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## **Differences between official inspections and third party audits of food establishments**

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27 **Abstract**

28 Official food control inspections (official inspections) of food establishments and third party  
29 audits of food safety management systems (FSMSs) based on international standards both  
30 focus on food safety, which has raised discussions on whether FSMSs and their audits could  
31 reduce official inspections in food establishments. The aim of this study was to investigate  
32 whether the findings of official inspections and third party audits in food establishments are in  
33 alignment and to survey the inspectors' and food business operators' (FBOs) perceptions of  
34 official inspections and audits. The results can be used in planning the use of audit results as  
35 part of official food control. The results show that both inspectors and auditors recognized  
36 non-compliances/non-conformities, but significant discrepancies between the findings of  
37 official inspections and audits existed, making the utilization of audit results challenging.  
38 However, most of the FBOs and inspectors agreed that official inspections and audits overlap,  
39 and the majority also agreed that audits of a certified FSMS could under certain circumstances  
40 reduce official inspections.

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42 Keywords: food safety; official control; official inspection; audit; food safety management  
43 system

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53 **1. Introduction**

54 Food business operators (FBOs) are responsible for food safety in their establishment (EC,  
55 2002) and are obligated to comply with the general hygiene requirements and Hazard  
56 Analysis and Critical Control Point (HACCP) principles stipulated in European Union (EU)  
57 regulations (EC, 2004a). FBOs implement self-checking programmes, for example, for  
58 sanitation, pest control, traceability and HACCP to fulfil these requirements. The premises  
59 and operations, including the self-checking programmes, are regularly inspected by the  
60 official food control (food control). In addition to the implementation of the requirements for  
61 food safety legislation, many FBOs implement food safety management systems (FSMSs)  
62 based on commercial international food safety standards (Lee, 2006; Trienekens & Zuurbier,  
63 2008) such as those of the British Retail Consortium (BRC), the International Organization  
64 for Standardizations (ISO 22000) and the Food Safety System Certification (FSSC) 22000  
65 (Mensah & Julien, 2011; Qijun & Batt, 2016) for food safety reasons and customers'  
66 requirements (Crandall, van Loo, O'Bryan, Mauromoustakos, Yiannas, Dyenson, & Berdnik,  
67 2012; Fulponi, 2006). These standard-based FSMSs are audited by third party auditing bodies,  
68 which issue a certificate to the food business upon compliance with the standard (BRC, 2017;  
69 FSSC, 2016). Both food safety legislation and standards focus on food safety, and the  
70 implementation generates costs for FBOs (EC, 2004a,b; Trienekens & Zuurbier, 2008). This  
71 has raised discussions on the overlapping of official inspections and audits and on whether  
72 third party audits of FSMS could have a role in food control (Anonymous, 2013; CFIA, 2016;  
73 Martinez, Verbrugge, & Fearne, 2013; Räsänen & Vastamäki, 2016; Verbruggen & Havinga,  
74 2015; Wright, Palmer, Shahriyer, Williams, & Smith, 2013).

75

76 EU legislation states that the food control should take into account the results of quality  
77 assurance programmes (EC, 2004b), and some countries have included the possibility to  
78 utilize FSMS and the audits of those in food control (Räsänen & Vastamäki, 2016). In EU

79 countries such as Belgium, Denmark, the UK and the Netherlands, the frequency of the  
80 official inspections can be reduced according to certain preconditions in food businesses with  
81 a certified FSMS (Räsänen & Vastamäki, 2016). In addition, Canada has declared a policy  
82 statement including this possibility (CFIA, 2016), and the US has contemplated a role for  
83 third party audits (FDA, 2017), showing that there is a wide interest in taking FSMSs into  
84 account in food control. Studies, however, on the comparability of official inspection and  
85 audit results have not been published according to the knowledge of the authors.

