

## General guideline for applying Islamic dietary requirement in HACCP programme

Kohilavani<sup>1</sup>, W. Zzaman<sup>1,2</sup>, N.F.M. Idrus<sup>1</sup>, W.N. Wan Abdullah<sup>3</sup> and T.A. Yang<sup>1\*</sup>

<sup>1</sup>Universiti Sains Malaysia, School of Industrial Technology, Food Technology Division, 11800 Pulau Pinang, Malaysia;

<sup>2</sup>Shahjalal University of Science and Technology, Department of Food Engineering and Tea Technology, 3114 Sylhet, Bangladesh; <sup>3</sup>Universiti Sains Malaysia, School of Industrial Technology, Bioprocess Technology Division, 11800 Pulau Pinang, Malaysia; [taris@usm.my](mailto:taris@usm.my)

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### REVIEW ARTICLE

#### Abstract

This paper highlights the potential benefits of applying Islamic dietary laws to food production standards using the hazard analysis and critical control points (HACCP) concept. Currently, Islamic dietary specifications and obligations are being coordinated with standard guidelines in some countries without enforcing the use of safety standards. The HACCP concept approach with the identification of halal critical control points are discussed, ideally allowing the harmonisation and integration of common principles towards safe halal wholesome food. Eventually this approach leads to the easy and effective application of religious prescriptions by the food chain from farm to table systematically without compromising the law.

**Keywords:** halal, Islamic dietary law, food safety, HACCP, HCCP

#### 1. Introduction

A balanced relationship between halal and food safety control adds value in the food chain and improves confidence among Muslim consumers and those with various religious backgrounds. In addition, the advance of globalisation and new processing technologies, new distribution strategies, new challenges and new risks, different ingredients and preparation methods have exposed Muslims to uncertainty in identifying halal or haram due to ambiguity (Zunira Talib *et al.*, 2010). To support the changes, researchers like Riaz and Chaudry (2004) have discussed the use of hazard analysis and critical control points (HACCP) to identify halal critical control points (HCCP) while addressing food safety issues. This complements the saying of 'halalan toyyiban' which becomes the objective of Islamic dietary law. This paper provides a better understanding of Islamic dietary law, HACCP and the applicability of religious requirements by using the HACCP principles and guidelines.

#### 2. Islamic dietary law

Sharia Law is defined as an Islamic law based on the Al-Quran, Al-hadith (traditions of the messenger of Allah), Ijma (Consensus of Islamic scholars) and Qiyas (legal deduction or analogy) according to the Shafei or Schools of Thought. The term halal food defines food that is permitted under Islamic law and does not consist of or contain anything which is considered to be unlawful; i.e. food prepared, processed, transported or stored using appliances or facilities free from illegalities (Codex, 1997). In addition, halal food and products can be divided into main four categories: halal, haram, mashbooh and makrooh (Eliasi and Dwyer, 2002). Mashbooh means doubtful, while makrooh means discouraged to consume. It is very important for Muslim consumers to know which categories the products that they have bought and consumed fall into.

Al-Qaradawi (1985) has mentioned the key principles pertaining to halal (lawful or permitted) and haram (unlawful or prohibited) for Muslims to use as a guide in their customary practices. The principles of halal food production were further elaborated in simple and clear explanations by Riaz and Chaudry (2004).

Foods which are lawful according to Islamic law or halal food has been widely defined. First and for most, ethical halal requires sources of lawful food and should be free from corruption (Berry, 2000; Kohilavani *et al.*, 2013). In addition, halal food also focuses on 'processing' or stages of manufacturing starting with slaughter, washing and cleansing, packaging, storage, transportation, and selling, etc. (THS 24000:2552).

Countries with a strong halal industry like Malaysia, Singapore, and Thailand, among others, have been using their respective exclusive halal standards and logos officially sanctioned by their governments. Table 1 clearly shows that halal food is really attracting attention in southeast Asia, Middle East and Europe. The halal standards have outlined religious compliance and also the requirement for Islamic dietary law.

### 3. Hazard analysis and critical control points

HACCP stands for hazard analysis and critical control points and constitutes a system which ensures food safety based primarily on preventative measures and introduces appropriate corrective action when required (Arvanitoyannis and Traikou, 2005; Bernard, 1998). HACCP is a systematic integral programme used to identify and analyse potential hazards such as microbiological, chemical and physical and at the same time the exposure risk produced during the primary production, processing, storage, distribution, expense and consumption of foods. It was intended for use by individual food processing companies as a protocol for developing customised and unique safety assurance procedures to meet the respective industry and processing needs (Ropkins and Beck, 2000).

