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RESEARCH ARTICLE

STUDY OF FINDINGS FROM SOME SECOND PART AUDITS ACCORDING TO ISO 22000:2005

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ABSTRACT

To minimize and control hazards, a number of standards setting targets or methods to follow or even both, have emerged. Audit is among one of the most widely used tools to ensure compliance or not of a company with standards requirements. In this study, we analyzed findings from 35 second part audits carried out in 32 companies of Moroccan food industry. The total duration is 49.5 days. These companies are spread over 9 of food chain categories and 8 different cities (59% of them are located in Casablanca city) with a coaching rate is of 9% in average. Findings raised from these audits are of 147 shared between 10 major non conformities, 50 minor non conformities, 78 remarks and 9 strength points. Chapter 7 has registered 60% of all findings followed with Chapter 5 with 18% then Chapter 4 with 13%. We noted that the cumulative findings related to compliance with regulations requirements, product standards and PRP represent 41% of the whole. Many reasons can explain this rates, among which we mention difficulties faced while collecting regulations and product standards, required investments, which are sometimes heavy, necessary to comply with good practice, change resistance, lack of necessary skills, etc.

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INTRODUCTION

Billions of meals are prepared safely each day throughout the world. Much of that food is deemed safe by some form of verification of practices, known commonly in the commercial food system as external audits or inspection. Yet when outbreaks of food borne illness happen, the results can be emotionally, physically and financially devastating to the victims and the businesses involved (Powell and al., 2013). The increasing number of widely reported serious food poisoning outbreaks has raised public demands for more effective food standards (Dillon and Griffith, 2001). Industry and governments have realized that effective food control systems require shared responsibility in aspects of their design, operation and verification. Governments are required to set the overarching limits within which these systems operate, and industry must design and operate to meet these limits. Food control standards, once set up, are not always effectively implemented, because of resistance to change, lack of commitment, limited resources and increased training requirements (Dillon and Griffith, 2001). An audit is an evaluation to verify that actual practices match set standards and codes and determine gaps, if any. With advances of the hazard analysis and critical control point (HACCP) system and the integrated food safety management system, the scope and purpose of audits in the industry have shifted from a snapshot examination of good hygienic and manufacturing practices to a more general audit of the food safety management systems. Thus, the primary purpose of audits is no longer for controlling hazards, but for confirming that control/preventive measures are implemented correctly and are effective (Motarjemi and al., 2014). The role of audit is therefore of increasing importance. Auditing food control systems using standard methods is now recognized as a challenge, for both industry and government, in the expanding and increasingly complex world of food protection. It is a challenge that must be met! (DILLON, 1997). The rapid growth of auditing platforms (e.g., those of the Global Food Safety Initiative, the International Organization for Standardization, Safe Quality Food -SQF-, the British Retailer's Consortium –BRC-, the Global Partnership for Good

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Agricultural Practice -GlobalGAP-) shows that supply chains see value in these systems (Committee FDA, 2010). One of the world widely used standard, we note ISO 22000 version 2005. There have been a number of attempts at the creation of an international food standard but with the introduction of the ISO 22000, Food safety management systems — Requirements for any organization in the food chain, a document has been created that is a suitable standard for all stakeholders in the food industry. It is possible to apply the standard to all organizations in the food chain, from primary producers to catering and retail outlets and the importance of the development of this standard was recognized by the involvement of many countries in its drafting, as well as significant international bodies such as the Global Food Safety Initiative. With its open structure and specific focus upon food safety issues it is a positive addition to the many other standards that are already evident in the food industry (Smith & al., 2007).

MATERIALS AND METHODS

To carry out an audit according to ISO 22000 version 2005 standard, the auditor should have the skills and training needed for this mission. Audits realization period was between April 2011 and June 2014. Requirements of the following standards were used as reference while conducting audits:

- ISO 22000:2005: Food safety management systems — Requirements for any organization in the food chain,
- ISO/TS 22002-1:2009: Prerequisite programs on food safety — Part 1: Food manufacturing,
- ISO/TS 22002-2:2013: Prerequisite programs on food safety — Part 2: Restoration,
- ISO/TS 22002-3:2011: Prerequisite programs on food safety — Part 3: Agriculture,
- ISO 19011:2011: Guidelines for auditing management systems,
- ISO/TS 22003:2007: Food safety management systems — Requirements for bodies providing audit and certification of food safety management systems.

