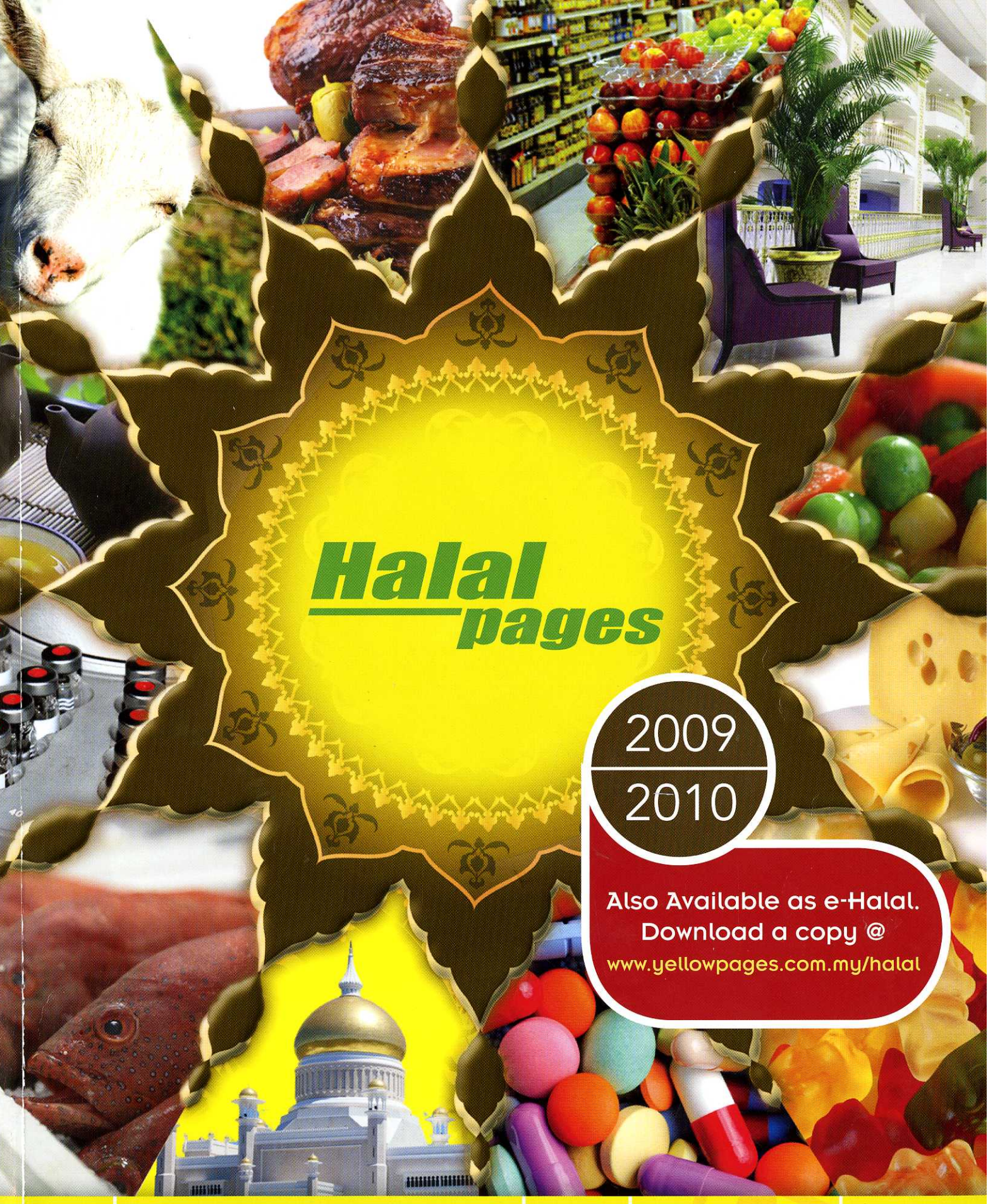


Contents

TM INFO-MEDIA SDN BHD – PUBLISHER

Chief Executive Officer *Nasaruddin bin Mohd Zaini*
Head of Bussiness Strategy & Marketing *Jimmy Yong*
Head of Sales *Eric Chew*