HACCP looks for hazards and what could go wrong at each stage with possible causes and the likely effect. Adequate control measures are then put in place to safeguard against

potential violation and failures in terms of product safety. However, Snyder (1991) has also stated that in HACCP implementation there will never be a process that is totally safe but there will be a constant effort to achieve zero defects.

Like many other management standards, HACCP is a procedural approach and it does not introduce a pre-defined system but rather helps users to construct their own system based on industry needs. Furthermore, HACCP is not a discrete programme and other programme such as Codex general principles of food hygiene, Codex codes of practice appropriate food safety legislation (Codex, 1997) and good manufacturing practice need to be applied together to manage food safety from farm to fork.

### 4. Historical background of HACCP

The concept of HACCP was developed in the early 1960s by the Pillsbury Company. Originally the firm worked with NASA (National Aeronautic and Space Administration) and the laboratories of the American army of Natick (previous called Quartermaster Food and Container Institute of the United States Armed Forces) to ensure microbiological safety of foodstuffs consumed by the astronauts (Hicham and Mohammed, 2010; Marriott *et al.*, 1991). However, the HACCP concept has been broadened to include physical and chemical hazards in food production (Mortimore and Wallace, 1998).

HACCP was first introduced at the United States National Conference of Food Protection in 1971 for widespread use by Howard Bauman from Pillsbury Company (Bauman, 1974; FDA, 1972). The objective of the introduction is to assure that the produced food is free from contamination by food spoilage microorganism or pathogens, toxins, chemical and physical hazards that could cause harm or an illness to consumers (Pierson and Corlett, 1992). HACCP was introduced as proactive solution to the conventional end-

**Table 1. Halal standards from various countries.**

Country	Halal standards
Malaysia	MS1500:2009 halal food; production, preparation, handling and storage general guidelines
Singapore	Singapore muis halal standard
Thailand	National halal standard general guidelines on halal THS 24000:2552
Indonesia	Peraturan LPPOM MUI ( <a href="http://www.halalmui.org">www.halalmui.org</a> )
Brunei	Bruinei Darussalam standard PBD 24:2007
Philippines	NCMF halal accreditation guidelines
United Kingdom	European halal standard
Bosnia	Halal standard requirement and measures for halal quality H BAS 1049:2007
Herzegovina	Halal standard requirement and measures for halal quality H BAS 1049:2007
Saudi Arabia	SASO 2172 general requirements for halal food
New Zealand	Animal products (overseas market access requirements for halal assurances) notice & amendments 2010

product testing which was not effective in ensuring the safety of the food because significant proportions of food product have to be sub-sampled for analysis to ensure representivity. Furthermore, the testing procedures are expensive, old and only assured with regards to tested hazards. The control of hazards were found to be reactive and the safety is only confirmed at the point of testing (Ropkins and Beck, 2000).

The evolution of the global food safety system has been summarised in Table 2.

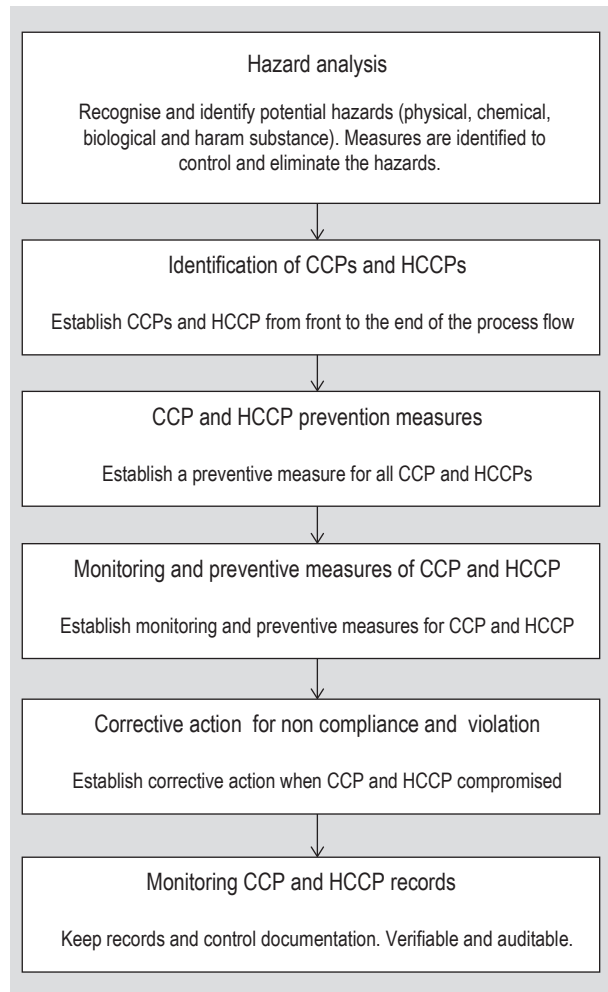
Consequently, to achieve safe food production, HACCP principles were adopted and heavily promoted worldwide in a wide range of industry sectors in industrialised countries as stated in Codex Alimentarius Commission (Codex, 1997). However it was spread to be used without harmonised guidelines upon which companies could design their HACCP system (NACMCF, 1997).