RESULTS AND DISCUSSION

1. Audited companies

32 companies operating in Moroccan food sector belonging to various categories have been audited. For confidentiality reasons, these companies' names are not cited in this work.

1.1. Categorical ranking

The ranking by food chain categories as set by Annex A of ISO 22003:2007 (ISO/TC 34, 2007) of these companies is as specified in table 1.

Table 1. Ranking of audited companies by category

Category code	Category	Percentage	Number
E	Processing 3	31%	10
G	Restoration	28%	9
B	Agriculture 2	9%	3
C	Processing 1	9%	3
A	Agriculture 1	6%	2
D	Processing 2	6%	2
F	Feed production	3%	1
L	(Bio)chemical manufacturing	3%	1
M	Package material manufacturing	3%	1
H	Distribution	0%	0
I	Services	0%	0
J	Transport and storage	0%	0
K	Equipment manufacturing	0%	0

We notice the dominance of E and G categories related to processing 3 and Restoration. Moreover, according to our study (El ammari *et al*., 2015), E and G classes represent 63.9% and 17.3% of all Moroccan food companies respectively. Geographically distribution standpoint, audited companies are heterogeneously distributed in 8 Moroccan cities.

1.2 Geographic distribution

The largest number of audits was conducted in Casablanca city which is considered as the economic capital so the large number of companies, of all sectors, which are installed there.

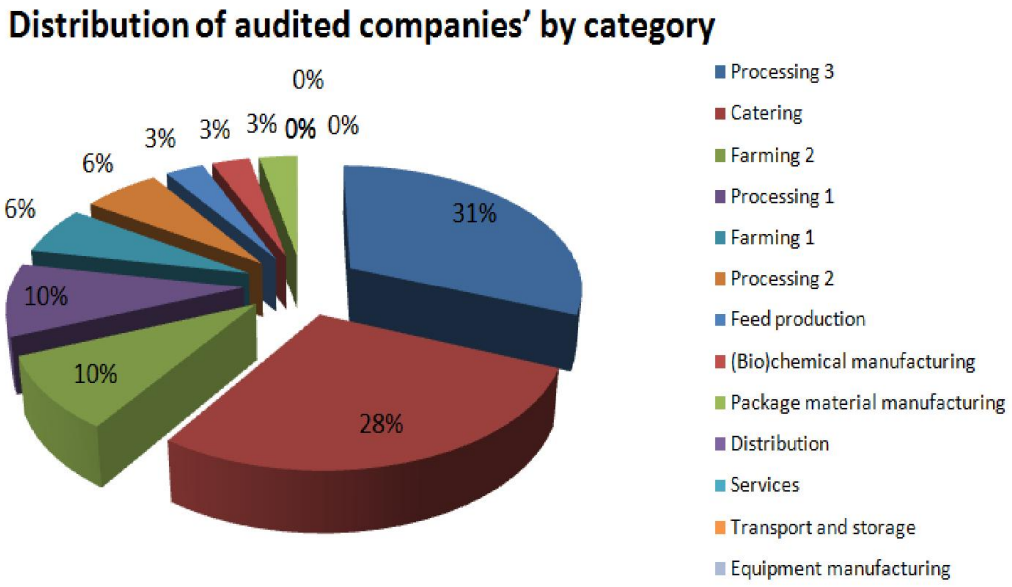

Figure 1. Distribution of audited companies' by category

Table 2. Number of companies' audited by city

City	Percentage	Number
Casablanca	59%	19
Agadir	9%	3
Kenitra	3%	1
Saidia	6%	2
Fes	6%	2
Tanger	6%	2
Marrakech	6%	2
Laayoun	3%	1
Total	100%	32

1.3 Employees and coaching

Employee's number varies from a company to another depending on, among others, the nature of its business, its size, its turnover, the complexity of its processes and its level of industrialization. In this work case, Figure 3 provides information on the number of employees including interim. The maximum recorded is 96 persons, while the minimum is 15. The average of all these companies is 39 workers.