86

87 The utilization of FSMSs and their results in food control has raised concerns due to  
88 differences in the practices between food control and third party audits (Martinez et al., 2013;  
89 Wright et al. 2013; Räsänen and Vastamäki, 2016). Audits are carried out at least annually  
90 (FSSC, 2016; GFSI, 2011), and the FBO is usually aware of the audit well in advance, but  
91 most of the official inspections must be carried out unannounced. Furthermore, food control is  
92 risk based, which means that the risks involved with food operations influence the frequency  
93 of the official inspections (EC, 2004b; Evira, 2017). A major difference is that food control is  
94 independent from the food businesses, with the primary aim of safeguarding consumers (EC,  
95 2004b), whereas the certification bodies are part of the market economy (Martinez et al.,  
96 2013). Economic interest involved with private standards may cause risks (Martinez et al.,  
97 2013) and, for example, has led to speculation on whether non-compliances could go  
98 unnoticed (Verbruggen & Havinga, 2015). In slaughterhouses in the Netherlands meat safety  
99 was considered to have decreased as a consequence of increasing the responsibility of the  
100 FBOs, but decreasing official control (Anonymous, 2014). Because the use of FSMSs and  
101 audits of those in food control raises such questions, it is important to investigate the  
102 comparability of official inspection and audit results.

103

104 The aim of our study is to investigate whether the findings of official inspections and third

105 party audits in food premises are in alignment with the special focus on non-compliances  
106 observed in official inspections and non-conformities in audits. Furthermore, we will  
107 investigate the perceptions of FBOs and local food control inspectors (inspectors) of official  
108 inspections and audits. The results can be used in developing the utilization of audits of  
109 FSMSs in food control.

110

## 111 **2. Material and methods**

### 112 **2.1. Official inspection and audit reports**

113 Food establishments that were members of the Finnish Food and Drink Industries' Federation  
114 were asked to participate in the study. Only food establishments that could provide both  
115 official inspection and audit reports from a one- to two-year period were included. Ten food  
116 establishments provided the data required (Table 1). The data comprised 66 official inspection  
117 and 18 audit reports. The official inspections and audits were conducted between the years  
118 2013 and 2015. Among the 10 establishments, the certified FSMS based on ISO 22000 was  
119 the most frequent (Table 1). The official inspections were performed by different inspectors in  
120 different local food control units. The audits were performed by four international audit  
121 organisations and seven different auditors.

122

123 The inspected and audited issues were divided into 21 categories (Fig. 1). Observed non-  
124 compliance or non-conformity and possible time-limits for correction of those were detected  
125 from the official inspection and audit reports. The depth of the official inspection or the audit  
126 was not assessed because the official inspection and audit reports did not consequently  
127 describe how the official inspections or audits were performed, how thoroughly an area was  
128 covered and what kind of inspection and audit techniques were used. This study did not  
129 compare whether the legislation and the standards contained the same requirements, but  
130 focused on comparing official inspections and audits based on the reports.

## 131 **2.2. Questionnaire for inspectors and FBOs**

132 Local food control inspectors' and FBOs' views on food safety legislation and standards and  
133 official inspections and audits were inquired in spring 2015 with an electronic questionnaire  
134 (E-lomake, Eduix Oy). The questionnaire was sent to all local food control units in Finland  
135 (62 units) and to the members of the Finnish Food and Drink Industries' Federation (260  
136 companies). The name of the local food control unit was not enquired to ensure the  
137 confidentiality of the responding inspectors. Therefore, the response rate was not possible to  
138 calculate. The FBOs were instructed to provide answers from only one person per food  
139 business. The FBOs were asked about the production type, the number of personnel (<10, 10-  
140 49, 50-249,  $\geq 250$ ) to describe the size of the establishment, and the existence of a certified  
141 FSMS at the food establishment. Sections for both respondent groups included the  
142 respondents' knowledge and perceptions of legislation and standards and views on the  
143 overlapping of official inspections and audits. The FBOs were further asked about the  
144 expertise of the inspectors and auditors and the impact of the official inspections and audits.  
145 The questionnaire consisted of multiple-choice questions and open-ended questions. The  
146 multiple-choice questions followed a four-step Likert scale (totally disagree, somewhat  
147 disagree, somewhat agree, totally agree). The impact of the official inspections and audits on  
148 food safety risk management was measured on a four-step scale (not at all, somewhat, clearly,  
149 very clearly). One reminder was sent.