PRODUCTION TEAM

Joint Editorial Team
Assoc. Prof. Dr. Hamzah Mohd. Salleh
Jamal Abdul Nasser Zainal Abidin
Abdul Rahim Ahmad
Ahmad Md Redzuan
Asma Nasaruddin
Technical Support *Mazidah Ramli*
Designer *Yusroyka Karim*

Concept and Design
TM Info-Media Sdn Bhd (178079-D)
Ground Floor, Block E,
Mines Waterfront Business Park,
No. 3, Jalan Tasik,
Mines Resort City, 43300 Seri Kembangan,
Selangor.
Tel: *03-8949 8228*
Fax: *03-8949 8338*
Email: *help@yellowpages.com.my*
www.yellowpages.com.my

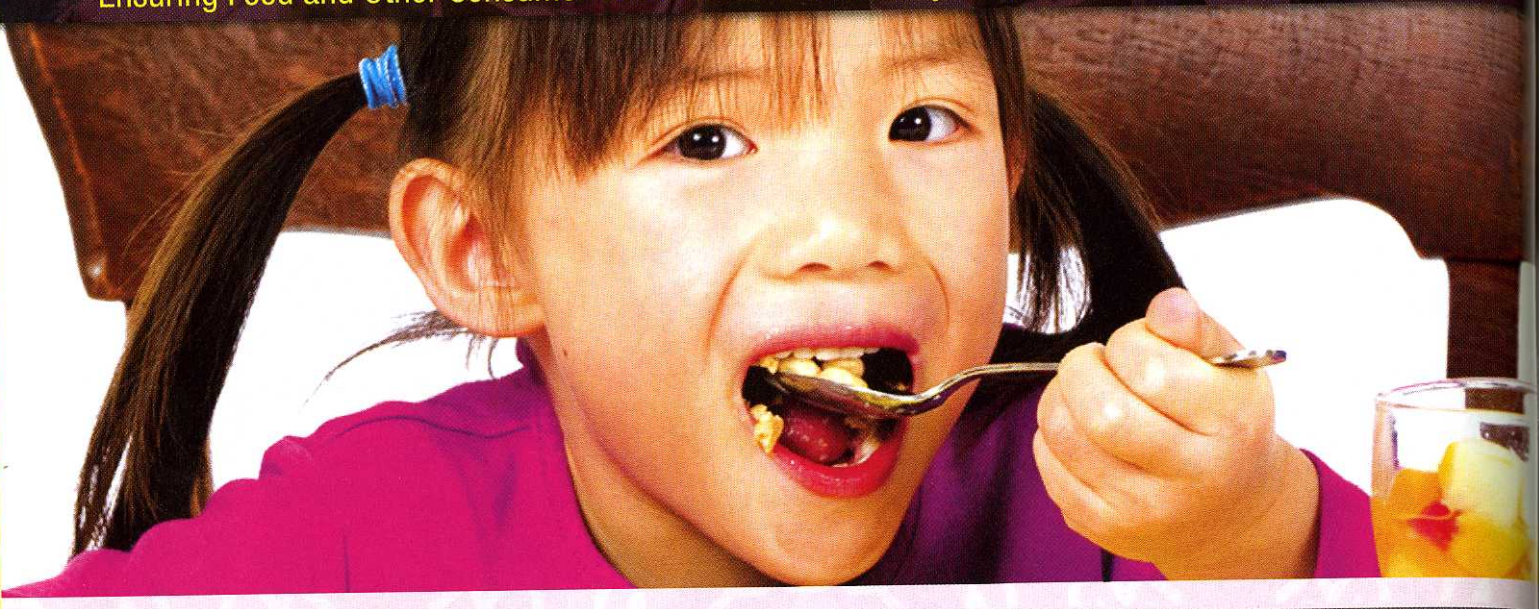
Printed By *BHS BOOK PRINTING SDN BHD*
Lot 17-22 & 17-23, Jalan Satu,
Bersatu Industrial Park,
Cheras Jaya,
43200 Cheras,
Selangor