Table 3 presents coaching rates. We find that the average in these companies is about 9%, which coincides with the results of the study on food safety constraints - Focus on documentation we have achieved (El ammari et al., 2015). In this study, we found that coaching rates between 1 and 20% is present in 80% of Moroccan food industry companies.

Tableau 3. Number of senior/middle management and coaching rates

	Number of senior/middle	Coaching rates (%)
Maximum	15	18
Minimum	3	2
Average	8	9

2. Findings

Audits numbers and days realized are presented Table 4.

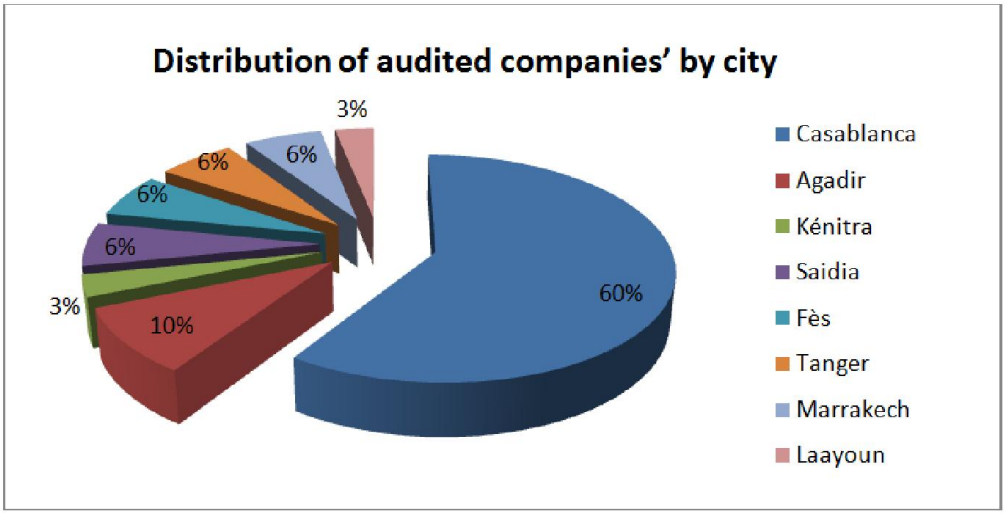

Figure 2. Distribution of audited companies' by city

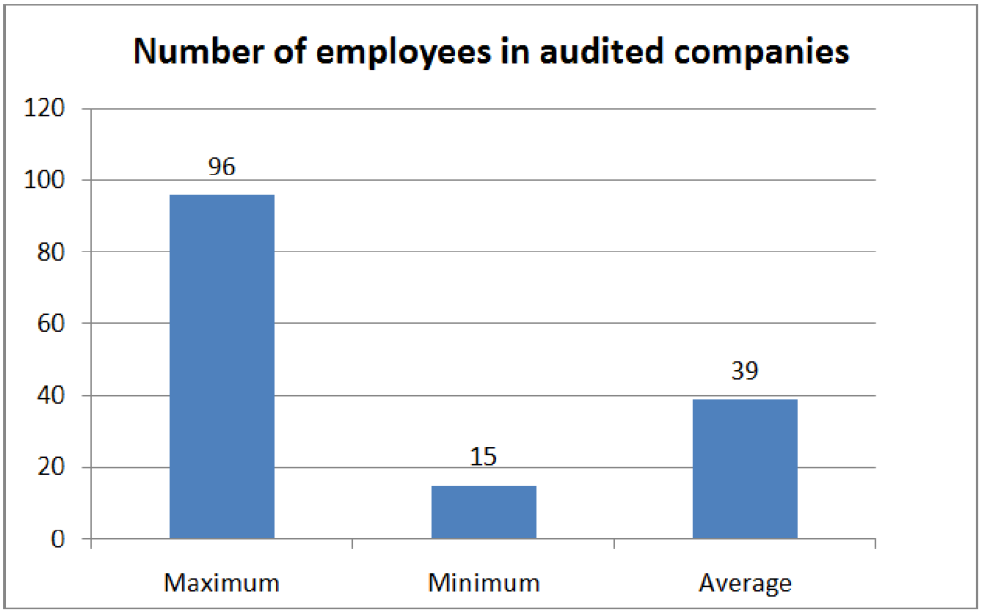

Figure 3. Number of employees in audited companies

Table 4. Audits numbers and days by type

	Audit type		Total
	In blank	internal	
Audits number (U)	24	11	35
Audits days number (d)	33,5	16	49,5

We note that three companies have remade internal audits. During these audits, 147 findings were raised shared between major non conformities, minor non conformities, remarks and strength points.