150

## 151 **2.3. Statistical analysis**

152 We employed SPSS 22.0 (IBM, USA) software for a quantitative statistical analysis. The  
153 difference in the occurrence of non-compliances and non-conformities was tested with the  
154 Fisher exact test, which is applied in dichotomous values. The significance of the differences  
155 between the answers of the inspectors and FBOs were tested with the Mann-Whitney test  
156 (suitable for testing the difference between two groups), and the significance of the number of

157 personnel with the Kruskal-Wallis test (suitable for testing the difference between several  
158 groups). Both tests are nonparametric and can be used for small sample sizes. The differences  
159 in the opinions of the FBOs representing establishments handling food of animal origin or  
160 other establishments was also tested the with Mann-Whitney test. The Wilcoxon Signed  
161 ranks test, which is used to testing the distribution of dependent samples, was applied for the  
162 FBOs' assessment of the inspections and audits. The statistical significance was considered at  
163 95% confidence intervals ( $p < 0.05$ ).

164

### 165 **3. Results**

#### 166 **3.1. Non-compliances/non-conformities observed in official inspections and audits**

167 The frequency of non-compliances/non-conformities varied greatly between the official  
168 inspections and audits according to the reports (Fig. 1). The official inspection reports  
169 contained significantly more remarks on non-compliance concerning cross-contamination,  
170 maintenance, hygienic working methods, sanitation and sampling than the audit reports on  
171 non-conformities ( $p < 0.05$ ), (Fig. 1). In some categories, such as HACCP and recall, the  
172 frequency of non-conformities was higher in the audits than of non-compliances in official  
173 inspections, although the difference was not statistically significant (Fig. 1).

174

175 Time limits for the correction of non-conformities was set on every non-conformity observed  
176 at the audits, according to the reports. The frequency of setting time limits for non-  
177 compliances observed in official inspections varied greatly. Most frequently a time limit was  
178 set for the correction of non-compliances concerning by-products (50%), waste management  
179 (33%), maintenance (26%), sanitation (25%) and separation of hygiene areas (25%). No time  
180 limits were set for non-compliances such as hygienic working methods or temperature control  
181 according to the reports.

182

183 **3.2. Respondents of the questionnaire and their knowledge of food safety legislation and**  
184 **standards**

185 The number of responding inspectors from local food control units was 28 and of the 260  
186 members of Finnish Food and Drink Industries' Federation, 42 (response rate 16%). Among  
187 these FBOs 74% (31/42) had a certified FSMS (Table 2). One of the FBO's FSMS was based  
188 on BRC, while 28 FBOs that specified their FSMS relied on ISO 22000 and 19 FBOs on  
189 FSSC 22000. Both FBOs handling products of animal origin and other food establishments  
190 were represented among the respondents (Table 2). The size of the food establishments  
191 according to the number of personnel was as follows: 50-249 (55%), 10-49 (21%), > 250  
192 (19%) and < 10 persons (5%).

193  
194 All but one FBO (97%, 37/38) and half of the inspectors (50%, 14/28) reported to have at  
195 least some knowledge of a food safety standard. The most commonly known standard among  
196 FBOs and inspectors was ISO 22000 (90% and 29% were familiar with the standard  
197 respectively). However, most of the inspectors (86%) stated that they need more information  
198 about food safety standards, and 33% reported that they need more information concerning  
199 food safety legislation. Among the FBOs, 46% needed more information on food safety  
200 legislation and its implementation (Table 3). There were no significant differences in the  
201 answers of the FBOs according to the size of the food business.

202

203 **3.3. Overlapping of food safety legislation and standards**

204 The majority of inspectors and FBOs evaluated that food safety is sufficiently included in  
205 food safety legislation (96% and 98% respectively) and in the official inspections (100% and  
206 95% respectively) (Table 3). The majority of inspectors and FBOs assessed that standards and  
207 audits include food safety sufficiently; however, significantly fewer inspectors than FBOs  
208 were of this opinion ( $p < 0.001$ ) (Table 3). All of the inspectors and the majority of the FBOs



209 (90%) totally or partly agreed that food safety legislation and standards overlap, and the  
210 majority of the respondents assessed that the inspectors inspect and the auditors audit same  
211 issues (Table 3). No significant differences were observed in the answers between  
212 establishments of different sizes or the existence of a certified FSMS or not.