ADVERTISING OFFICES

Kuala Lumpur	*Tel: 03-8949 8228*	*Fax: 03-8949 8338*
Penang	*Tel: 04-261 2323*	*Fax: 04-263 8333*
Ipoh	*Tel: 05-243 1111*	*Fax: 05-242 2211*
Johor Bahru	*Tel: 07-227 4818*	*Fax: 07-227 4808*
Seremban	*Tel: 06-601 2959*	*Fax: 06-601 3142*
Kuantan	*Tel: 09-514 8811*	*Fax: 09-514 0088*
Kuching	*Tel: 082-57 2727*	*Fax: 082-57 1717*
Kota Kinabalu	*Tel: 088-31 7888*	*Fax: 088-31 7333*

Halal Food Analysis

Ensuring Food and Other Consumer Goods to be Authentically Halal



Mohamed Elwathig Saeed Mirghani - **elwathig@iium.edu.my**

Introduction

Halal is an Islamic term for anything that is 'permissible or lawful' and the term comes from the Holy Qur'an and the traditions of Prophet Muhammad (peace be upon him). Haram, also an Islamic term, means 'unlawful or prohibited'. In relation to food and other consumer products, halal means 'permissible for consumption and used by Muslims' whereas haram is just the opposite. Examples from the Qur'an pertaining to halal are:

"O ye people! Eat of what is on earth, Halal and good; and do not follow the footsteps of the Evil One, for he is to you an avowed enemy."
(Qur'an, Surah Al-Baqarah:2 verse 168) and

"O ye who believe! Forbid not the good thing which Allah hath made Halal for you, and transgress not. Lo Allah loveth not transgressors. Eat of that which Allah hath bestowed on you as food Halal and good, and keep your duty to Allah in Whom ye are believers."
(Qur'an, Surah Al-Maidah:5 verses 87 and 88).

Ensuring food and other consumer goods to be authentically halal is paramount for Muslims. Halal should involve approval of all ingredients and all food processing at any stage of the production – the concept of from farm to mouth. Bearing in mind that Muslim population is about 1.6 billion worldwide, many companies are looking at halal concept as a new tool for marketing.

It is also very important to know that in Islam, food should be halal and toyyib (permissible and good/ wholesome) as mentioned in a number of Qur'anic verses. Halal food in the contemporary food industry means that the food is of high quality and safety, and conforms to international standards such as food safety according to Hazard Analysis and Critical Control Point (HACCP) and of course it should be permitted under the Islamic Shariah law.

Challenges in Halal Food Analysis

It is very challenging and increasingly difficult for Muslims to ensure the halal status of food in the market due to the diversification of sources acquired globally for food processing and production. This trend has raised concerns among Muslim consumers regarding processed food. Adulteration of value-added food products - involving the replacement of high cost ingredients with lower grade and cheaper substitutes can

be very attractive and lucrative for food manufacturers or raw material suppliers. Many fraudulent and deception cases were reported worldwide involving adulteration of haram ingredients in halal food (especially porcine-based products).

In other cases, non-halal contaminants got introduced in the final food products unintentionally.

Halal food is a sensitive and serious matter to Muslims. With many fraudulent issues around and cases of unintentional non-halal contaminants in food, more stringent monitoring should be established by the competent certification authorities. Authentication and verification for halal has become one of the major challenges in analysis of processed food. At present, very limited analytical methods are available for halal food verification.

Rapid, sensitive, reliable and yet affordable methods are urgently needed for halal food verification and for detection of non-halal components (e.g porcine origin) in food products.

