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1 | Title: EVALUTION OF A SIMPLIFIED APPROACH IN FOOD SAFETY MANAGEMENT SYSTEMS IN THE
2 | RETAIL SECTOR: A CASE STUDY OF BUTCHERIES IN FLANDERS, BELGIUM AND LANCASHIRE, UK

3
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9

10 | **Abstract**

11 | The EFSA BIOHAZ panel published a scientific opinion proposing a new approach in food safety
12 | management, adapted to the needs of small retail businesses such as grocery, butcher, bakery,
13 | fishmonger and ice cream shops. The opinion is aiming at a more hands-on development and
14 | maintenance of their food safety management system, based on prerequisite programs and ~~HACCP-~~
15 | ~~hazard analysis critical control point~~-principles ~~(EFSA_BIOHAZ, 2017)~~. In this paper, the added value
16 | of the EFSA opinion is evaluated by comparing requirements with existing legislation and applied
17 | guidelines relevant for butchers, and to assess perceptions about introduced changes by this opinion
18 | for small independent butcheries in Flanders, Belgium and in North-West England, UK as a case
19 | study. ~~Results show that the conditions for flexibilities, as stated in the EFSA opinion, could lead to~~
20 | ~~difficulties in interpretation among Member States. Also, the hazard analysis approach applied in the~~
21 | ~~two main UK guides to good practice appeared to be similar to the simplified approach proposed by~~
22 | ~~EFSA. For Belgium, the main difference is that in the Belgian guide to good practice hazards are~~
23 | ~~ranked and CCPcritical control points are identified for the preparation and selling of fresh meat,~~
24 | ~~minced meat and meat preparations. The specification of PRPprerequisite programs and related~~
25 | ~~activities in the EFSA opinion can be an important step towards harmonization among EU Member~~
26 | ~~States. The new approach removes hazard ranking and, as such, no critical control points are~~
27 | ~~identified. Instead, thirteen prerequisite programs are linked to monitoring activities, record keeping~~
28 | ~~and corrective actions. The EFSA opinion will advance the development and maintenance of food~~
29 | ~~safety management systems present in butcher shops in a positive way, certainly for the EC Member~~
30 | ~~States, in which the flexibilities for these retail establishments were not appropriately or correctly~~
31 | ~~worked out or interpreted. However, the conditions for allowance of flexibilities are more generally~~
32 | ~~described in the EFSA opinion and these do not completely overlap with the scope at national level~~
33 | ~~(e.g. size, nature and activities of the retail organisations). This could lead to difficulties in~~
34 | ~~interpretation of application of flexibility and may lead to confusion amongst Member States.~~
35 | ~~Assessing the perceptions of 10ten UK and 10ten Belgian butchers revealed that it can be stated that~~

36 the hazard analysis approach and the thirteen prerequisite requirements proposed by EFSA, are
37 generally positively experienced by the butchers. However, the introduction of the proposal
38 'Monthly microbiological tests' to verify cleaning and disinfection activities is rejected by all the
39 Belgian butchers and by the majority of the UK butchers. This proposal will not ease their job and the
40 necessity of these tests should be reconsidered.

41 Key words: food safety management system; HACCP plan; butchery; EFSA opinion; hazard analysis

42 **1.Introduction**

43 All food companies have to ensure the safety and hygienic status of their food products by the
44 development, implementation and maintenance of a tailored food safety management system
45 (FSMS). However, as stated in the Codex Alimentarius 'General Principles of Food Hygiene', certain
46 flexibility is possible for smaller food companies in order to ease the burden of administration and
47 perceived difficulties in implementation of their FSMS based on prerequisite programs (PRPs) (which
48 includes good hygiene practices (GHP) and good manufacturing practices (GMP) among other good
49 practices) and procedures based on Hazard Analysis Critical Control Point (HACCP) principles (CAC,
50 2003; EC., 2016). In the European hygiene regulation, the nature and size of the business are defined
51 as the two main criteria making a food business operator eligible for flexibilities, and these are
52 further specified at national level by the Member States (EC., 2004a). So the objective of the
53 introduction of the concept 'flexibility' is actually 'to seek for proportionality of control measures by
54 adaptation to the nature and size of the business' (EC., 2016). The European hygiene legislation also
55 encourages the development and use of guides to good practice to help food business operators to
56 control hazards and demonstrate compliance (EC., 2004a). Many of such guides have already been
57 developed and assessed by national competent authorities for several food sectors. These are
58 mostly dealing with good practices and pre-requisite programs but can also cover some or all HACCP-
59 based principles (EC., 2017; FASFC, 2017). For example, in the case of butcher shops, both Belgian
60 and UK butchers can appeal to such national guides.

61 Next to these guides, in UK the Food Safety Authority provides 'fact sheets', easy and visual
62 representations of food safety and hygiene procedures (e.g. hand washing) and other information
63 packs to help small businesses with their food safety management procedures and hygiene
64 regulations, via the well-known "Safer Food Better Business" program (FSA, 2019). Similarly, in
65 Belgium the Federal Agency for Safety of the Food Chain (FASFC), published 'quick start fiches' for
66 business-to-consumer (B2C) businesses (FASFC, 2018).

67 In an attempt to facilitate and harmonize the implementation of EU requirements on PRPs and
68 HACCP principles and clarify flexibilities in this matter, the European Commission published a

69 'Commission Notice on the implementation of procedures based on the HACCP principles, and
70 facilitation of the implementation of HACCP principles in certain food businesses' (EC., 2016). Several
71 practical solutions focusing on the simplification of some system areas such as flow diagrams, hazard
72 analysis, documented procedures and records are described. The document also states that for
73 certain categories of food businesses with identical, standardised and limited handling of food (e.g.
74 butcher shops), it may be possible to pre-determine hazards that need to be controlled. Guidance on
75 such hazards and on the control thereof can be addressed in a generic HACCP guide (EC., 2016).

76 In small non-industrial establishments, HACCP should be used as a means of managing food safety,
77 highlighting the importance of critical control points (CCPs) and monitoring operations, rather than
78 strictly complying with the seven principles defined for the food industry (Panisello & Quantick,
79 2001). In certain cases, a hazard analysis may demonstrate that no significant hazard has been
80 identified and therefore there is no need for CCPs. In this case all food hazards can be controlled by
81 the implementation of the PRPs (EC., 2016). For example, distributors of non-perishable food
82 products (e.g. for food donation) may not need any CCPs to safeguard food safety and hygiene (De
83 Boeck, Jacxsens, Goubert, & Uyttendaele, 2017).

84 However, the question remains whether this flexibility may pose a greater potential for failures in
85 food safety and hygiene rules and at the end foodborne disease, especially when working with quite
86 risky products from a microbiological perspective, such as raw meat in a butcher shop (De Boeck,
87 Jacxsens, Bollaerts, Uyttendaele, & Vlerick, 2016).

88 The report from the Commission (FVO, 2015) on the experience gained in Europe from the
89 application of the hygiene Regulations (EC) 852/2004 (EC., 2004a), (EC) 853/2004 (EC., 2004b) and
90 (EC) 854/2004 (EC., 2004c), identified certain difficulties with their implementation particularly in
91 small food businesses in most Member States. An important issue raised, is dealing with the concept
92 of 'flexibility' as described in Regulation (EC) 852/2004 (EC., 2004a). Managing flexibilities in FSMS is
93 a national affair, as prescribed in EU Regulation (EC) 852/2004, 'nature' and 'size' should be defined
94 by authorities at national level. However, according to the FVO report (FVO, 2015), Member States
95 are experiencing difficulties to deal with these concepts. Also semantic structures in these legislative
96 texts (e.g. Regulation 852/2004) such as "if applicable" or "if necessary" are difficult to interpret
97 (BIO_by_Deloitte, 2014; De Boeck et al., 2017). This lack of clarity, leads to fragmentation of Member
98 States' food safety policies and the risk that Member States hold different standards with respect to
99 food safety and hygiene. For example, in Poland, EU Regulation (EC) 852/2004 is interpreted very
100 rigidly, making it nearly impossible for food banks to distribute food donations, whereas in Belgium
101 provisions are foreseen (e.g. freezing food at the end of shelf life for food donation) enabling these
102 activities (BIO_by_Deloitte, 2014). So in some cases, flexibility is not permitted at all or is only
103 permitted by the control authority in cases where an officially adopted guide is available (e.g. self-

104 checking guides approved by the Belgian food safety authority), resulting in small businesses being
105 required to maintain unnecessary levels of documentation. As such, the Member States highlighted
106 in the FVO report the need for more practical guidance, including examples, on flexibility which
107 would address at least the following: (i) what constitutes flexibility, (ii) where flexibility is permissible,
108 and (iii) under what conditions flexibility may be granted. The latter would need to provide some
109 clarity on the required level of documentation (FVO, 2015).