213

214 The FBOs and especially the inspectors stated that inconsistencies exist in the demands of the  
215 inspectors and auditors ( $p < 0.001$ ) (Table 3). Interestingly, the analysis showed that the FBOs  
216 with a certified FSMS reported significantly fewer inconsistencies (21%, 6/28) than the FBOs  
217 with no certified FSMS (100%, 10/10) ( $p < 0.001$ ). The analysis showed that inspectors with  
218 no knowledge of a food safety standard were of the opinion that there were more  
219 inconsistencies than inspectors with at least some knowledge (93%, 13/14 and 67%, 8/12,  
220 respectively), although the difference was not statistically significant ( $p > 0.05$ ).  
221 Unfortunately, only a few respondents specified how the demands were inconsistent. One  
222 FBO commented that the auditor's approach is more theoretical than the inspector's, and one  
223 inspector stated that the auditor requires more in general, but not concerning production  
224 hygiene issues.

225

226 Almost all respondents agreed totally or partly that a certified FSMS could reduce official  
227 inspections (Table 3). Both FBOs (11/42) and inspectors (3/28) commented that the frequency  
228 of official inspections or inspection time could be reduced (Table 3). However, two inspectors  
229 stated that any reductions in official inspections should be preceded by an evaluation of how  
230 the FSMS meets the food safety legislation requirements and that the inspector should have  
231 access to the criteria used in audits.

232

233 **3.4. The FBO's perceptions on inspectors' and auditors' expertise and the impact on**  
234 **food safety**

235 The FBOs evaluated the auditors' and inspectors' expertise on food safety legislation as good  
236 on average (mean 3.5 and 3.4 respectively) (Fig. 2). Most of the FBOs also totally or partly  
237 agreed that auditors and inspectors interpret the requirements of the food safety legislation in  
238 a practical way (mean 3.6 and 3.1 respectively) ( $p < 0.01$ ). The FBOs handling food of animal  
239 origin assessed the expertise in food safety legislation and the ability to interpret the  
240 requirements of the legislation in a practical way better than the FBOs representing other food  
241 establishments (Fig. 2). This difference between the establishments handling food of animal  
242 origin and other establishments was significant concerning the inspectors' expertise on food  
243 safety legislation ( $p = 0.046$ ) and the auditors' expertise on interpreting the requirements of  
244 the legislation in a practical way ( $p = 0.047$ ). No significant differences in the answers were  
245 observed between the size of the food businesses.

246

247 The FBOs evaluated that audits (100% of the FBOs) and official inspections (90% of the  
248 FBOs) had improved food safety risk management (Wilcoxon signed ranks test,  $p < 0.001$ ).  
249 The food risk management had improved very clearly due to audits, as reported by 30% of the  
250 FBOs, and official inspections, as reported by 15% of the FBOs (Fig. 3). The majority of the  
251 FBOs' totally or partly agreed that auditors' and inspectors' demands to correct non-  
252 conformities/non-compliances were easy to fulfil (84%, 26/31 and 69%, 23/33 respectively)  
253 (Wilcoxon signed ranks test  $p > 0.05$ ).

254

#### 255 **4. Discussion**

256 The study reveals differences between official inspections and audits, which are important to  
257 take into account when assessing the utilization of audit results in food control. It is especially  
258 important to acknowledge that there were significant differences in the observation of non-  
259 compliances in official inspections and non-conformities in audits. The differences were

260 observed in important self-checking categories, for example, maintenance of the premises and  
261 sanitation, which may have serious consequences on food safety.

262

263 The observed differences can be due to many reasons, such as the inspectors' and auditors'  
264 ability to recognize non-compliances/non-conformities. Discrepancies between official  
265 inspections (Läikkö-Roto, Mäkelä, Lundén, Heikkilä, & Nevas, 2015) and between audits  
266 (Albersmeier, Schulze, Jahn, & Spiller, 2009) have been observed earlier, but differences in  
267 observations between official inspections and audits on site have not been investigated before.  
268 Differences in the observation of non-compliances and non-conformities can also arise from  
269 the fact that official inspections and audits were not performed at the same time and are a  
270 snapshot of a specific point in time (Jacxsens, Kirezieva, Luning, Ingelrham, Diricks, &  
271 Uyttendaele, 2015). It is normal that non-compliances occur and are corrected, which means  
272 that the situation in the establishment is not identical from one day to another. However, the  
273 differences observed in this study were major, the extent and magnitude of the observed  
274 differences were surprising, and it is not likely that they can be solely explained by different  
275 on-site visit times.