Remarks are related to gaps when provisions are in line with internal or external requirements but they tend to drift and become non-compliant. Strengths points correspond to observed provisions that go beyond the requirements of internal and external standards and lead the company towards excellence. Minor non-conformities are associated with non-compliance to internal and external and for which consequences were not observed. There is therefore a potential risk. For major non-conformities, it is for provisions not in compliance toward internal or external for which consequences was observed (http://www.qualiblog.fr/, 2014).

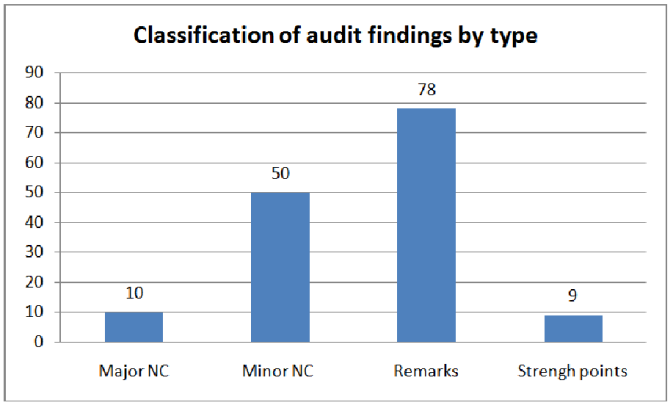

Figure 4. Classification of audit findings by type

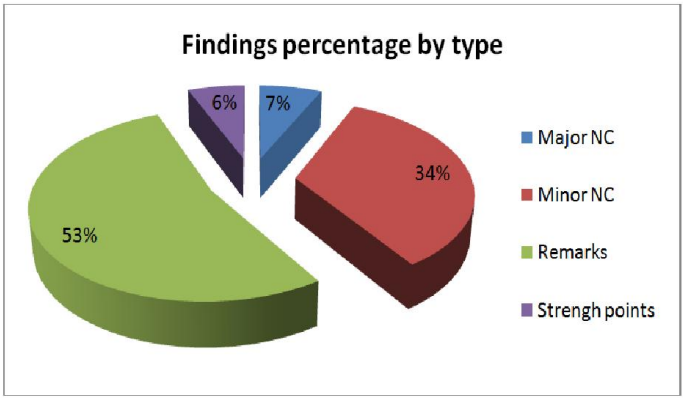

Figure 5. Findings percentage by type

We note that the remarks and minor nonconformities represent 87% of all findings raised. These findings are spread over all chapters of the audit referential standard, heterogeneously, as shown in the following Figure 6:

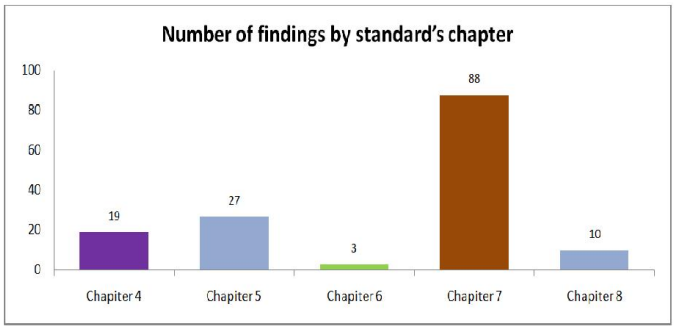

Figure 6. Number of findings by standard's chapter

From this figure, Chapter 7 was the site of much of findings with 88 overall. This is the chapter that develops planning realization processes, from receipt of raw materials to delivery of finished products (BOUTOU, 2008). Having 60% of findings only in this chapter, may be related to the presence of difficulties in implementing its requirements by food companies, lack of training / information needed, insufficient resources deployed for compliance with the standard, etc.