110
111 In this context, the BIOHAZ panel of EFSA prepared a scientific opinion proposing a new approach
112 which is adapted to specific types of retailers' needs and which would facilitate the development and
113 maintenance of the FSMS (EFSA_BIOHAZ, 2017). Addressing first the issue of understanding the
114 concept of 'flexibilities', in this EFSA opinion it is stated that flexibility in FSMS means that for each
115 food business at least compliance with relevant PRPs is required and that a hazards analysis must be
116 carried out using a risk-based approach to determine the necessity to establish CCPs (EFSA_BIOHAZ,
117 2017). This document also introduces changes in the process of hazard analysis in comparison to the
118 Codex approach: for example, the grouping of the hazards to reduce detailed information, the
119 elimination of hazard ranking and the need for CCPs by controlling all the hazards with PRPs. For five
120 types of small retail businesses: grocery, butcher, bakery, fishmonger and ice cream shops, a FSMS-
121 table is developed which may replace the current HACCP-plan. Moreover, a table of PRPs is
122 proposed, accompanied with control and monitoring activities, record keeping requirements, and
123 corrective actions. This means that businesses falling within these specific retailer groups (grocery,
124 butcher, bakery, fishmonger, ice cream shop) can adopt this simplified process and associated
125 control and monitoring requirements without the need to perform their own hazard analysis or
126 HACCP study; however, care must be taken to ensure that the food handling processes used by the
127 businesses are indeed in line with those considered within the EFSA scientific opinion (EFSA, 2017).

128 Latronico et al. (2017) states that "the EFSA opinion takes into consideration a detailed analysis of
129 constraints in implementing FSMS and provides guidelines in a user-friendly way". However, no
130 evaluation of this EFSA opinion is available in scientific literature. As such the aim of this research
131 was to evaluate the added value of this EFSA opinion compared to existing legislation and guidelines
132 relevant for UK and Belgian butchers (objective 1), and to assess perceptions about introduced
133 changes by this opinion for small independent butcheries in Flanders, Belgium and butcheries in
134 North-West England, UK as a case study (objective 2). For the first objective, a document review was
135 performed in which conditions for flexibilities, hazard analysis approach and PRP requirements are
136 compared between the EFSA opinion and relevant documents (e.g. guides to good practice). For the
137 second objective face-to-face interviews were performed to investigate the opinion of the butchers
138 about the introduced changes.

139 **2. Material and methods**

140 **2.1 Objective 1: Method for document review**

141 *2.1.1 Selection of documents*

142 Relevant documents were selected based on searches in database of EURLEX, websites of national
143 sector organizations and food safety authorities, and discussions with experts in European and
144 national legislation regarding food safety and hygiene from both UK and Belgium (belonging to
145 Department Food Technology, Safety and Health, Ghent University, Belgium and School of Sport and
146 Wellbeing, University of Central Lancashire, UK). Following documents were considered relevant: the
147 EFSA opinion under study (EFSA_and_ECDC, 2017), Commission Notice on the implementation of
148 procedures based on the HACCP principles, and facilitation of the implementation of HACCP
149 principles in certain food businesses (EC., 2016) and the national guides to good practice. With
150 regard to these national guides, in Belgium, a self-check guide is freely available on the official
151 website of the Belgian food safety authority (FASFC, 2015). The Belgian self-checking guide contains
152 informative instructions and addresses biological, chemical and physical risks. It provides advice on
153 purchasing food, the use of recognised food contact materials, proper organisation of food in fridges,
154 cooking and distribution of food. In Belgium, these national agreed guides are used as auditing
155 reference to validate the organization's FSMS. In the UK, several guides are available. Firstly, a basic
156 hygiene guideline document, named 'Food Hygiene, a guide for businesses' (FSA, 2013), which is a
157 general document for all catering and retail establishments. 'Safe Food Handling for Butchers' (FSA,
158 2012) is a guideline for the butchers and is developed by a consultative group in Northern Ireland.
159 'ButcherSafe' (Food_Standards_Scotland, 2013) is another guide originating from Scotland. These are
160 both provided via the Food Standards Agency (FSA) website. In addition, another guidance is
161 provided by 'Meat Training Council': 'HACCP review and guidance manual for retail butchers' (MTC,
162 2016). However, as this guide is provided against payment and is a considerable cost for small
163 butcher shops, the latter guidance document will not be included further in this research. It should
164 also be noted that, in contrast to the situation in Belgium, no certification against these guides is
165 possible, and connection of UK butcher shops to an association of butcher shops is less common.
166 The guides included in this study, legal documents and the EFSA opinion are freely available online.

167 *2.1.2 Comparison of the reference documents*

168 For the comparison of the included reference documents, tables were made describing the
169 requirements for each section of the documents and this was discussed by the experts. For the
170 comparison of the conditions to be eligible for flexibilities, conditions described in the EFSA opinion
171 (EFSA_BIOHAZ, 2017) (to be eligible for using the proposed simplified hazard analysis proposed in
172 this document) were compared with the self-checking guide of Belgium (FASFC, 2015) and two guides

173 from the UK (Food_Standards_Scotland, 2013; FSA, 2012) (Results: see 3.1.1 and Table 1).
174 Comparison of the hazard analysis approach was first investigated at European level. The approach
175 described in the EFSA opinion (both proposed simplified approach and classical approach as
176 described in this document) was compared with the approach described in the Commission Notice
177 on FSMS (EC., 2016) (both 'classical' approach and approach applicable to companies eligible for
178 flexibilities) (Results: see 3.1.2 and Table 2). Secondly, also the approaches described in the national
179 guides (Belgium and UK) were investigated (Results: see 3.1.3 and Table 2). Prerequisite
180 requirements were compared between the EFSA opinion and the national guides (Belgium and UK)
181 (Results: see 3.1.4 and Table 2).

182

183 **2.2 Objective 2: Method for assessment of perception of butchers**

184 **2.2.1 Selection and characteristics of butchers**

185 For the sample of the butchers to be interviewed, micro scale independent butcher shops which can
186 profit from the national flexibilities were targeted for this research. Affiliated butcher shops, being
187 affiliates of a large scale centrally coordinated meat distribution company were excluded. Also,
188 butchers not meeting the conditions for national flexibilities were considered out of the scope. Only
189 butcher shops meeting the conditions were interviewed. Participation was completely voluntary and
190 willingness to participate was respected. This was a convenience sample, as butcher shops in the
191 neighbourhood were contacted via acquaintances in Antwerp, Flanders and via contacting those
192 within a geographical area of Preston, UK. All included Belgian butchers (n=10) used the national
193 guide to good practice (FASFC, 2015). In the UK, where more guides are available, two of the
194 interviewed butchers used the guide 'Safe Food Handlings for Butchers' (FSA, 2012), seven used
195 'ButcherSafe' (Food_Standards_Scotland, 2013) and one of them used 'HACCP review and guidance
196 manual for retail butchers' (MTC, 2016).

197 **2.2.2 Design questionnaire**

198 The questionnaire was developed by the same group of experts performing the document review
199 (see section 2.1). As current practices with respect to HACCP and prerequisite programs'
200 implementation might be different for Belgium and the UK, two separate questionnaires were
201 developed based on the document review. First part of the questionnaire consists of general
202 questions about the organisation of the butcher shop. The second part was based on the document
203 review. An overview was made of changes (compared to national guides) in PRP and HACCP
204 requirements proposed in the EFSA opinion, and these were then included in the questionnaire via
205 questions comparing changes proposed by EFSA to the butchers' current practice (e.g. Is a
206 registration form filled out for each monitoring of temperature of the cold storage room?) and

207 questions asking for the opinion of the butchers towards the proposed changes (e.g. How do you
208 experience the proposal of EFSA to execute monthly microbiological analysis for monitoring of
209 cleaning and disinfection?). The survey contained mainly open questions. The questionnaire for the
210 Belgian butchers was in Dutch and consists of 32 questions. The questionnaire of the UK was in
211 English and consists of 48 questions (see Appendix A for full questionnaires).

212 **2.2.3 Face-to-face interviews**

213 Face-to-face interviews with the responsible manager/supervisor of each butchery in both Belgium
214 and the UK were performed. At the outset, the responsible manager/supervisor of the butcher shop
215 received an announcement letter. In this letter, the butchers were fully informed about the purpose
216 of the study. The voluntary nature of their participation and how the data would be anonymised and
217 used was explained. Each interview took approximately 30-45 minutes and was performed by the
218 same interviewer both in Flanders and in UK. Before use, a validation of the questionnaires was
219 executed. A preliminary survey was used by the interviewer to conduct the interview with one extra
220 Belgian and UK butcher. Also terminology and formulation of the questions was discussed. Hygiene
221 conditions in the butcheries were not assessed during the visits for the interviews, as this was not
222 within the scope of this study.

223 **2.2.4 Data processing**

224 The responses of the interviews were registered. For the questions related to how proposed changes
225 were experienced by the butcher, a categorization was executed. The responses were categorized as
226 positive, neutral or negative (towards each change proposed by EFSA) by the interviewer, as the
227 latter could also capture underlying sentiments during the conversations with the butchers. The
228 general questions and questions about current practices were not further processed, but were used
229 in case extra information was needed to explain positive, negative or neutral appraisal of proposed
230 changes. The results were presented in graphs for the Belgian and UK butchers for each PRP/hazard
231 analysis step introducing changes proposed by EFSA (Results: see 3.2.1, 3.2.2, Table 3 and Figure 1).