276

277 Another factor that can affect the results is the unexpectedness of the official inspections or  
278 the expectedness of the audits. Most of the official inspections must be unannounced, but  
279 audits have been announced in advance, which may influence the authenticity of the situation  
280 at the establishment. To overcome this issue, the conduction of unannounced audits is also  
281 being included as a requirement in some standards (Räsänen & Vastamäki, 2016). Further, it  
282 can be hypothesised that the expertise of the inspectors and auditors and time available for  
283 carrying out official inspections and audits may influence the outcome. Whatever the reasons  
284 are for the discrepancy observed between official inspections and audits, it makes comparison  
285 of the official inspection and audit results difficult, which poses a challenge to the utilization

286 of audit reports in food control. Actions to decrease discrepancies could include, for example,  
287 joint visits of inspectors and auditors to establishments and availability of the criterion that the  
288 auditors use, when assessing findings, to inspectors.

289

290 The majority of inspectors stated that there are inconsistencies between the demands of the  
291 inspectors and auditors. However, only few inspectors specified what the inconsistencies  
292 were, suggesting that most of the inspectors do not have any concrete examples of  
293 inconsistent demands. Further, all FBOs not having a FSMS agreed that there are  
294 inconsistencies, whereas most of the FBOs that did have a certified FSMS did not agree.  
295 These results indicate that inspectors and FBOs not familiar with the topic have a strong  
296 impression of audits and official inspections being inconsistent, although in reality this might  
297 not always be the case.

298

299 Most of the FBOs with a certified FSMS and those few inspectors with some knowledge of a  
300 food safety standard agreed that food safety legislation and standards overlap. This is not  
301 surprising since most of the respondents also assessed that food safety is sufficiently included  
302 in both food safety legislation and standards. Consequently, the majority also agreed that a  
303 certified FSMS could reduce official inspections or inspection categories. It seems therefore  
304 that Finland has a willingness to utilize the results of audits in official control, as in many  
305 other countries (FDA, 2017; Räsänen & Vastamäki, 2016). Suggestions, however, to reduce  
306 the frequency of official inspections or reduce control of certain inspection categories should  
307 not be made unless the reasons for the discrepancies between official inspection and audit  
308 results are investigated. At the moment audit results are not actively utilized in food control in  
309 Finland, such as, for example, in Belgium and Denmark (Räsänen & Vastamäki, 2016).  
310 However, audits can indirectly influence official inspection results in Finland; if audits result  
311 in higher compliance towards food safety legislation, it can lead to decreased inspection

312 frequency (Evira, 2017).

313

314 Both official inspections and audits appear to be important for food safety, as they have  
315 impacted food safety risk management according to the FBOs. This finding is in line with  
316 previous findings suggesting that official control and certified FSMS improve food safety  
317 (Dzwolak, 2016; Escanciano & Santos-Vijande, 2014; Kettunen, Nevas, & Lundén, 2015;  
318 Nevas, Kalenius, & Lundén, 2013; Psomas & Kafetzopoulos, 2015; Qijun & Batt, 2016).  
319 Audits were assessed in this study to have impacted risk management more than official  
320 inspections. The reasons for this were not revealed, but it is possible that longer audit visits  
321 compared to shorter official inspections, the content of the audits and official inspections, or  
322 the competence of the auditors and inspectors have influenced the FBOs' perceptions of the  
323 impact.

324

325 The fact that both inspectors and auditors found non-compliances and non-conformities in  
326 food establishments is of concern; however, it is not uncommon to find non-compliances in  
327 official inspections (Läikkö-Roto et al., 2015; Guiducci, Copeland, Dorsey, & Edelstein,  
328 2011). This indicates that external control is warranted in food establishments, although the  
329 FBOs carry the responsibility for the safety of the products. It can also be speculated that  
330 more efficacious enforcement measures should be applied due to the high frequency of non-  
331 compliances. Time limits for the correction of non-conformities were set systematically in the  
332 audits, but in the official inspections time limits were not often used or they were at least not  
333 documented. It is possible that some of the non-compliances, for instance, non-compliances  
334 concerning hygienic working methods, were requested to be corrected immediately at the  
335 official inspection, and therefore a time limit was not documented. The use of time limits is of  
336 great importance because they improve the correction of non-compliances (Läikkö-Roto et al.,  
337 2015; Luukkanen & Lundén, 2016).

