). Overall, in the process of issuing a Certificate of training in knowledge about food safety and hygiene, the successful dossiers accounted for 81.0% with a mean time of process was 11.2 days (the regulation allowed maximum 13 days).

Procedures for inspecting bottled water facilities

The results of Table 5 show that in 2018, 78 bottled water facilities were inspected. 100% of facilities passed at the stage of preparation and inspection at facilities; 10% of facilities were fined because they did not comply with the time to pay fines according to regulations; At the end of the inspecting period, only 92.3% of facilities (72/78) passed. According the regulation, each bottled water facility must be inspected once a year.

Table 5. Procedures for inspecting facilities

| No. | Steps | n | Dossiers - Pass | | Dossiers - Fail | |
|-----|--------------------------|-----------|-----------------|-------------|-----------------|------------|
| | | | n | % | n | % |
| 1 | Prepare to inspect | 78 | 78 | 100 | 00 | 00 |
| 2 | Inspection at facilities | 78 | 78 | 100 | 00 | 00 |
| 3 | Handling violations | 60 | 54 | 90 | 06 | 10 |
| 4 | Ending inspection | 78 | 72 | 92.3 | 06 | 7.7 |
| | Evaluation | 78 | 72 | 92.3 | 06 | 7.7 |

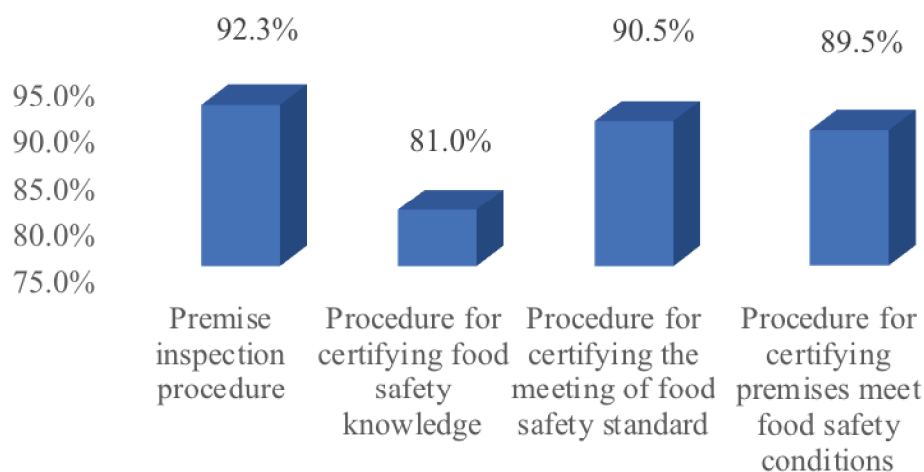


Figure 1. Assessing the food safety management procedure of bottled water producing premises, Dak Lak Province

Figure 1 shows that 89.5% met the procedure for certifying premises those met food safety conditions, 90.5% met the procedure for certifying premises those met food safety standard, 81% met the procedure for certifying food safety knowledge, and 92.3% premise inspection procedures met requirement.

Factors affecting food safety management of bottled water

Legal documents, policies related to food safety management

The Government has issued the Directive No. 13/CT-TTg dated May 9, 2016 on increasing the state management of food safety. This directs the allocation of 100% funding from administrative fines for food safety management agency and the money is used in the inspection and monitoring activities. Thus, the food safety management at local level has been improved, both in the directive actions of the Steering Committee at different levels as well as the communication, monitoring and inspection activities at premises... However, officers working on food safety did not have additional field allowance,

but only got 25% of their salary (2) and for inspection missions, the additional allowance followed the Decision No. 12/2014/QĐ-TTg (3). These, somehow affected the food safety management activities for bottled water.

The supervision and directive guidance of upper level

In 2018 there were five documents from the General Department of Food Safety to provide directive guidance on food safety management of bottled water. The supervision team from upper level supervised five times on food safety, which helped the provincial department of Food Safety to deal with limitations and problems identified as well as provided opportunities for officials at local levels to improve their capacities and solved challenges they faced in managing food safety for bottled water.

Food safety management resource

Human resources for food safety management

Provincial Food Safety Department had sufficient human resource to implement food safety management activities: 85.7%

of officers had bachelor and post graduate degrees, 80.9% had specialized inspection certificates, and 66.7% had certificates on state management and taking food samples for testing. However, the number of staff was still lacking, which only met 84.0% of the requirement. Most of staff were young with few years of working experiences in food safety management so the capacity in implementing food safety management activities were somehow still limited.

Facilities and equipment

Currently, the Provincial Department of Food Safety was located on the same campus with another department, with a small area and thus was limited in organizing working places for staff. There was only one car, which was used for transporting food samples, undertaking supervision and inspection missions. Equipment for food safety inspection and management were not sufficient and all food samples collected needed to be sent to other laboratories for analysis.

... the most challenging issue that we are facing now is we haven't got our own campus and offices. Staff from different departments are working together in a very dense working place. We need to hire meeting and conference rooms when we organise workshops and conferences. These affect us in completing our tasks... (Health manager).

Budget available in 2018 for food safety management

Provincial budget spent for food safety management was very low, only accounted for 17.0% of the total estimated budget, while there were various food safety management missions needed to be completed and

required budget such as inspection, monitoring, post-inspection, taking samples for testings, hazard control and monitoring for high risk foods including bottled water etc. Due to limited budget, these activities were not implemented comprehensively according to plan.