232 **3.Results and discussion**

233 **3.1 Objective 1: Results for document review: Comparison of conditions for flexibility,** 234 **hazard analysis approach and PRP requirements**

235 **3.1.1 Conditions for flexibility**

236 Results of the document review for the comparison of conditions for flexibility are given in Table 1.
237 The conditions in Belgium and the UK are both expressed as the extent of delivery to other
238 businesses/organisations (B2B). Butcher shops supplying to other organisations are only eligible in
239 case of limited distance and percentage of sales. Small butcher shops, delivering only to the final

240 consumer (B2C), are in any case eligible for flexibilities. The scope in the EFSA opinion (EFSA_BIOHAZ,
241 2017)) is more general and does not completely overlap with the scope on national level. The EFSA
242 opinion defines the size and the nature of the business instead of the limitation for B2B deliveries.
243 The EFSA opinion refers to small businesses which serve to local customers but does not specify the
244 distance. This could be because distances are not comparable between Member States of different
245 sizes, which would hinder harmonization.

246 The production of meat products is not in the scope of the EFSA opinion. This means that some
247 butcher shops who currently profit from the flexibilities are not fully eligible for the simplified
248 approach proposed by EFSA. However, purchased meat products from the meat industry, can still be
249 sold in the shop. As such, two possibilities can be deduced: butchers may apply the simplified
250 approach if they are fully eligible, or butchers may only apply the simplified approach to the products
251 concerned. This is not specified in the EFSA opinion and could lead to confusion and different
252 interpretations between the Member States.

253 It could be stated that this concept of 'flexibility' is generally difficult to interpret, especially by
254 smaller businesses without extensive knowledge related to food safety and hygiene legislation. The
255 Commission Notice gives some clarification on how to interpret 'nature' and 'size' as eligibility
256 criteria (EC., 2016). Nature is related to activity (e.g. processing versus only storage of packaged
257 products) of the business and should be assessed in a risk-based way. With respect to size, the
258 Commission Notice refers to e.g. production volume and throughput.

259 **3.1.2 Hazard analysis approach: change compared to current European legislation**

260 The classical hazard analysis approach, the simplified approach proposed by EFSA (EFSA_BIOHAZ,
261 2017) and the approach described in the Commission Notice on the implementation of FSMS (EC.,
262 2016) are compared (Table 2). For the Commission Notice, the comparison is made for 2 cases: with
263 and without taking into account the flexibilities for small businesses. The differences introduced by
264 EFSA are highlighted in bold.

265 An important finding is that in the EFSA opinion, the proposed simplified approach, which is intended
266 for small establishments profiting from flexibilities, is compared with the classical approach
267 (corresponding to the hazard analysis approach without taking into account the flexibilities), instead
268 of comparing with the hazard analysis approach taking into account the flexibilities (as described in
269 the Commission Notice (EC., 2016)). Comparing the simplified approach with the hazard analysis
270 approach without the flexibilities introduces changes in each step, promising changes for
271 improvement. For the classical approach without the flexibilities, the most important change
272 introduced by the EFSA opinion, is the fact that no detailed description and knowledge is required for
273 the hazard identification and the removal of the hazard ranking. If flexibilities already proposed in

274 the Commission Notice are taken into account, there is only one major change, i.e. the removal of
275 the hazard ranking.

276 **3.1.3. Hazard analysis approach: changes compared to national guides to good practice**

277 In Table 2, the EFSA opinion (EFSA_BIOHAZ, 2017) is further compared with the national guides to
278 good practice for Belgium and UK. In case in these documents, a difference was noticed with the
279 EFSA simplified approach, this was highlighted in bold. For all presented guides, the hazard analysis is
280 pre-developed in the guide and is 'ready-to-use' by the butchers. For the Belgian guide also hazard
281 identification and hazard ranking are premade and flow diagrams and HACCP-plans for each product
282 group are provided. As such, no detailed description and knowledge about the nature of the hazard is
283 necessary from the butchers. This detailed description and knowledge was required in the classical
284 approach (according to the EFSA opinion and Commission Notice). The documentation related to the
285 FSMS in Belgium can be replaced by the guide according to the Ministerial Decree of 2 March 2013
286 (FASFC, 2013) concerning the flexibilities of the application modalities of self-checking and
287 traceability in some establishments in the food chain. This removal of hazard ranking is a change
288 compared to the classical approach, the approach in the Commission Notice and the Belgian self-
289 checking guide, but not for the UK guides.

290 In the two guides of the UK, the current approach is similar to EFSA's proposed approach. UK guides
291 also do not specify the hazards nor include hazard ranking. The guide 'ButcherSafe' identifies the
292 stages. Hazard identification is not based on the stages but on the PRPs. Still, this is not considered a
293 real change introduced by the EFSA opinion. This guide gives a definition for CCPs, but manages all
294 hazards via 'house rules', which can actually be considered as PRPs. For the guide 'Safe Food
295 Handling for Butchers', every hazard is linked to control, monitoring, record keeping and corrective
296 actions, but CCPs are not really specified.

297 In practice, if the simplified hazard analysis approach would be introduced, the guides would be
298 adjusted. The butcher must then obtain the updated guide to comply with legislation.

299
300 To conclude, the new approach removes hazard ranking and, as such, no CCPs are identified. Instead,
301 the 13 PRPs are linked to monitoring activities, record keeping and corrective actions. This is similar
302 to the approach used in UK. As hazard ranking is omitted, all the hazards are identified as critical and
303 the criticality seems to be indicated by the level and frequency of monitoring and record keeping
304 requirements. For the case of Belgium, the simplified approach seems to be more a restructuring of
305 the FSMS without CCPs. This could be due to the fact that in the national self-checking guide, certain
306 preventive measures such as storage temperature of food products and reception of raw materials
307 are, *sensu stricto*, wrongly indicated as CCPs according to the HACCP-principles of CAC (2003) and EU

308 Regulation 852/2004 (EC, 2004a). However, it was a risk management/policy decision to introduce
309 these CCPs, probably because it was deemed inappropriate not to have any CCP in a HACCP plan. As
310 such, the EFSA opinion actually rectifies this mix-up between PRPs and CCPs. This illustrates that we
311 have to pay attention that, although in some cases some flexibility and simplification in the
312 implementation of FSMS is necessary, we do not lose track of the fundamental HACCP-principles
313 behind it.

314

315 **3.1.4. Comparison approach to manage prerequisite programs**

316 The EFSA opinion (EFSA_BIOHAZ, 2017) provides a summary of pre requisite activities including the
317 12 defined PRPs from the Commission Notice (EC., 2016) and an additional PRP ‘product information
318 and consumer awareness’. Furthermore, the activities, monitoring, extent of record keeping and
319 corrective actions are specified for each of the PRPs. As an example, a comparison is made of
320 requirements in the EFSA opinion with the national guides to good practice for PRP 2 ‘Cleaning and
321 Disinfection’ and PRP 11 ‘Temperature control of storage environment’ in Table 3. Table 3 shows that
322 for cleaning and disinfection the EFSA opinion introduces a change with respect to monitoring
323 activities for both UK and Belgian butchers (following the national guides), as EFSA proposes a
324 monthly microbiological check of cleaning and disinfection. With respect to temperature control,
325 mainly the Belgian butchers will be affected, as according to the Belgian guide registration was only
326 necessary in case of non-compliance, whereas the EFSA opinion proposes to keep records for each
327 monitoring. This does not introduce changes for UK butchers.

328 An additional PRP ‘product information and customer awareness’ (PRP 13) is proposed in the EFSA
329 opinion (EFSA_BIOHAZ, 2017), which makes the set of PRPs for small scale retail shops more
330 complete. However, the Belgian butchers are already required to inform the consumer written or
331 orally about the conditions of use, storage conditions, shelf life, presence of allergens etc. Moreover,
332 they should keep a written statement in the store stating that allergen information can be requested.
333 In the UK, the information given is limited to allergen and shelf life information. Awareness about the
334 role and responsibility of the consumer in managing food safety is emerging in the last decade
335 (Mensah & Julien, 2011). Consumer complacency on food hygiene is a major source of food-borne
336 illnesses (Redmond & Griffith, 2003). Expecting butchers to provide each customer all the required
337 information, might be an impossible task during peak hours. Considering this as a responsibility of
338 butcher might also increase complacency from consumers. Increasing the awareness of the
339 consumer requires effort, but would be an important strategy. Awareness campaigns, posters in the
340 shop illustrating ‘proper handling of meat, storage conditions’ could be complementary to achieve
341 the goal of this prerequisite (De Boeck et al., 2016).

342 3.2 Objective 2: Results for butchers' perceptions

343 3.2.1 Opinion about changes in simplified hazard analysis approach

344 For Belgium, the first two steps of hazard analysis do not induce changes compared to the current
345 requirements as explained earlier (see 3.1). However, the third step 'hazard ranking', is removed in
346 the simplified hazard analysis approach according to the EFSA opinion (EFSA_BIOHAZ, 2017). The
347 opinion of Belgian butchers about this change was asked (see Appendix A). None of the Belgian
348 butchers were against this proposal. Nine butchers of the ten were positive. Generally, they found it
349 would be easier to understand, less technical and less complicated, but they were mostly aware that
350 it would not affect them in their daily routine. In practice, no major changes will occur for the Belgian
351 butchers, due to the fact that the Belgian guide provides a pre-developed ready-to-use HACCP-table.
352 It is sufficient for the small retailers to keep the guide in the butcher shop and to consult it when
353 necessary. This guide replaces also the documentation for procedures based on HACCP principles.
354 Even though, it would not be a big change in practice, a less complex HACCP-table is certainly
355 appreciated by the butchers. For UK butchers, no questions were asked concerning the simplified
356 hazard analysis approach as it does not introduce changes. It is remarkable that the simplified hazard
357 analysis approach proposed by EFSA does not introduce big changes in practice for both UK and
358 Belgium regarding hazard analysis. Most probably because the existing guidelines already simplified
359 the HACCP-principles for them.