338

339 The FBOs agreed that inspectors and auditors have good expertise in food safety legislation  
340 and also assessed positively on average the ability of especially the auditors but also the  
341 inspectors to interpret legislative requirements. This is important because it has been shown  
342 that FBOs appreciate assistance in interpreting the requirements of legislation (Buckley, 2015;  
343 Kettunen, Lundén, Lääkkö-Roto, & Nevas, 2017). In this study almost half of the FBOs stated  
344 that they need even more information about food safety legislation and its implementation,  
345 which is a challenge for inspectors, auditors and possible other players in the field.  
346 Interestingly, differences between the opinions on expertise and the ability to interpret  
347 requirements in a practical way were seen between the FBOs handling food of animal origin  
348 and the other FBOs. The reason for this was not revealed in this study, but it can be  
349 hypothesized that the inspectors and auditors visiting establishments handling food of animal  
350 origin have more in-depth training due to the risks involved with animal-derived products.

351

352 The results of this study concerning official inspection and audit reports can be generalized to  
353 other establishments with some limitations. The number of included establishments was rather  
354 small, but the establishments represented different production types, and the official  
355 inspections and audits were carried out by several inspectors and auditors. The discrepancies  
356 between the findings of inspectors and auditors were also quite striking. The results of the  
357 questionnaire must be interpreted carefully because of the scarce number of respondents. The  
358 number of responding inspectors is modest, presumably because very few have knowledge of  
359 food safety standards. All of the responding FBOs were members of the Finnish Food and  
360 Drink Industries' Federation, and therefore we do not know if FBOs that are not members  
361 would show a similar answering profile. However, most of the responding FBOs had a  
362 certified FSMS. Therefore, we hypothesize that these results can be generalized better to  
363 FBOs with a certified FSMS.

364 In conclusion, official inspections and audits overlap, and both inspectors and FBOs agree  
365 that audits of certified FSMSs could somehow reduce official control. However, this study  
366 shows striking differences in the observations in official inspections and audits, which makes  
367 the comparison of official inspections and audits challenging. The development of a  
368 utilization scheme of audit results as part of food control requires a better understanding of  
369 the reasons leading to discrepancies between audit and official inspection results.

370

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## Highlights

- Inspectors observed significantly more non-compliances than auditors non-conformities
- All inspectors and 90% of FBOs agree that legislation and standards overlap
- The majority of respondents stated that certified FSMSs could reduce inspections
- Almost half of the FBOs need more information on food safety legislation

## Figure captions

### Figure 1.

Frequency of non-compliances observed at official inspections (n=66) and non-conformities at audits (n=18).

1=Cross-contamination\*; 2=Maintenance\*; 3=Hygienic working methods\*; 4=Traceability; 5=Contact material; 6=Sanitation\*; 7=Temperature control; 8=Pest control; 9=Waste management; 10=Separation of hygiene areas; 11=Personnel health; 12=Sampling\*; 13=Self-inspection documentation; 14=By-products; 15=Inspection of received products; 16=HACCP; 17=Reclamations; 18=Recall; 19=Personnel training; 20=Allergen control; 21=Labelling.

\*Statistically significant difference in the number of non-compliance observed at official inspections and non-conformities observed at audits (Fisher exact test  $p < 0.05$ ).

### Figure 2.

Food business operators' evaluation of the inspectors' and auditors' expertise in food safety legislation and their ability to practically interpret the requirements of the legislation.

\*Only FBOs with a certified food safety management system answered.

### Figure 3.

Food business operators' assessment of the impact of official inspections and audits.

\*Only FBOs that had a certified food safety management system answered.