### 5. Potential areas of use

Normally HACCP is used to identify hazards, and manage risks related to hazards throughout the food chain. In general hazards are categorised as biological, chemical and physical. Haram substances can also be listed under the hazard category based on religious law. *Najs/filt* (haram substance) is considered as the fourth hazard when integrating Islamic dietary law with HACCP. The HACCP concept can be used to identify haram substances and remove them from the process line by using the same HACCP principles with a suitable modification. Saurabh *et al.* (2009) have mentioned that HACCP is most useful when product and process understanding is sufficiently comprehensive to support identification of critical control points. Similarly it can potentially be used to identify halal critical control points with assistance from the halal decision tree. Figure 1 shows a summary of HACCP principles for the food industry; the same type of programme can be adapted and supplemented for halal food industries.

**Table 2. Evolution of the global food safety system (Sperber, 2005).**

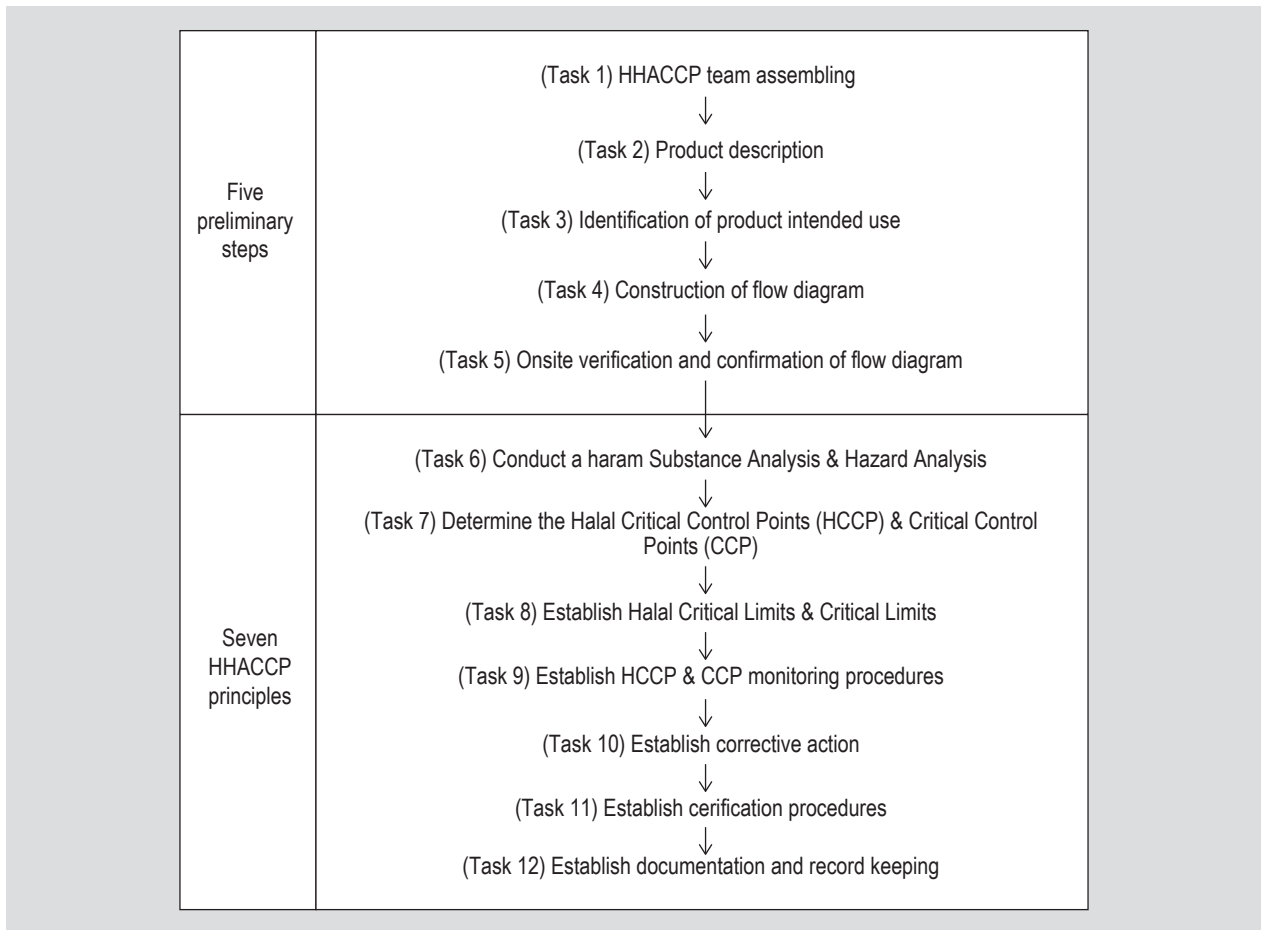
1945	Food and Agriculture Organization (FAO)
1947	General Agreement on Tariffs and Trade (GATT)
1948	World Health Organization (WHO)
1963	FAO/WHO Codex Alimentarius Commission (CAC)
1994	Agreement on Application of Sanitary and Phytosanitary Measures (SPS)
1995	World Trade Organization (WTO)
1997	Codex Document on HACCP principles and application