360 3.2.2 Opinion about changes in prerequisite requirements

361 Figure 1 represents web diagrams with the percentage of positive, negative and neutral opinions by
362 the Belgian (right) and UK (left) butchers. Belgian and UK butchers, using different guides, might
363 experience the proposal in governing PRPs differently. As the butchers' opinion is only asked about
364 PRPs which introduce changes compared with the requirements described in the guide, more points
365 are indicated in the web diagram showing the results of the UK butchers' opinion than in the web
366 diagram referring to the Belgian butchers' opinion (Figure 1).

367 The UK butchers were generally more positive about the introduced changes related to the
368 facilitation of the record keeping requirement. Although this should introduce changes as workload
369 would be expected to decrease, in practice, some of the butchers were already deviating from the
370 prescriptions in the current guide. The proposal by EFSA to check visually cleaning and disinfection
371 each day (Table 3 and PRP 2 (M) in Figure 1) is in both Member States (UK and Belgium) already the
372 case in practice. The UK and Belgian butchers were both aware of the importance of cleaning and
373 disinfection and do the daily check spontaneously although it is not required in the guide. This
374 explains why most butchers (UK: 80% and Belgium: 100%) were positive about this change (Figure
375 1).

376 Both UK and Belgian butchers perceived some of the changes as neutral. These changes are mostly
377 related to proposals introducing higher frequency of monitoring for the Belgian butchers. The
378 majority (>50%) of the Belgian butchers were neutral about the proposal of a weekly check of the
379 pests (PRP 3, 60%) and a continuous monitoring of the equipment (PRP 4a, 60%). They were neutral
380 about the requirement of a monthly visual check of the infrastructure (PRP 1, 70%), which is now
381 recommended but not mandatory. Respondents with neutral responses claimed that this has
382 become a routine. The UK butchers were mainly neutral about proposals introducing record keeping
383 by exception. This is the case for PRP 1 'Infrastructure: building and equipment' (60%), PRP 2
384 'Cleaning and disinfection' (50%) and PRP 5 'physical and chemical contamination from the
385 production environment' (60%). The same reason holds as for the Belgian butchers with neutral
386 responses: they did not consider it a big effort to fill out the check list, as this is considered a routine.
387 Attention should be paid to the requirements experienced negatively by the butchers. In both cases
388 the introduction of the requirement of 'monthly microbiological tests' to check cleaning and
389 disinfection (Table 3 and PRP 2 on Figure 1) is rejected by all the Belgian butchers (n=10) and by 60%
390 of the UK butchers. The issue here is mostly cost of these analyses. Moreover, lack of expertise and
391 knowledge in food safety and hygiene could hinder correct interpretation of lab results and putting in
392 place suitable corrective actions. Taylor (2001) states that small businesses often consider food
393 safety as a public good and that associated costs should be paid by government or other agencies. As
394 these challenges (such as lack of expertise) also hold for other types of small food establishments,
395 further research is advised to investigate perceptions experienced by these other types of small food
396 establishments within the scope of the EFSA opinions. Still, for other changes in prerequisite
397 requirements most UK butchers (<50%) did not negatively experience the proposal by EFSA. So, it can
398 be concluded that the UK butchers are in general not negative about the proposals of EFSA
399 concerning the PRPs. On the contrary, most Belgian butchers (>50%) were negative about four
400 additional changes, i.e. the record keeping requirements for PRP 1 (R) (70%), periodic (daily/weekly)
401 check of the calibration PRP 4b (M) (70%), 'record keeping only when there is remedial work required
402 for physical and chemical contamination of production environment' for PRP 5 (R) (70%) and the
403 'record keeping requirement for all the controls of the temperature' PRP 11 (R) (60% in Figure 1 and
404 see also Table 3). For these prerequisites bigger changes and higher workloads are introduced for
405 Belgian butchers and less or none for UK butchers. For PRP 5, currently, measures to prevent
406 physical and chemical contamination are extensively described in the Belgian guide, without the
407 requirement of record keeping. The supervisor should control the compliance of these requirements.
408 In practice, all the butchers are doing this unconsciously. This PRP also overlaps with other PRPs like
409 pest control (PRP 3), cleaning and disinfection (PRP2) etc. According to the Belgian butchers, this
410 would be time-consuming and unnecessary. On the contrary, for UK, the butcher (supervisor) should

411 tick the box after control and register the corrective action taken. EFSA proposes to write down only
412 the corrective actions taken. That explains why the majority (n=6) is neutral about the change, as
413 they were already registering this. Four of them are more positive stating that the change would
414 make work easier. With regard to PRP 11, the majority of Belgian butchers (n=6) only record non-
415 conformities in temperature, which is required by the current butcher guide. The other four butchers
416 have an automated monitoring with alarm and continuous record keeping. For the latter butchers,
417 there is no extra burden due to the proposal of recording all temperature checks, but for the other 6
418 butchers this is negatively perceived as this would be very time-consuming. For UK butchers, again,
419 no changes are introduced with their current practice as this is already required.

420 **4.Limitations of the research and further developments**

421 This research only focused on butcher shops, whereas the EFSA opinion (EFSA_BIOHAZ, 2017)
422 concerns five types of small retail businesses (butcher, grocery, bakery, fish and ice cream shop)
423 established in the European Union. The other establishments could be affected differently or could
424 have different opinions about the proposals, which is not taken into account in this research. Also,
425 the opinion concerns all the Member States whereas in this research only Belgium and the UK are
426 considered. National (food safety) culture differences might have an impact on perceptions
427 concerning the proposals raised in the EFSA opinion. Moreover, food business operators in Member
428 States where no such guides to good practice exist, might respond differently than food business
429 operators from Member States providing national guides. Further research including other Member
430 States, could provide insights in these national differences. Also, the document comparison was only
431 performed for two freely available guides in UK (Safe Food Handlings for Butchers' (FSA, 2012) and
432 'ButcherSafe' (Food_Standards_Scotland, 2013)), whereas in UK more guides are available (against
433 payment).

434 Moreover, because of the limited sample size of ten butchers in each country and the voluntary
435 participation of the butchers, this sample is not representative for all the butchers in Belgium and the
436 UK. However, the low sample does allow more in depth-interviews. During the face-to-face
437 interview, further explanation of the proposals was possible, which gives a high input quality in
438 contrast to a survey with higher response rate.

439 It should be noted that, in 2018, a second EFSA scientific opinion was published: Hazard analysis
440 approaches for certain small retail establishments and food donations: second scientific opinion
441 (EFSA_BIOHAZ, 2018). The aim of this opinion is to develop a similar approach for other small retail
442 establishment including retail distribution centres, supermarkets, restaurants and food donation. In a
443 lot of these retail establishments limited resources are available and staff turnover is high, posing
444 challenges towards building and keeping knowledge and expertise regarding food safety and hygiene

445 (De Boeck et al., 2017). Especially for food donation at retail level novel food safety challenges are
446 presented, as many actors are involved in the food donation/acceptation chain and as the donated
447 food may be near to the end of its shelf life (EFSA_BIOHAZ, 2018). This second scientific opinion was
448 not included in this research.

449 5. Conclusion

450 In this research the added value of the EFSA opinion (EFSA_BIOHAZ, 2017) is evaluated. With respect
451 to objective 1 (document review), it can be stated that the formulation of conditions for flexibilities
452 in the EFSA opinion could lead to difficulties in interpretation among different Member States.

453 Looking at the hazard analysis approach, it can be concluded that for the case of the UK, the hazard
454 analysis approach of the two concerned UK guides to good practice is similar to the simplified
455 approach proposed by EFSA, as the general and specific hazards are also merged and hazards are not
456 ranked. In contrast, the Belgian guide does rank the hazards and identifies CCPs for the preparation
457 and selling of fresh meat, minced meat and meat preparations. With regard to documentation and
458 requirements related to PRPs, it can be stated that by specifying PRPs and related activities on
459 European level, the first steps towards harmonization of the verification requirements related to the
460 PRPs in establishments profiting from flexibilities have been taken.

461 With respect to objective 2 regarding the perceptions of 10 butchers from Belgium and 10 butchers
462 from UK ~~With respect to objective 2 regarding the perceptions of 10 butchers from Belgium and 10~~
463 ~~butchers from UK~~, the hazard analysis approach and the thirteen PRPs proposed by EFSA, are
464 generally positively experienced by the butchers. However, it is recommended in this research to
465 reconsider the few proposals negatively experienced by the butchers (e.g. monthly microbiological
466 analysis). Nevertheless, simplifying the requirements is only possible to a certain point as flexibility
467 may not pose risks to food safety.

468

469

470 REFERENCES

471 CAC. (2003). General Principles of Food Hygiene, C.A. Commission, CAC/RCP 1-1969.
472 <http://www.fao.org/fao-who-codexalimentarius/codex-texts/all-standards/en/>, last accessed
473 on the 22nd of June 2019.