Figure 1

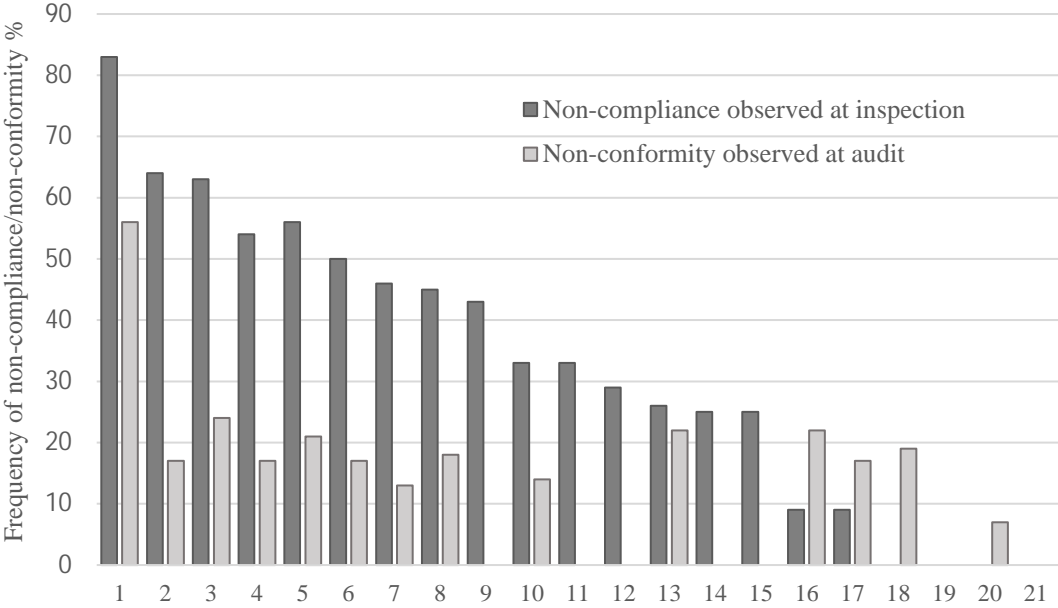


Figure 2.

