

Verification of halal certificates in food chains

Marjolein van der Spiegel, Ine van der Fels-Klerx, Saskia van Ruth, Ingrid Scholtens, Piet Sterrenburg, and Esther Kok

Halal food market

Global halal food market is increasing: 16% of the entire global food industry in 2009 and it could account for 20% of world trade in food products in the near future.

What is halal?

A halal food product is defined as a food product that is produced according to Islamic law. The Koran describes the illegal (i.e. haram) food, their substances and the way animals should be handled and slaughtered.

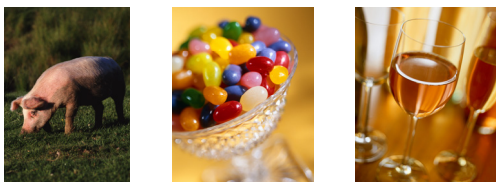


Figure 1: Examples of haram food: pork, pork gelatin, and alcohol

Variety in halal requirements and certificates

Worldwide there is no national legislation on halal. A variety of halal requirements has been arisen due to differences in interpretations of Islamic law, originating country of Muslims, and consumer awareness of haram ingredients in food. Many halal certificates and standards have been developed, which makes halal food production ambiguous for consumers, producers and importers.



Figure 2: Examples of different halal certificates

Difficulties in judgment of halal compliance

Judgment on the compliance with halal criteria is difficult due to:

1. Inability to measure several aspects of halal production: e.g. animal welfare, ritual slaughter method, cleaning and disinfection.
2. No declaration of the origin of ingredients on food label: e.g. emulsifier, gelatin, enzyme, glycerin, lecithin, bread quality improver (E471, E472).

Halal compliance can be verified by audits of production combined with laboratory analysis methods to create more trust for consumers and importing countries.

Audits of production

Audits of production ensure that critical points in the halal food chain (HCPs) are performed without contamination. HCPs have to be controlled and assured: e.g. animal welfare, slaughter person, knife, stunning, slaughter method, invocation, packaging and labeling.

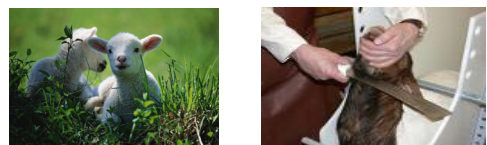


Figure 3: Animal welfare and ritual slaughtering are examples of halal critical points in the food chain.

Laboratory analysis methods

Monitoring of specific ingredients can prove compliance with halal requirements. Several laboratory analysis methods can be used to detect halal and haram ingredients.

Table 1: Examples of laboratory tests to detect ingredients

Identification	Laboratory analysis methods
Animal species	PCR, DNA hybridization, DNA sequencing
Fat composition	FTIR, NIRS, DSC, NMR, HPLC, LC-MS(MS), GC, PTR-MS, electronic nose
Protein composition	SDS-PAGE, CE, colorimetry, chromatography, immunoassays/-blotting, biosensors, NIRS, MS, MALDI-TOF
Animal origin of ingredients	SNIF-NMR, IRMS & SNIF-NMR, Isotope ratio-based finger prints, chiral GC analysis, CHN-analyser
Alcohol	GC, electronic nose, PTR-MS

A preliminary test of halal snack products using PCR showed that two out of ten samples did not comply with the ingredient declaration.

Conclusions

A variety of halal requirements and halal assurance activities are applied worldwide, which makes halal food production ambiguous. Verification of halal certificates is needed

- to obtain more reliable halal food for consumers;
- to create more trust for the importing countries.

Audits and laboratory analysis methods in the whole food chain can be combined to verify the appropriate performance of HCPs and to confirm the absence of haram contaminants.

Acknowledgement

The authors gratefully acknowledge RIKILT for financial support, Christos Frygas for performing PCR-analyses, and all experts who contributed to this study for their valuable contribution.