474 De Boeck, E., Jacxsens, L., Bollaerts, M., Uyttendaele, M., & Vlerick, P. (2016). Interplay between food
475 safety climate, food safety management system and microbiological hygiene in farm
476 butcheries and affiliated butcher shops. *Food Control*, 65, 78-91.

477 De Boeck, E., Jacxsens, L., Goubert, H., & Uyttendaele, M. (2017). Ensuring food safety in food
478 donations: Case study of the Belgian donation/acceptation chain. *Food Research*
479 *International*, 100, 137-149. Retrieved from <Go to ISI>://WOS:000413128800015.
480 doi:10.1016/j.foodres.2017.08.046

481 EC. (2004a). Regulation No 852/2004 of the European Parliament and of the Council of 29 April 2004
482 on the hygiene of foodstuffs. *Official Journal of the European Union*, L139, 1-54.

483 EC. (2004b). Regulation No 853/2004 of the European Parliament and of the Council of 29 April 2004
484 laying down specific hygiene rules for food of animal origin. *Official Journal of the European*
485 *Union*, L226, 22-82.

486 EC. (2004c). Regulation No 854/2004 laying down specific rules for the organisation of official controls
487 on products of animal origin intended for human consumption. *Official Journal of the*
488 *European Union*, L226, 83-127.

489 EC. (2016). Commission Notice on the implementation of food safety management systems covering
490 prerequisite programs (PRPs) and procedures based on the HACCP principles, including the
491 facilitation/flexibility of the implementation in certain food businesses. *Official Journal of the*
492 *European Union*, C278/271-C278/232.

493 EC. (2017). Guides to good practice, [https://ec.europa.eu/food/safety/animal-feed/feed-](https://ec.europa.eu/food/safety/animal-feed/feed-hygiene/guides-good-practice_en)
494 [hygiene/guides-good-practice_en](https://ec.europa.eu/food/safety/animal-feed/feed-hygiene/guides-good-practice_en), accessed on the 15th of June 2017.

495 EFSA_and_ECDC. (2017). The European Union summary report on trends and sources of zoonoses,
496 zoonotic agents and food-borne outbreaks in 2016. *EFSA Journal*, 15(12), 5077.

497 EFSA_BIOHAZ. (2017). Scientific Opinion: Hazard analysis approaches for certain small retail
498 establishments in view of the application of their food safety management systems. *EFSA*
499 *Journal*, 15 (3), 4697. doi:10.2903/j.efsa.2017.4697

500 EFSA_BIOHAZ. (2018). Hazard analysis approaches for certain small retail establishments and food
501 donations: second scientific opinion. *EFSA Journal*, 16(11), 5432.

502 FASFC. (2013). Ministerial Decree 22/03/2013: Ministerieel besluit betreffende de versoepeling van
503 de toepassingsmodaliteiten van de autocontrole en de traceerbaarheid in sommige
504 inrichtingen in de voedselketen. *Belgisch Staatsblad 05-04-2013*, 2013018181, 21351-21354.

505 FASFC. (2015). Guide for autocontrol in the butchery-butcher shop (G-003-Version 2).
506 <http://www.favv.be/autocontrole-nl/gidsen/distributie/g003/>, accessed on the 5th of July
507 2017.

508 FASFC. (2017). Self-checking guides, <http://www.favv.be/autocontrole-nl/gidsen/>, accessed on the
509 15th of June 2017.

510 FASFC. (2018). Quick start fiches. <http://www.favv.be/autocontrole-nl/gidsen/qs fiches/default.asp>,
511 last accessed on the 3rd of February 2018.

512 Food_Standards_Scotland. (2013). *ButcherSafe, Food Safety Assurance System*.
513 [http://www.foodstandards.gov.scot/downloads/ButcherSafe -](http://www.foodstandards.gov.scot/downloads/ButcherSafe_-_Full_PDF_Manual_with_FSS_logo.pdf)
514 [Full PDF Manual with FSS logo.pdf](http://www.foodstandards.gov.scot/downloads/ButcherSafe_-_Full_PDF_Manual_with_FSS_logo.pdf), last accessed on the 20th of July 2018: TSO.

515 FSA. (2012). *Safe food handling for butchers*. [https://acss.food.gov.uk/sites/default/files/butchers-](https://acss.food.gov.uk/sites/default/files/butchers-haccp.pdf)
516 [haccp.pdf](https://acss.food.gov.uk/sites/default/files/butchers-haccp.pdf), last accessed on the 2nd of August 2018.

517 FSA. (2013). Food hygiene - a guide for businesses. FSA/1690/0613.
518 <https://www.rushmoor.gov.uk/CHttpHandler.ashx?id=15972&p=0>, last accessed on the 1st
519 of August 2018.

520 FSA. (2019). Safer Food Better Business fact sheets. [https://www.food.gov.uk/business-](https://www.food.gov.uk/business-guidance/safer-food-better-business)
521 [guidance/safer-food-better-business](https://www.food.gov.uk/business-guidance/safer-food-better-business), last accessed on the 3rd of July 2019.

522 FVO. (2015). Overview Report: Better HACCP implementation. Luxembourg: Publications Office of the
523 European Union. ISBN 978-92-79-43526-3. doi:10.2772/59374. 44 pp.

524 Latronico, F., Correia, S., Felicio, T. D., Hempen, M., Messens, W., Ortiz-Pelaez, A., . . . Hugas, M.
525 (2017). Challenges and prospects of the European Food Safety Authority biological hazards
526 risk assessments for food safety. *Current Opinion in Food Science*, 18, 50-55. Retrieved from
527 <Go to ISI>://WOS:000417079000009. doi:10.1016/j.cofs.2017.10.013

528 Mensah, L. D., & Julien, D. (2011). Implementation of food safety management systems in the UK.
529 *Food Control*, 22, 1216-1225.

530 MTC. (2016). HACCP review and guidance manual for retail butchers.
531 [https://www.foodtraining.org.uk/wp-content/uploads/2016/11/Haccp-Review-and-](https://www.foodtraining.org.uk/wp-content/uploads/2016/11/Haccp-Review-and-Guidance-MAnnual-order-form-V3-5-12-16.pdf)
532 [Guidance-MAnnual-order-form-V3-5-12-16.pdf](https://www.foodtraining.org.uk/wp-content/uploads/2016/11/Haccp-Review-and-Guidance-MAnnual-order-form-V3-5-12-16.pdf), last accessed on the 3rd of August 2018.

533 Panisello, P. J., & Quantick, P. C. (2001). Technical barriers to Hazard Analysis Critical Control Point
534 (HACCP). *Food Control*, 12(3), 165-173. Retrieved from <Go to ISI>://WOS:000168160200004.
535 doi:10.1016/s0956-7135(00)00035-9
536 Redmond, E. C., & Griffith, C. J. (2003). Consumer food handling in the home: A review of food safety
537 studies. *Journal of Food Protection*, 66(1), 130-161. Retrieved from <Go to
538 ISI>://WOS:000180383000021.
539 Taylor, E. (2001). HACCP in small companies: benefit or burden? *Food Control*, 12(4), 217-222.
540 Retrieved from <Go to ISI>://WOS:000168605700005. doi:10.1016/s0956-7135(00)00043-8
541

Table 1: Comparison of conditions for flexibilities according to the EFSA opinion (EFSA_BIOHAZ, 2017), the national guide to good practice in Belgium (FASFC, 2015) and the guides in UK (Food_Standards_Scotland, 2013; FSA, 2012)

EFSA	<p>a) The small retail establishments (butcher, grocery, bakery, fish and ice cream shops) covered are typically 'micro' business.</p> <p>b) The size of micro businesses is defined as having less than 10 employees (but in many cases, may have as few as two to three employees), with a turnover or balance sheet total of €2 million or less.</p> <p>c) The nature of micro businesses is defined by the qualities they generally share: They serve local customers; have a limited share of the available market; are owned by one person, or by a small group of people; are managed by their owners who deal with all management issues, usually with little other help; they are independent businesses not parts of, or owned by, larger companies.</p> <p>e) In the flowchart for butcher shops it can be derived that the production of meat products is out of the scope.</p>
BE	<p>a) Delivers only to the final consumer (B2C); or</p> <p>b) Deliveries limited up to maximum 30% of the sales within a radius of 80 km; or</p> <p>c) Maximum of two organisations belong to the same operator as the one delivering*. *Delivered organisations: only B2C or comply with conditions mentioned in a) and b)</p> <p>d) Establishments where only 2 full-time equivalents are employed and deliveries do not meet the conditions mentioned in b) and c).</p> <p>e) Establishments that handle and process meat</p>
UK	<p>A butcher supplying retailers as well as final consumers from his own premises, may be exempt from approval as a cutting plant if the wholesale element of the business is 'marginal, localized and restricted' exemption</p> <p>a) Marginal: supply of food of animal origin: (a) up to a quarter of the business (25%) (in terms of food); or (b) in relation to: fresh or processed meat, (but not wild game meat) up to 2 tonnes a week, subject to the establishment having a genuine retail outlet supplying the final consumer with part of its production of meat;</p> <p>b) Localised: supply of food of animal origin within the supplying establishment's own county plus the greater of either the neighbouring county or counties or 50 km/30 miles from the boundary of the supplying establishment's county;</p> <p>c) Restricted: supply of food of animal origin is limited to certain types of products or establishments. In the meat sector, the restrictions are in relation to the amounts of meat supplied and the requirement for a 'genuine' retail outlet (see 'marginal' above).</p>

EFSA_BIOHAZ. (2017). Scientific Opinion: Hazard analysis approaches for certain small retail establishments in view of the application of their food safety management systems. *EFSA Journal*, 15.