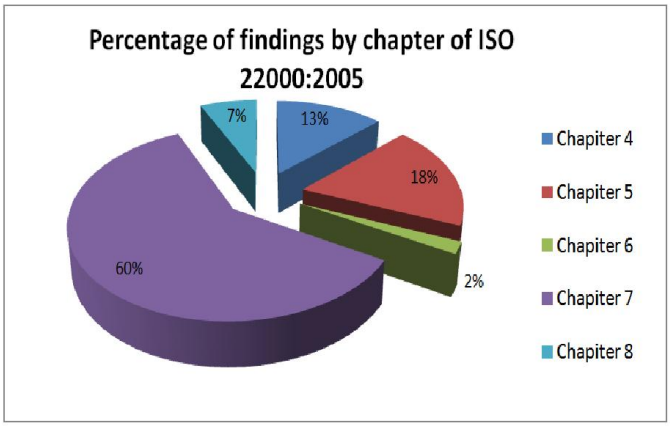

Figure 7. Percentage of findings by chapter of ISO 22000:2005

Details of raised findings by chapter, by type and by number are given in Table 5 below.

From Table 5 and Figure 8, we note that with the exception of chapter 7.5, findings were spread on all other chapters. The big part of findings was raised in 7.2 chapter related to Prerequisite programs (PRP): 6 major none conformities, 16 minor none conformities, 16 remarks and 3 strengths points.

The second chapter in terms of finding's number is that relating to Management responsibility. Management, at its highest level, involvement is essential for the establishment of a real food safety management system or any other management system. As table 5 shows, findings are related to management commitment's formalization which does not take into consideration legal and regulatory requirements and updating of authorities and responsibilities. Also, some non-conformities were about complying to internal and external communication standard requirements, preparation for emergencies as well as input and output elements of management review. It is noted that three strengths points among the 10 were also associated with this chapter.

Table 5. Number and types of findings by chapter of the standard

Chapter	Finding	Type			
		Major	Minor	Remark	Strength point
4.1	Inadequate definition of food safety management system's scope		2	1	
4.1	Insufficient control of some outsource processes that may affect end product conformity	2	2	4	
4.2	Presence of uncontrolled documents			4	
4.2	Lack / difficulty of access to records		1	3	
5.1	In the Management commitment communication of meeting the regulatory requirements doesn't figure			3	
5.3	Les responsabilités et autorités ne sont pas à jour			3	
5.6	External communication disposals implemented do not allow providing appropriate information concerning food security aspects		2	1	
5.6	Some statutory and regulatory authorities requirements related to food safety are not available			1	
5.6	Lack / insufficiency of efficient tools for internal communication with personnel on issues having an impact on food safety		1	3	
5.6	statutory and regulatory requirements are well controlled and followed				1
5.7	Emergency preparedness and response procedure do not take into consideration some situations that could have incidence on food safety		2	1	
5.7	Well prepared stuff for emergency situations				2
5.8	Lack of some management review inputs		2	3	
5.8	Lack of some management review outputs			2	
6.2	Efficiency of trainings / awareness's actions done was not measured			3	
7.2	Gaps of PRP application according to ISO 22002	6	16	16	3
7.3	Incomplete food safety team		1		
7.3	Incomplete identification of statutory and regulatory requirements related to raw material		2	1	
7.3	Product characteristics are insufficiently detailed (raw material et product final)			5	
7.3	Incomplete identification of statutory and regulatory requirements related to product final		1	1	
7.3	Presence of differences between prepared flow diagrams and reality on site			1	
7.4	Hazard identification & evaluation methods are not adequate with the activity of the enterprise	1	2	2	
7.4	Hazard identification & evaluation well detailed				2
7.4	Certain selected control measures do not allow prevention, elimination or reduction of hazards		2	3	
7.6	Reasons of choosing certain critical limits were not available			2	
7.7	Uncompleted updating of documents specifying PRPs & HACCP plan			2	
7.8	Conclusions of verification planning were not available		2		
7.9	Completed or partial lose of traceability (upstream/downstream)	1	2	3	
7.9	Records insuring traceability do not comply to statutory and regulatory requirements		2	3	
7.10	None conformities causes are not determined		1	2	
7.10	Efficiency of withdrawal programs are not verified		1	2	
8.2	Validation of control measure combinations do not include some important measures for final product safety		1	2	
8.3	Some equipments impacting food safety are not calibrated & verified		3		
8.3	Lack of actions on equipments that proved found not conform to requirements			1	
8.3	Measurement equipments are well controlled				1
8.4	Analysis of results of verification activities are not recorded		2		
Total		10	50	78	9