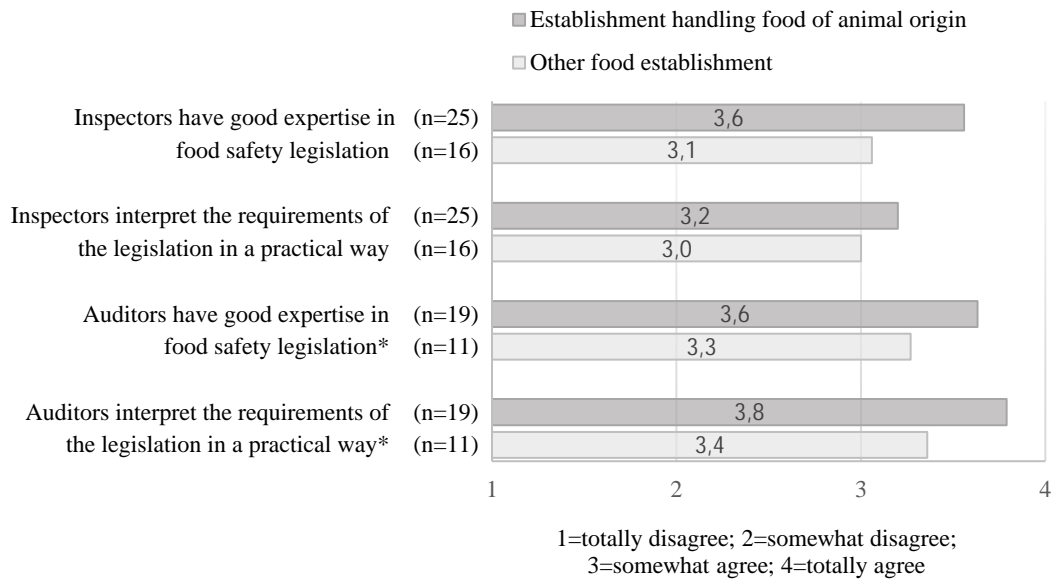




Figure 3

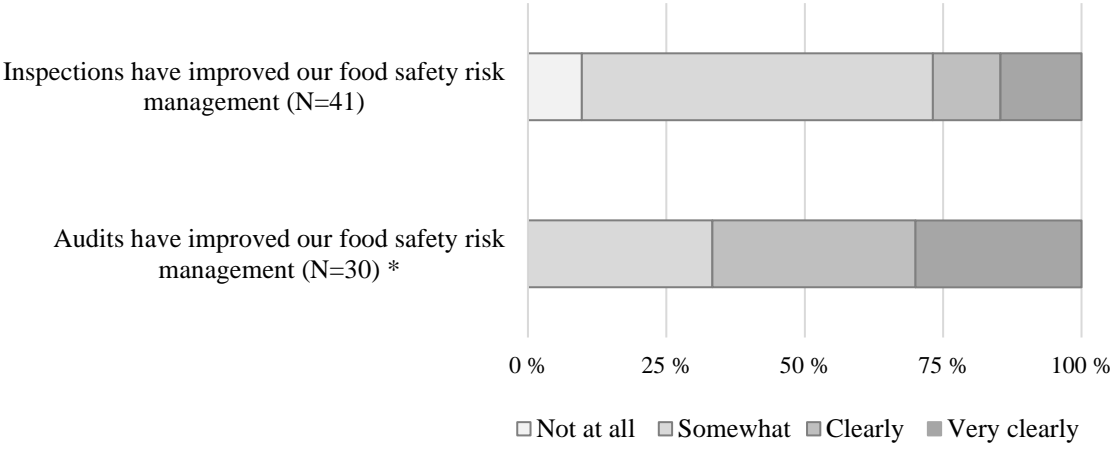


Table 1. Number and type of food establishments that provided official inspection and audit reports for the study.

Food business operator	Food establishment	Product type	Food safety management system			
			ISO 22000	ISO TS 22002-1	FSSC 22000	BRC
1	1	Milk powder	1	1		
1	2	Cheese	1	1		
2	3	Meat product	1	1	1	
3	4	Ready-to-eat product	1	1	1	
3	5	Ready-to-eat product	1	1	1	
4	6	Bakery product	1	1	1	
5	7	Processed fishery product	1			
6	8	Meat cutting	1	1	1	
7	9	Processed vegetables	1			
8	10	Cooking oil				1

Table 2. Respondent groups and response rates of the questionnaire and the presence of a certified food safety management system (FSMS) in the responding food businesses.

Respondent group	Number of respondents (%)	Number of food businesses with a FSMS (%)
Food control inspector at local unit	28 <sup>a</sup>	-
Food business operator <sup>b</sup>	42 (16)	31 (74)
Establishment handling food of animal origin	26	20 (77)
Other food premises <sup>c</sup>	16	11 (69)

<sup>a</sup>The questionnaire did not enquire the name of the local food control unit to maintain the anonymity of the inspectors, and therefore the percentage of the responding units cannot be calculated.

<sup>b</sup>The questionnaire was sent to the members (n=260) of the Finnish Food and Drink Industries' Federation. The share of establishments handling food of animal origin and other food establishments among the members is not known.

<sup>c</sup>Premises handling vegetables, baking products, candy, beverages, berries, oil or yeast.

Table 3. Food business operators' (FBO) and local food control inspectors' views and the educational needs of food safety legislation and standards.

Statement	Agree completely or partially with the statement % (n/N)		p-value <sup>a</sup>
	FBOs	Local food control	
<b>Food safety</b>			
Food safety is sufficiently included in food safety standards	100 (39/39)	77 (10/13)	< 0.001
Food safety is sufficiently included in food safety legislation	98 (38/39)	96 (25/26)	> 0.05
Food safety is sufficiently included in audits	100 (39/39)	73 (8/11)	< 0.001
Food safety is sufficiently included in official inspections	95 (37/39)	100(26/26)	> 0.05
<b>Overlapping</b>			
Requirements of food safety legislation and standards overlap	90 (28/31)	100 (8/8)	> 0.05
Inspectors and auditors inspect/audit the same issues	81 (26/32)	89 (8/9)	> 0.05
Inspectors' and auditors' demands have been inconsistent	42 (16/38)	81 (21/26)	< 0.001
Certified food safety management system could reduce inspections	93 (27/29)	89 (8/9)	> 0.05
<b>Knowledge and educational needs</b>			
I have basic knowledge about at least one food safety standard	97 (37/38)	48 (13/27)	< 0.001
I need more information about food safety standards	37 (15/41)	86 (24/28)	< 0.001
I need more information about food safety legislation and its implementation	46 (19/41)	33 (9/27)	> 0.05
Food control officials need more information about food safety standards	89 (34/38)	89 (25/28)	> 0.05

<sup>a</sup>Statistical significance of the difference between groups was tested with the Mann-Whitney test.