FASFC. (2015). Guide for autocontrol in the butchery-butcher shop (G-003-Version 2). <http://www.favv.be/autocontrole-nl/gidsen/distributie/g003/>, accessed on the 5th of July 2017.

Food_Standards_Scotland. (2013). *ButcherSafe, Food Safety Assurance System*. [http://www.foodstandards.gov.scot/downloads/ButcherSafe - Full PDF Manual with FSS logo.pdf](http://www.foodstandards.gov.scot/downloads/ButcherSafe_-_Full_PDF_Manual_with_FSS_logo.pdf), last accessed on the 20th of July 2018: TSO.

FSA. (2012). *Safe food handling for butchers*. <https://acss.food.gov.uk/sites/default/files/butchers-haccp.pdf>, last access on the 2nd of August 2018.

Table 2: Comparison of the simplified hazard analysis approaches proposed by EFSA (EFSA BIOHAZ, 2017) with the current European hygiene legislation (EU Reg. 852/2004) and with the current guides to good practice used in Belgium and UK for butcher shops. In case in these documents, a difference was noticed with the EFSA opinion, this was highlighted in bold. In case a difference was noticed with the EFSA opinion, this was highlighted in bold. The differences introduced by EFSA are highlighted in bold.

Approach	1 - Stage identification	2 - Hazard identification	3 - Hazard ranking
Simplified Approach proposed in EFSA opinion (EFSA_BIOHAZ, 2017)	<ul style="list-style-type: none"> - Flow diagrams to provide an overview of the different stages. - Detailed description of the activities at each stage not required. - General flow diagram is provided for five target retail establishments. 	<ul style="list-style-type: none"> - The hazards are simply grouped as 'biological', 'chemical', 'physical' or 'allergen'. Sufficient to know the most relevant 'groups of hazards' - Structured questionnaire and Ishikawa diagram provided to identify activities contributing to an increased/ decreased occurrence of the hazard 	<ul style="list-style-type: none"> - Hazard ranking is not required for the five-target small food retail establishments. - The hazards that might occur, most efficiently controlled using PRPs.
Classical Approach mentioned in EFSA opinion (EU Reg. 852/2004)	<ul style="list-style-type: none"> - Flow diagrams summarising the different stages are given. All incoming streams and all outgoing streams are included. - Each stage is accompanied by a short description of the activities and A floor plan is required. 	<ul style="list-style-type: none"> - All relevant hazards (biological, chemical, physical and allergens) that may occur at each stage need to be identified. - Responsible person should know detailed and hazard-specific information. 	<ul style="list-style-type: none"> - Qualitative, semi-quantitative or quantitative methods can be used to rank the hazards.
Commission Notice (2016/C 278/01) without flexibilities	<ul style="list-style-type: none"> - Extensive flow diagrams including all processes from receiving the raw materials to placing the end product on the market. - Each stage is accompanied by a description of the activities (incl. delays during or between steps, etc.) 	<ul style="list-style-type: none"> - All relevant specific hazards (biological, chemical, physical and allergens) at each stage need to be identified. - Responsible person should know detailed and hazard-specific information. 	<ul style="list-style-type: none"> - Decision tree and/or semi-quantitative risk evaluation methods can be used to rank the hazards.
Commission Notice (2016/C 278/01) with flexibilities	<ul style="list-style-type: none"> - Flow diagram can be very simple. - Similar products can be grouped. 	<ul style="list-style-type: none"> - Pre-determination of the hazards by providing a general HACCP guide or perform a general hazard analysis is recommended. - Detailed description of the nature of the hazards is not required. 	<ul style="list-style-type: none"> - Simplified decision trees and/or simplified semi-quantitative risk evaluation methods can be used to rank the hazards.
Guide BE (FASFC, 2015)	<ul style="list-style-type: none"> - Flow diagrams are provided in the guide for each type of product. (Fresh meat, minced meat, meat preparations etc.) - No detailed description at each stage required. 	<ul style="list-style-type: none"> - Hazard identification is done. - Hazards are grouped as 'biological', 'chemical', 'physical' or 'allergen'. - Activities contributing to an increased/ decreased occurrence of the hazard are also determined. 	<ul style="list-style-type: none"> - Hazard ranking is done for each hazard. - There are CCPs determined. - Control measures are allocated to the hazards.
Guide UK ButcherSafe (Food_Standards_Scotland, 2013)	<ul style="list-style-type: none"> - In the introduction, a general simplified diagram is shown but does not have all the process steps. - Hazard analysis is based on the PRPs (exclusive of : PRP 8 & 12) and not on the stages of the flow diagram. 	<ul style="list-style-type: none"> - For each PRP, hazards are identified. - Hazards are grouped as 'microbiological', 'physical' and 'chemical'. - Short description is given, but not detailed. Pathogens are called harmful bacteria and not by their species name. - Allergens are handled separately. 	<ul style="list-style-type: none"> - No systematic hazard ranking step involved. - In the introduction, a definition is given for CCPs and these are defined as controls critical for food safety. - The house rules (PRPs) are considered as critical controls, which should be accompanied by control measures, monitoring activities, corrective actions and record keeping.

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Table 2: Comparison of the simplified hazard analysis approaches proposed by EFSA (EFSA BIOHAZ, 2017) with the current European hygiene legislation (EU Reg. 852/2004) and with the current guides to good practice used in Belgium and UK for butcher shops. In case in these documents, a difference was noticed with the EFSA opinion simplified approach, this was highlighted in bold. In case a difference was noticed with the EFSA opinion, this was highlighted in bold. The differences introduced by EFSA are highlighted in bold.

<p>Guide UK Safe Food Handling for Butchers (FSA, 2012)</p>	<p>- All possible steps in butchery operations are mentioned. The butchers have to tick the box for the applicable steps.</p>	<p>- Microbiological hazards are identified at each step. - Chemical and physical contamination and allergens are handled separately. - Hazards are not specified into detail. Microbiological hazards are just called food poisoning bacteria.</p>	<p>- No systematic hazard ranking step. In the introduction, CCPs are defined as most important points where things can go wrong. - Every hazard is linked to control, monitoring, record keeping and corrective actions, and subsequently considered as CCP.</p>
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FASFC. (2015). Guide for autocontrol in the butchery-butcher shop (G-003-Version 2). <http://www.favv.be/autocontrole-nl/gidsen/distributie/g003/>, accessed on the 5th of July 2017.

Food_Standards_Scotland. (2013). *ButcherSafe, Food Safety Assurance System*. [http://www.foodstandards.gov.scot/downloads/ButcherSafe - Full PDF Manual with FSS logo.pdf](http://www.foodstandards.gov.scot/downloads/ButcherSafe_-_Full_PDF_Manual_with_FSS_logo.pdf), last accessed on the 20th of July 2018: TSO.

FSA. (2012). *Safe food handling for butchers*. <https://acss.food.gov.uk/sites/default/files/butchers-haccp.pdf>, last accest on the 2nd of August 2018.

Table 3

Table 3: Comparison of requirements for Prerequisite program 'cleaning and disinfection' and 'temperature control of storage environment' described in the guides to good practice of Belgium and the UK with requirements proposed in EFSA opinion (EFSA_BIOHAZ, 2017). ~~Changes (compared to requirements in the guides) are highlighted in bold~~

PRPs		infrastructure/activities	Monitoring	Record keeping	Corrective actions
PRP 2: Cleaning and Disinfection	EFSA opinion	Cleaning and disinfection schedule and/or 'clean as you go' policy	Spot visual checks Daily visual checks Monthly microbiological testing	Yes, when there is a non-compliance	Cleaning and disinfection of area/equipment affected; Review and if necessary retrain staff and/or revise frequency and method of disinfection
	Guide BE	Cleaning and disinfection schedule Procedure for cleaning machines	Supervisor control Monthly (or customized frequency by company size, identified issues etc.) Microbiological testing, if the butcher wants to know the microbiological count of the disinfected surface	Yes, each time (Not mandatory)	Revision of applied methods and procedures; Training staff; Revise the frequency; Personnel hygiene, Clean and disinfect again; Cut off contaminated part
	Guide UK ButcherSafe	Cleaning and disinfection schedule	Regularly check (Weekly/ Fortnightly)	Yes, each time	Should be filled in by the butcher (few examples given)
	Guide UK Safe Food Handling for Butchers	Cleaning and disinfection schedule and Clean as you go	Supervise cleaning regularly (5x a week)	Yes, each time	Not defined
PRP 11: Temperature control of storage environment	EFSA opinion	Temperature of storage environment (cooling or deep freezing) is adequate to reach product temperature requirements	Automatic monitoring with alarm and automated record keeping; Manual monitoring/ daily check or more checks of the temperature of storage facilities and product	Yes, each monitoring, where the control activity is based on quantifiable parameters such as temperature (e.g. chilling and cooking)	Replace/repair/reset chilling/ freezing equipment Based on the extent of the non-compliance consider disposal of the affected product
	Guide BE	Required storage temperature of different products are specified in guide;	Daily check the temperature of the storage facilities Routine checks of product temperature Equip freezers (>10 m ³) with automatic temperature recording devices	Yes, but only when there is a non-compliance	Bring the meat below the required temperature or apply it to heated meat products if safety is guaranteed (if not: destruction) Adjust the thermostat; Defrost cooling element; Call refrigeration engineer
	Guide UK ButcherSafe	Store and prepare meat at sufficient low cooling (5°C or below) temperature	Recommended twice daily check all refrigerator, chill and cold display cabinet temperatures	Yes, each monitoring	Should be filled in by the butchers
	Guide UK Safe Food Handling for Butchers	Temperature of storage environment is adequate to reach product temperature requirements.	Check the temperature at least once per day, some businesses may wish to control more frequently	Yes, each monitoring	Store correctly to avoid cross-contamination Dispose food;