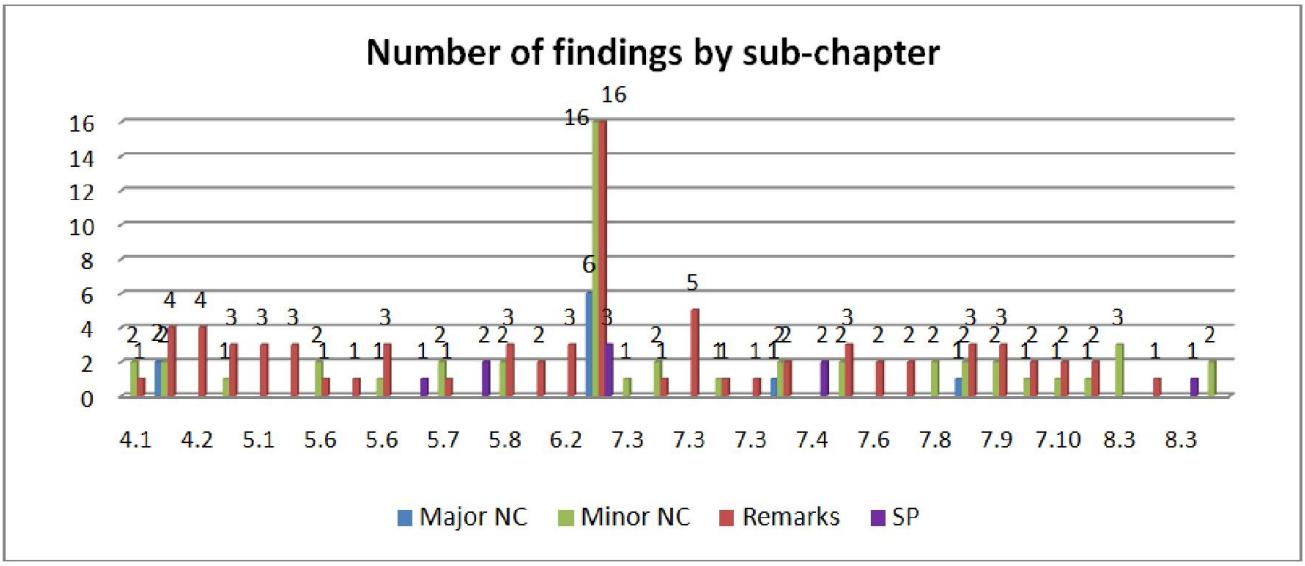

Figure 8. Number of findings by sub-chapter

3. Findings related to regulation, product standards & PRP compliance

Compliance with regulations is mentioned 14 times in ISO 22000:2005, including 12 times as a requirement as mentioned in Table 6. Compliance is an essential prerequisite. Managers shall know applicable regulations for their activities.

A regulatory watch is, undoubtedly, one of the most complex tasks to achieve due to the fact that the texts are numerous (Bourquin & Thiagarajan, 2010). The analysis of audit results shows that findings related to compliance with legal and regulatory requirements, product standards (raw materials and finished products) and the appropriate application of prerequisite programs (PRP) represent 41% of all findings raised.

Table 6. Chapters related to regulation, product standards & PRP requirements in ISO 22000: 2005 standard