**Figure 1. Hazard analysis and critical control points principles for the food industry and the same type of programme can be adapted and supplemented for halal food industries (HCCP = halal control points; CCP = critical control points).**

### 6. How to implement halal-HACCP management

The first step to implementing halal-HACCP management is to form a team; its members could be the production manager, halal executive, personnel manager, logistics manager, purchasing officer, store manager, R&D manager and other disciplines as required by the industry. Then a complete product description needs to be established and the intended use of the product needs to be identified. After completing the product description, a process flow should be constructed reflecting all operations. The team is responsible for confirming the processing procedure against the flow diagram and changes may be made as necessary and then documented (Figure 2).



**Figure 2. Twelve tasks of halal-hazard analysis and critical control points (HHACCP) management (HCCP = halal control points; CCP = critical control points).**

**Implementing the principles of halal-HACCP**

*Identify all possible hazards and analyse those hazards*

Hazard analysis conducted to identify any hazardous biological, chemical or physical properties in the ingredients used in the product, the activities conducted at each level or step of the process, the equipment used, the final product, the packaging material and its method of storage and distribution. Haram substances should be identified and analysed as a new risk.

*Determine halal critical control points in addition to existing HACCP, CCPs*

Critical Control Points are located at any step of the processing line where hazards can be prevented, eliminated or reduced to acceptable levels. On the other hand HCCPs are located at any step where haram substances can be totally eliminated and zero tolerance can be achieved. For each identified CCP/HCCP, a method of control must be established and monitored.

*Establish halal critical limit and critical limit*

A critical limit is used to distinguish between safe and unsafe operating conditions at CCP and should not be confused with operation limits which are established for reasons other than food safety (Stevenson and Bernard, 1999). Similar concept but different priority established in Islamic dietary law by distinguishing between halal and haram status.

*Establish a monitoring system for halal CCPs*

Monitoring systems are defined by describing the associated procedures (how), determining the frequency for monitoring (how often) and responsibilities (who) (Corlett, 1998). If deviations do occur, monitoring will provide the information as to when problems occurred so that corrective action can be taken. The monitoring procedures must be able to detect loss of control at the CCP/HCCP.

*Establish corrective action for deviations that may occur*

Once a deviation is identified, the process will be stopped and affected products are segregated. The control limit will be adjusted to demonstrate that the CCP is once again in control and records of the corrective action are maintained (Deodhar, 1999). Similar steps should be carried out for HCCP as well. If necessary the HACCP plan needs to be modified with improvised controls (Mortimore and Wallace, 1998).