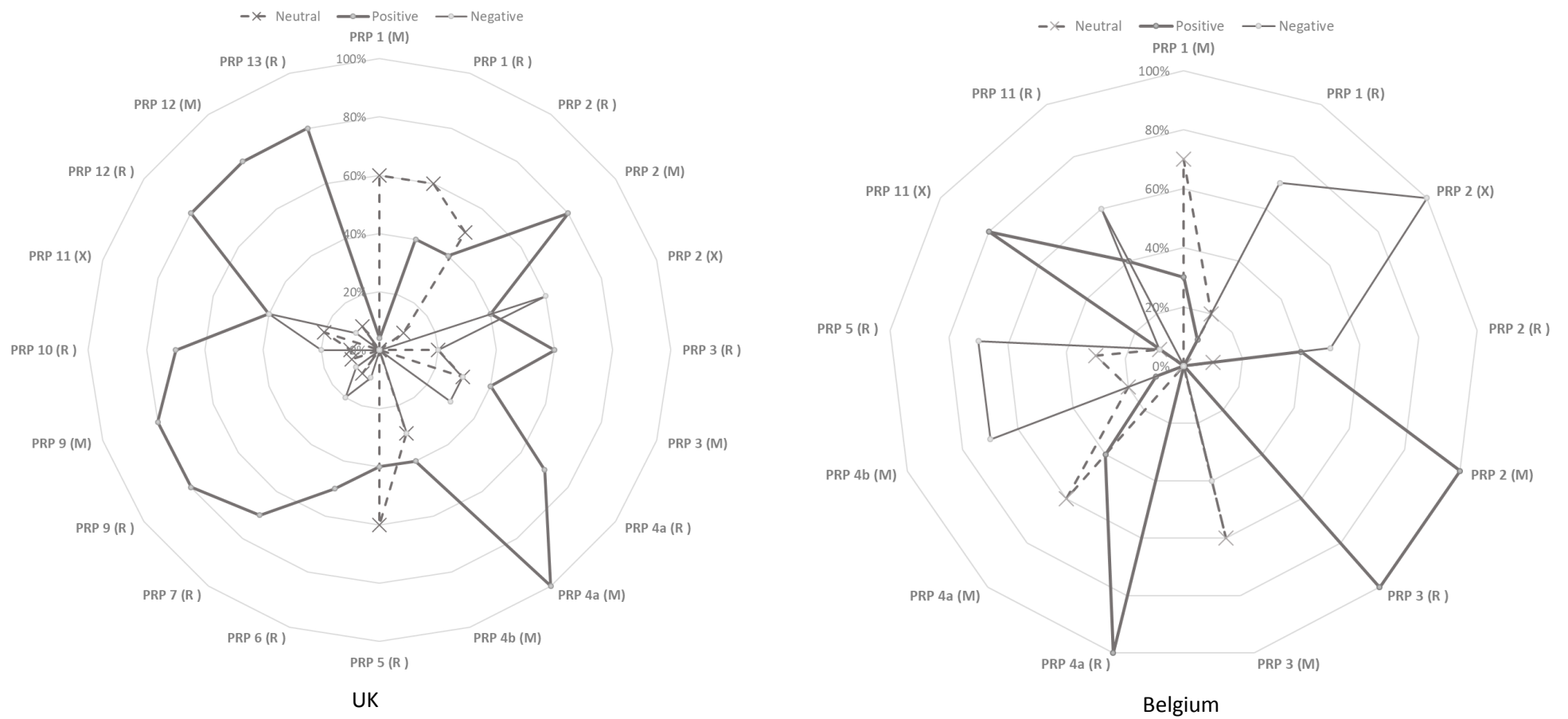
Figure 1 caption

Figure 1: Web diagrams with the percentage of **A: positive, negative and neutral** opinions **or B: negative** opinions of the UK butchers (n=10, left) and Belgian butchers (n=10, right) for the changes in **PRP-prerequisite** requirements introduced by the EFSA opinion (EFSA_BIOHAZ, 2017). Only requirements changed by the EFSA opinion are displayed, therefore less PRPs are indicated for the web of the UK butchers. R stands for requirements related to record keeping, M for monitoring requirements, PRP2(X) for monthly microbiological testing and PRP11(X) for Automatic monitoring with alarm and automated record keeping

Field Code Changed

EFSA_BIOHAZ. (2017). Scientific Opinion: Hazard analysis approaches for certain small retail establishments in view of the application of their food safety management systems. *EFSA Journal*, 15.

Figure 1



PRP 1: infrastructure, PRP 2: cleaning and disinfection, PRP 3: Pest control, PRP 4: Technical maintenance(a) and calibration(b), PRP 5: Physical and chemical contamination from production environment, PRP 6: Allergens, PRP 7: Waste management, PRP 8: Water and air (not included, as normal potable water is used), PRP 9: Personnel, PRP 10: Raw materials, RPR11: Temperature Control of Storage Environment, PRP 12: Working methodology, PRP 13: Product Information and Consumer Awareness

*Highlights (for review)

- EFSA BIOHAZ panel proposed a simplified approach in food safety management
- The approach applies to small retail businesses such as small independent butcheries
- A critical review of the EFSA opinion is performed
- The opinion of butchers in Lancashire, UK and Flanders, Belgium is investigated
- The approach will advance butchers in a positive way and help harmonize flexibilities

Conflict of Interest and Authorship Confirmation Form

Please check the following as appropriate:

- All authors have participated in (a) conception and design, or analysis and interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version.
- This manuscript has not been submitted to, nor is under review at, another journal or other publishing venue.
- The authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the manuscript
- The following authors have ~~affiliations with organizations with direct or indirect financial interest in the subject matter discussed in the manuscript:~~

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Appendix A:

1) Questionnaire UK (Opinion about EFSA proposals)

General questions

1. How many years of experience do you have?
2. How much employees do you have?
3. Are you using a guide for food safety management systems in butcher shops? Yes / No
- (If yes) Which one are you using?
- (If no) How do you get the right information concerning food safety management systems?
4. Are you a member of an organisation for butcheries which guides you through the implementation of the food safety management system? Yes / No
- (If yes) Which organisation?

In order to help small butchers to implement a good-working food safety system, a simpler approach at European level is in the making. The European Commission has called on EFSA, their scientific advisory body, to elaborate this. Now, I will ask you some questions and try to determine to what extent this approach will help you, as a butcher, move forward.

Conditions for flexibilities

5. Do you supply only to the final consumer? Yes/ No
- (If no) Does the supply to other establishments exceed a quarter of your production? Yes/ No
- (If yes) Does the supply to other establishments exceed 2 tonnes a week? Yes/ No
6. Are the supplied establishments localised (within 30 miles from the boundary of supplying establishment's county)? Yes/ No

If the conditions are not met, the interview ends. The butcher shop has to be eligible for the flexibilities.

7. Are you making meat products by yourself? Yes/ No
- The simplified approach is only applicable for fresh meat, meat preparations and not for meat products. So, the current system must be followed for meat products.*

Hazard analysis approach

8. Do you know what a HACCP-plan is? Yes/ No
9. Is the HACCP-plan premade in the guide? Yes/ No
10. Are the hazards ranked as CCP, CP and PRP? Yes/ No
11. Are the hazards determined at each step? Yes/ No
12. Are there CCPs determined (in the guide)? Yes/ No
13. Are the CCPs monitored and recorded? Yes/No

In the new approach, a simpler table is proposed to replace the current HACCP-plan. In this plan, no CCPs are included. The hazards should be controlled with hygiene practices. So, there is no distinction anymore between the practices in terms of CCPs, control points and hygiene practices. (Hazard ranking is removed.)

14. Would this help you?

Control activities

15. Do you have a **temperature logger** with alarm and automated record keeping? Yes/ No
- Automatic monitoring with alarm and automatic record keeping is recommended.*

16. Are you prepared to get one in your premise?
17. Do you fill in a **delivering** checklist each time? Yes/ No

EFSA proposes only recording when there is a non-compliance

18. Would these changes help you and ease your work?
19. Do you **calibrate** the thermometer and other measuring devices? Yes/No
20. In which frequency?
21. Do you record the status of the calibration each time? Yes/NO

EFSA proposed to control the status of calibration more frequent, namely weekly or even daily (+ o -). Record keeping by each control is required. Temperature is a main parameter which should be on point. That is the reason why the requirements of calibration are tightened.