Chapters related to regulation
Introduction It requires an organization to meet any applicable food safety related statutory and regulatory requirements through its food safety management system. 1 Scope b) to demonstrate compliance with applicable statutory and regulatory food safety requirements, 5.1 Management commitment b) communicating to the organization the importance of meeting the requirements of this International Standard, any statutory and regulatory requirements, as well as customer requirements relating to food safety, 5.2 Food safety policy b) conforms with both statutory and regulatory requirements and with mutually agreed food safety requirements of customers, 5.6.1 External communication c) statutory and regulatory authorities, 5.6.1 External communication Food safety requirements from statutory and regulatory authorities and customers shall be available. 5.6.2 Internal communication h) statutory and regulatory requirements; 7.2 Prerequisite programs (PRPs) 7.2.2 The organization shall identify statutory and regulatory requirements related to the above. 7.2 Prerequisite programs (PRPs) 7.2.3 When selecting and/or establishing PRP(s), the organization shall consider and utilize appropriate information [e.g. statutory and regulatory requirements, customer requirements, recognized guidelines, Codex Alimentarius Commission (Codex) principles and codes of practices, national, international or sector standards]. 7.3.3.1 Raw materials, ingredients and product-contact materials The organization shall identify statutory and regulatory food safety requirements related to the above. 7.3.3.2 Characteristics of end products The organization shall identify statutory and regulatory food safety requirements related to the above. 7.4.2 Hazard identification and determination of acceptable levels 7.4.2.3 For each of the food safety hazards identified, the acceptable level of the food safety hazard in the end product shall be determined whenever possible. The determined level shall take into account established statutory and regulatory requirements, customer food safety requirements, the intended use by the customer and other relevant data. The justification for, and the result of, the determination shall be recorded. 7.9 Traceability system Traceability records shall be maintained for a defined period for system assessment to enable the handling of potentially unsafe products and in the event of product withdrawal. Records shall be in accordance with statutory and regulatory requirements and customer requirements and may, for example, be based on the end product lot identification. 7.10.4 Withdrawals 1) notification to relevant interested parties (e.g. statutory and regulatory authorities, customers and/or consumers),

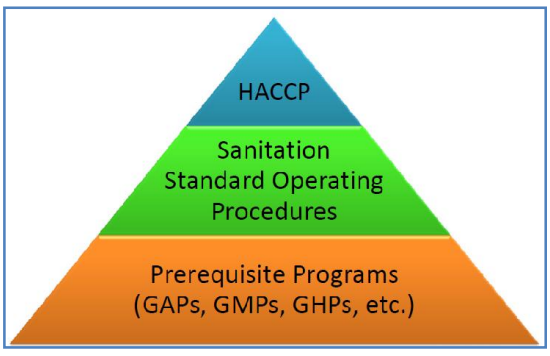

Figure 9. PRP site in implimenting HACCP system (Bourquin and Thiagarajan, 2010)

Table 7. Percentage of findings related to regulation

	Total number of findings	Regulation's findings	Product standard's findings	PRP's findings	% of regulation, product standards & PRP's findings	Other findings
Major NC	10	0	0	6	60%	40%
Minor NC	50	4	3	14	42%	58%
Remarks	78	9	5	16	38%	62%
Strength points	9	1	0	3	44%	56%
Total	147	14	8	39	41%	59%

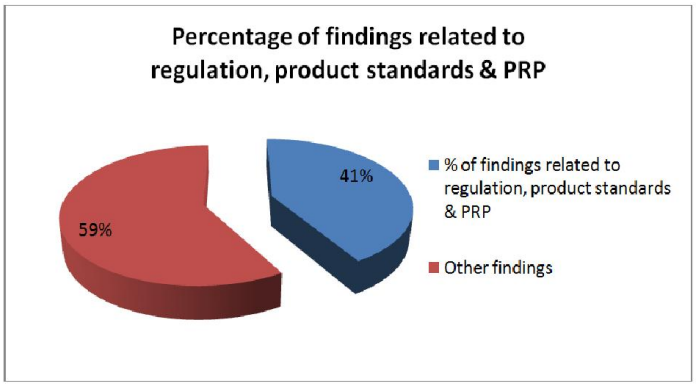

Figure 10. Percentage of findings related to regulation, product standards & PRP

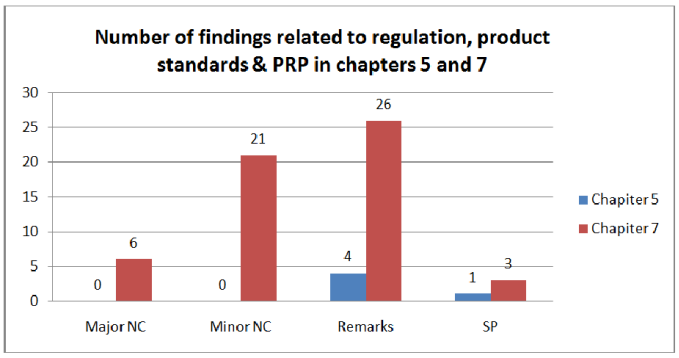

Figure 11. Number of findings related to regulation, product standards & PRP in chapters 5 and 7