*Establish verification procedures*

HACCP verification is defined as those activities, other than monitoring, that establish the validity of the HACCP plan and ensure that the HACCP system is operating according to plan. On the other hand it is an application of methods, procedures, tests and other evaluations, in addition to determining the compliance with the HACCP plan (FAO, 2001). Halal related requirements should also be verified to reconfirm compliance.

*Establish record keeping and documentation including the disposal of products after failure of halal CCPs*

Efficient and accurate record-keeping is essential for the application of an HACCP and halal system management. Furthermore, documentation and record-keeping is important because these are the management tools that can show trends, improve operational efficiency, review the effectiveness of the halal-HACCP plan and show the operational process history and provide proof of adherence to the food safety and halal plan.

**7. Problems associated with the implementation of halal-HACCP**

One factor that prevents the easy implementation of halal-HACCP system is a poor understanding of HACCP principles (technical knowledge) as well as Islamic dietary

law (Sharia knowledge) requirements by the industry and also insufficient trained personnel. Furthermore, halal agencies have not promoted their standards or acceptability. Even if the message gets through, it is not being sustained and continuously monitored. The consumer market and commercial customers have not made the effort to learn what the standards are. They only look at it from a business point of view rather than a need to fulfil customer requirements. If this state of affairs continues, the voluntary standard will remain neglected.

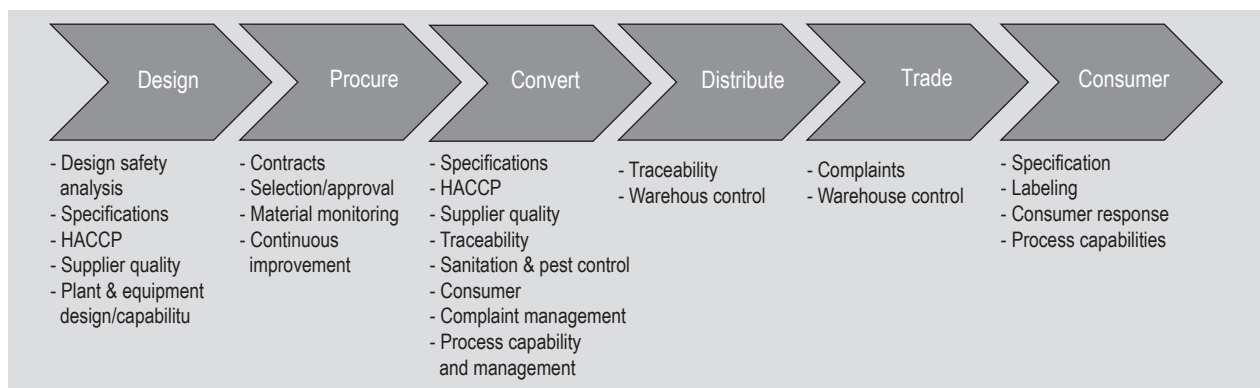
**8. Training and education in the halal-HACCP system**

Training of individuals in each and every stage and department of industry, government, university in halal and food safety is very important for its effective implementation. Specific and targeted group training needs to be conducted to ensure that staff or employees have a better understanding and practise it in their daily work. Figure 3 clearly illustrates the stages and example of halal and safety training requirements to ensure that the safety and halalness of the product is not compromised.

**9. Conclusions**

The halal-HACCP system identifies probable hazards, i.e. biological, chemical, physical and haram hazard to ensure safe halal food. It is cost-effective and leads to reduced product loss and wastage. It increases the effectiveness of the quality system by focusing on the critical parts of the process. Its focus is on prevention rather than relying mainly on end-product testing. It can aid inspection by regulatory authorities and promote international trade by increasing confidence in halal food safety and promote security in drug safety as well as improving the stability of other quality management systems.

HACCP would enable the producers, processors, distributors, and exporters, etc. of halal food products to utilise



**Figure 3. Training and education to meet safety and halal food production and distribution (HACCP = hazard analysis and critical control points).**

technical resources efficiently and in a cost-effective manner in assuring the safety of halal food products. Regulatory inspections and audits would be more systematic and therefore hassle-free. Initially it would probably involve the deployment of some additional finances but this would be more than compensated for in the long run with consistently better quality and hence better prices and returns.

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