22. What do you think about this proposal?

Supervisor control

23. Do you use a supervisor checklist? Yes/ No
24. In which frequency are you doing the supervisor check? Weekly/ Fortnightly/ Monthly/
25. Do you check each time the list and fill in the corrective actions taken? Yes/ No
26. Does the control the hygiene condition of the premise and equipment?
27. Does the supervisor checklist include checks whether the premises and equipment is in good condition? Yes/ No

EFSA proposes a monthly visual check of the hygiene and condition infrastructure with record keeping only when there is a non-compliance.

28. What do you think about this proposal?
29. Does the supervisor checklist include checks whether cleaning and disinfection has been carried out in the right way?
Yes/ No
- EFSA proposes a daily and spot control of the execution and a monthly microbiological testing.*
30. Are you positive about this proposal?
31. Does the supervisor checklist include checks on pest control? Yes/ No
32. Do you work with a specialised firm for pests? Yes/ No
- If yes, how frequent are they controlling?
- EFSA proposed a weekly pest-control without recording the corrective actions when taken.*
33. Would this change help you and ease your work?
34. How often is technical maintenance of the equipment done?
35. Do you keep documents to prove this? Yes/ No
- Continuous control with no documentation for technical maintenance is required in the new approach.*
36. What do you think about this proposal?
37. Does the supervisor control list include checks on physical and chemical contamination is from environment? Yes/
No
- EFSA propose check this during processing and monthly and only recording when remedial work is required.*
38. What do you think about this proposal?
39. Do you have allergens in your assortment? Yes/ No
- If yes; Does the supervisor checklist include checks on the requirements for allergens rules? Yes/ No
- EFSA proposes to remove the record keeping requirement.*
40. What do you think about this proposal?
41. Does the supervisor checklist include checks on waste control? Yes/ No
- EFSA proposed to remove the record keeping requirement.*
42. Would this change help you and ease your work?
43. Does the supervisor checklist include checks on personal hygiene of the staff including hand washing, clean clothes
etc.? Yes/ No
- EFSA proposes a daily visual check of the compliance on personal hygiene without record keeping.*
44. What do you think about these proposals?
45. Does the supervisor checklist include checks on working method? Yes/ No
- EFSA proposes a daily visual check of the compliance on working method of the staff without record keeping.*
46. Would these changes help you and ease your work?
47. Does the supervisor checklist include checks on the awareness and the practices of the staff concerning product
information (promote proper handling, storage and preparation by consumers, shelf life information and allergens)?
Yes/ No
- EFSA proposed to control the staff members whether they give sufficient information to the consumers without
recording the corrective actions. This control should not be recorded.*
48. What do you think of this proposal?

2) Questionnaire Belgium (Opinion about EFSA proposals)

Algemene organisatie

1. Hoeveel jaar ervaring heb je als slager?
2. Hoeveel medewerkers zijn er werkzaam in deze slagerij?
3. Zijn jullie aangesloten aan een bond of een organisatie die jullie begeleidt bij het uitvoeren van de hygiëneregels en het HACCP-plan? Ja / Neen.....

Zo ja, de welke?

4. Hoe blijft u op de hoogte van de veranderingen van de wetgeving van deze sector?
5. Maakt u gebruik van de autocontrole gids beenhouwerij-spekslagerij? Ja / Neen

Om kleine slagerijen zoals jullie verder te helpen bij het invoeren van een effectief voedselveiligheidssysteem wordt er op Europees niveau gewerkt aan een eenvoudigere aanpak. De Europese commissie heeft namelijk beroep gedaan op hun wetenschappelijk adviesorgaan EFSA om dit uit te werken. Nu ben ik verantwoordelijk om na te gaan in hoeverre deze aanpak jullie slagers zal vooruit helpen.

Versoepelingen

6. Wordt er enkel bediend aan de eindconsument of leveren jullie ook aan andere inrichtingen? Enkel B2C / Ook B2B
→ Indien vraag 6 "ook B2B"; Zijn de B2B activiteiten beperkt tot 30% van de omzet en binnen een straal van 80 km? Ja / Neen
→ Indien "Neen"; Zijn de B2B activiteiten beperkt tot het bevoorraden van maximaal 2 inrichtingen? Ja / Neen
(Inrichtingen leveren op hun beurt enkel aan de eindverbruiker ofwel max. 30% van hun omzet binnen een straal van 80 km leveren aan andere inrichtingen en behoren tot dezelfde operator als deze die levert.)
→ Indien "Neen"; Zijn er slechts twee voltijds equivalenten tewerkgesteld in de inrichting? Ja / Neen

7. Worden er vleesproducten, zoals worst en ham, gemaakt en verkocht? Ja / Neen

De aanpak van EFSA geldt enkel voor vers vlees, gehakt vlees en vleesbereidingen. Dus als de voorstellen van EFSA goedgekeurd zullen worden, zal u voor de verwerkte producten het huidige systeem moeten verder zetten.

Gevarenanalyse (HACCP)

8. Gebruikt u de HACCP-plan in de gids of heeft u er zelf een opgesteld?
9. Wordt er onderscheid gemaakt tussen de verschillende gevaren als CCP, PVA en GHP? Ja/ Neen

In het voorstel van EFSA wordt het HACCP-plan vervangen door een eenvoudiger tabel. Hierin worden weer de gevaren die in de slagerij kunnen optreden op voorhand gedefinieerd. Er wordt geen onderscheid meer gemaakt tussen CCP PVA en GHP. Alle gevaren worden beheerst m.b.v. goede praktijken.

10. Hoe zal u deze verandering ervaren?

BVP – Infrastructuur (gebouw en uitrusting)

11. Hoeveel keer per maand wordt er gecontroleerd op de orde en netheid van de inrichting en de uitrusting?
12. Wordt er daarbij telkens een controlelijst ingevuld? Ja / Neen

EFSA stelt voor om maandelijks een controle te houden en de controlelijst enkel in te vullen bij verbeteringsmaatregelen. Dus de registraties worden beperkt.

13. Zal dit u verder helpen?

BVP – Reiniging en ontsmetting

14. Hoeveel keer per maand wordt er gecontroleerd op de reiniging en ontsmetting van de omgeving en de uitrusting?
15. Wordt er daarbij telkens een controlelijst ingevuld? Ja / Neen

EFSA stelt voor om de controlelijst enkel in te vullen bij niet-naleving en deze controle dagelijks en steekproefsgewijs uit te voeren.

16. Hoe zal u deze verandering ervaren?

EFSA heeft voorgesteld om maandelijks microbiologische testen uit te voeren om de efficiëntie van de reiniging en ontsmetting na te gaan.

17. Staat u hier positief tegenover?

BVP - Ongediertebestrijding

18. Met welke frequentie controleert u op ongedierte?
19. Wordt er een controlelijst ingevuld bij het nemen van correctieve acties? Ja/ Neen

Voor ongediertebestrijding raadt EFSA een wekelijkse controle zonder registratie. Dus geen controlelijst meer.

20. Zal deze verandering u verder helpen?

BVP – Technisch onderhoud en ijking

21. Worden alle toestellen (o.a. thermometer, weegschaal, MAP-verpakkingstoestel etc.) minstens jaarlijks technisch onderhouden? Ja / Neen
22. Worden de correctieve acties van technisch onderhoud bijgehouden? Ja / Neen

Wat betreft technisch onderhoud stelt men voor om **continu/regelmatig** te onderhouden **zonder documentatie** bij te houden.

- 23. Wat vindt u hiervan?
- 24. Is er een procedure om de thermometer te iken? Ja / Neen
- 25. Met welke frequentie wordt de ijkingstatus van de thermometer gecontroleerd?

Bovendien heeft EFSA voorgesteld om de ijkingstatus meer te controleren, namelijk **wekelijks of zelfs dagelijks**.

- 26. Wat is uw mening hierover?.....

BVP- Fysische en chemische contaminatie van de omgeving

EFSA stelt voor om de acties die ondernomen worden indien er afwijkingen optreden i.v.m. fysische en chemische verontreiniging te noteren.

- 27. Wat is uw mening hierover?.....

BVP – Temperatuur controle van de opslagomgeving

- 28. Zijn de koelinstallaties e.d. voorzien van een automatische temperatuurregistratie-apparatuur? Ja/ Neen

- 29. Worden, bij het controleren van de temperatuur van de koelinstallaties, diepvriezers, het vlees e.d., de afwijkingen en de corrigerende acties geregistreerd op een controlelijst? Ja/ Neen

EFSA stelt voor om de temperatuur van de opslagfaciliteiten en producten **telkens** te registreren. Ook wordt er voorgesteld om te werken met een automatische **temperatuurregistratie-apparatuur** met alarm. Zo wordt continu de temperatuur van de opslagfaciliteiten optimaal gecontroleerd zonder dagelijkse inspanning.

- 30. Zal u deze verandering positief ervaren?

BVP – Productinformatie en consumentenbewustzijn

- 31. Wordt de nodige informatie over producten i.v.m. correct opslag, bereiding, houdbaarheid en allergenen mondeling overgebracht aan de consument? Ja / Neen

EFSA stelt voor om **routinecontroles** te houden om na te gaan of informatie mondeling of op de verpakking correct wordt overgebracht aan de klant. Deze informatie betreft correct verwerken, opslaan, bereiden, houdbaarheidsdatum en allergenen. **Registratie** is hierbij niet vereist.

- 32. Bent u mee met deze verandering?