... since 2016, food safety has been only a project in health program and the annual budget has been cut off dramatically. In 2018, we only received decision on budget allocation after July. Although the annual inspection plan was approved, but without sufficient budget, the testing of food samples and the inspection activities could not be implemented as planned. (Manager of Provincial Food Safety Department).

DISCUSSION

Implementing the procedure for bottled water food safety management

89.5% of dossiers met the procedure for certifying premises those met food safety conditions, which was quite low, but was still higher than that in Binh Phuoc Province (83.3%) (4). The main reason for dossiers that did not meet the requirement was not meeting the quality of the documents according to standard and also did not meet the requirement on the defined time limit. The average time to complete the procedure of granting certification was 8.5 days, which was shorter than the limit of maximum 15 days set by the regulation (5). This helped to reduce the waiting time to be certified for premises and improved the administrative procedure.

The procedure for certifying the meeting of food safety standard only achieved 90.5%.

The average time was 5.3 days, which was shorter than the time limit of maximum seven days (6). The result observed in this study was higher than that reported in Binh Phuoc Province (85.5%) (4) and was lower than that in Binh Dinh Province (99.2%) (7). The main reasons for those did not meet the requirements were the labels of products were not verified by the owners, and the test results were out of date or without the Vilas stamp... Some dossiers did not meet the time limit do correct mistakes in the documents that required written responses to premises to revise and complete the dossiers.

The procedure for certifying food safety knowledge for workers who directly work at bottled water producing premises achieved only 81.0%, which was lower than the proportion reported in Binh Phuoc Province (89.3%). The average time required was 11.2 days, which was 1.8 days shorter than the maximum time limit (maximum 13 days was allowed) and was shorter than the time required in Binh Phuoc Province (14.7%) (4, 8). The reason for the low percentage of procedure for certifying food safety knowledge for workers that met the requirement was due to the need of organizing training workshops and organize tests for the workers before being certified.

Implementing the inspection procedure at bottled water producing premises, there were two inspections that did not meet the standard procedure. A similar result was reported in a study by Phan Thanh Dung in Binh Phuoc Province (2016), in which 2/5 of the inspections implemented did not follow the standard procedure (4). The total number of premises being inspected only accounted for 74.3% of the planed target. This was higher

than the result reported in Binh Phuoc Province (2016), in which only 72.2% of the premises were inspected (4). 92.3% of inspections followed the standard procedure, while 7.7% of premises did not meet the time limit set for paying fines according to administrative fine decisions. Although in total seven inspection missions were implemented, this was still lower than the target due to the lack of human resource and budget for inspections and water sample testing.

Factors affecting the food safety management of bottled water premises

Legal documents and system on food safety were appropriate and sufficient, which met the need for food safety management at bottled water producing premises. Similar situation was reported in Ninh Binh Province (2016) (9). However, policies supporting staff working in the food safety sector was still not appropriate, which somehow affected their work. Our results showed that the policies to financially support staff in Dak Lak province was not sufficient and still largely depended on local budget. A study in Binh Phuoc Province in 2016 also reported a similar finding (4). Directive guidance from central and provincial levels were strengthened and the Vietnam Food Safety Agency directly guided the inspection, monitoring and applying fines on bottled water producing premises that did not meet the requirements (10). Regarding human resource for food safety management, the number of staff was still lacking, which only met 84.0% of the requirement and this was higher than that reported in Binh Phuoc Province in 2016 (72.0%) (4), and higher than those reported in other provinces in the Central Highland, including Kon Tum, Gia Lai provinces (52.0%), Lam Dong and Dak

Nong provinces (44.0%). Working conditions, facilities and equipment did not meet the requirements and workload allocated. Budget allocation for food safety management and inspection was limited, which was a challenge for implementing tasks as planned.

Although our study reported certain important results on food safety management of bottled water producing premises, some limitations of this study must be taken into consideration. Our assessment on food safety management of bottled water premises in Dak Lak province only. Currently, there were very few studies implemented in other provinces/cities in Vietnam for comparing results, thus the discussion section was quite limited.

CONCLUSIONS

Our study showed that the food safety management for bottled water premises did not meet the requirements in implementing different procedures: only 89.5% met the procedure for certifying premises those met food safety conditions, 90.5% met the procedure for certifying premises those met food safety standard, 81% met the procedure for certifying food safety knowledge for workers, and 92.3% premise inspection procedures met requirement.

Adequate legal documents on food safety for bottled water, the directive guidance and supervision from the upper level were factors helped strengthening the food safety management of bottled water premises at provincial level. However, the lack of sufficient working places, not enough equipment, human resource only met 84.% of the requirement, inadequate local budget

allocated for food safety management, lack of supporting policy for staff working in food safety management were factors negatively influencing the implementation of food safety management procedures for bottled water.

RECOMMENDATIONS

Provincial Food Safety Department in Dak Lak should review and make sure the procedures of food safety management of bottled water premises are implemented appropriately. The inspection activities should be further strengthened to meet the set targets. The food safety management activities at these premises did not meet requirements, thus further investments were needed to improve the management food safety management at bottled water manufacturing premises in the coming years.

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