PRP is defined in ISO 22000:2005 as *"Basic conditions and activities that are necessary to maintain a hygienic environment throughout the food chain suitable for the production, handling and provision of safe end products and safe food for human consumption NOTE: The PRPs needed depend on the segment of the food chain in which the organization operates and the type of organization. Examples of equivalent terms are: Good Agricultural Practice (GAP), Good Veterinarian Practice (GVP), Good Manufacturing Practice (GMP), Good Hygienic Practice (GHP), Good Production Practice (GPP), Good Distribution Practice (GDP) and Good Trading Practice (GTP)."* (ISO/TC 34, 2005).

However, despite their important role as fundamentals basis for the establishment of food safety system (Figure 9), findings related to PRPs are more numerous compared to other requirements. This may be related to investments needed that could be sometimes heavy for manufacturing units compliance, which are often old, with good practice guides, resistance to change observed for some managers and staff, lack of required competence, etc. This percentage (41%) confirms results obtained in the study on constraints related to food safety in Moroccan food industry - focus on documentation [9]. This study showed that Moroccan food companies have confirmed the presence of difficulties while collecting these documents (regulations, product standards and good practices guides) since they are not grouped together and easily accessible.

Findings distribution by standard chapter has shows that the majority of them are related to Chapter 7.

Conclusion

According to this study, we showed that the number of observations in various according to their types (major NC, minor NC, remark or strength point) and chapters within the standard. Chapter 7 (Planning and realization of safe products) has been identified as the most difficult in the implementation of ISO 22000:2005 according to the large number of findings raised, followed by Chapter 5 Management responsibility. In the last part of the experimental study, we highlighted findings in relation to regulatory compliance, product standards and PRPs. They represent 41% of all audit findings. This relatively high percentage may be due to the presence of difficulties in finding the regulations, product guides and standards as they are scattered and difficultly accessible plus the necessary investments for compliance with standards specifying the PRP.

REFERENCES

Bourquin. L and Thiagarajan. D. 2010. Prerequisite Programs: Minimizing Food Safety Hazards Along the Food Supply Chain. Michigan State University: 6

BOUTOU. O. 2008. De l'HACCP à l'ISO 22000. AFNOR : 274, 68.

Committee on the Review of the FDA's Role in Ensuring Safe Food. 2010. Enhancing food safety the role of the food and drug administration. National Academy of Sciences. 35: 136

Consultation on April 1st, 2014 at 21h10 pm. http://www.qualiblog.fr/audit-interne-audit-fournisseur/formaliser-des-constats-daudit-pertinents-la-qualite-de-vos-audits-en-depend/

Dillon Mike and Griffith Chris. 2001. Auditing in the food industry - From safety and quality to environmental and other audits. Woodhead Publishing Limited. 5: 14

DILLON. M. 1997. Verifying Food Safety Systems in the 1990s'- The Role of Government Agencies in Assessing HACCP. FAO/WHO Consultation, Geneva.

El ammari. Y, Chaouch. A, Harmouzi. A, El hadiri. H and El ammari. S. 2015. Food safety constraints analysis in Moroccan food industry - focus on documentation. Der Pharma Chemica. 7(2):189.

El ammari. Y, Harmouzi. A, Chaouch. A and El ammari. S. 2015. Ranking of Moroccan food sector companies according to ISO 22003 version 2007 food chain categories. Archives of Applied Science Research. 7 (1): 84.

ISO/TC 34. 2005. ISO 22000 - Food safety management systems - Requirements for any organization in the food chain: 3.

ISO/TC 34. 2007. ISO 22003 - Food safety management systems - Requirements for bodies providing audit and certification of food safety management systems: 13

Motarjemi. Y, Moy. G. G & Todd. E. CD. 2014. Encyclopedia of Food Safety. Volume 4, Elsevier, First edition: 288.

Powell. D.A, Erdozain. S, Dodd. C, Costa. R, Morley. K & Chapman. B.J. 2013. Audits and inspections are never enough: A critique to enhance food safety. Food Control. 30: 686.

Smith. D, Jackson-Smith. T, & Politowski. R. 2007. ISO 22000 Food Safety Guidance and Workbook for the Manufacturing Industry. BSI: VII.

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