Muslims acknowledge the importance of knowledge, intellect and reasons in leading a meaningful lifestyle. Having pointed this crucial viewpoint,

Muslims should not look for scientific evidence behind all commandments that come from the Creator before deciding to accept and adopt these injunctions in his/her lifestyle. Muslims should obey these commandments as a matter of worship (ibadah). As an example, Islamic teachings prohibited the consumption of blood of any type and consider it haram, a long time before chemical analysis showed that blood contains chemical substances that can be injurious to human health such as uric acid.

Current Analytical Methods that can be used for Halal Food Authentication

- **Gas Chromatography – FAC/ FAME and TAG Analysis**

  Gas-liquid chromatography (GLC), or simply gas chromatography (GC), is a common type of chromatography used in organic chemistry for separating and analyzing compounds that can be vaporized without decomposition. Typical uses of GC were for the determinations of non-Halal ingredients in food or for the analysis of toxicity, which make the food non-toyyib, i.e. non-halal.

- **Gas Chromatography – Mass Spectroscopy (GC–MS)**

  It is similar as GC (above), however it is more accurate, reliable and fast since two techniques (GC and MS) are integrated to form a single powerful method for analyzing mixtures of chemicals. Nowadays, a GC-MS equipment is connected to a computer and use advance software that allows building a library of the structures of targeted compounds to be analyzed.

- **Microscopic Determinations**

  It had been used for the determination of non-halal leather in leather products. It also has the potential to be used for the determination of non-halal food products.

- **Fourier Transform Infrared (FTIR) Spectroscopy**

  FTIR spectroscopy could be used to analyze food samples such as animal fats, chocolate, cake, and biscuits for the presence of non-halal ingredients such as lard. Analyses include characterizing and identifying the differences in FTIR spectra

profiles. FTIR spectroscopy with chemometric analysis offered rapid, simple, reliable and environmentally friendly analytical technique that can detect and quantify low level of lard adulterated food samples (3 - 5% detection limit).

- **Electronic Nose (E-Nose) Technology**

E-Nose is a newly introduced analytical instrument that provides rapid, early identification and quantification of atmospheric changes caused by chemical species to which it has been trained. E-Nose can also be used to monitor cleanup processes after a leak or a spill. Studies have showed that E-Nose can be used as a rapid detection of non-halal food contaminants in the food matrix by characterizing simple and complex odors.

Furthermore, the potential of E-Nose technology to sense the presence of pathogens in humans can contribute to the early detection of diseases. Recently, medical applications of electronic noses have been explored. The use of a novel electronic nose to diagnose the presence of aflatoxins and other mycotoxins in food or feeding stuff is of great potential.

- **Differential Scanning Calorimetry (DSC)**

DSC is a thermo-analytical technique for monitoring changes in physical or chemical properties of material by detecting the heat changes. Thermogram profiles show the presence of mixed or added substances such as lard in food sample. It also provides fast and accurate determination of lard mixed with other oils or other animal fats.

- **Molecular Biology Approaches**

  - Polymerase Chain Reaction (PCR)
  - DNA-sequencing

Molecular biology techniques are commonly employed in research and service laboratories around the world. The PCR technique can be used to verify, certify and monitor most animal proteins and related products for halal authentication efficiently and effectively as well as some other consumer products.

- **Chemical Testing**

Traditional wet chemical testing has been used in many laboratories to determine food quality. Many chemists rely on wet chemical methods, however these methods are considered to be non-environmentally friendly as many of these chemicals are hazardous to living things as well as the environment.

Testing of packaging material and microbial testing are also important for any type of raw material, food or feeding stuff and its of great importance for packed food as it can easily spread by local and/or international trading.

Exchange of technical expertise in laboratory analysis of halal food and sharing the information and data will help communities of practice in the food industry to enhance the capacity for halal food product development.

Halal R&D in Malaysia

Research and development are meant to help producers and processors to verify the technical aspects of Halal food production, certification of food ingredients and additives, as well as find alternatives to existing non-halal or doubtful (shubhah or mashbooh) ingredients and food processing aids. The scientific advices in food production especially in terms of Halal interpretations could also influence market potentials and business opportunities along the entire Halal food value chain.

A number of institutions such as the Halal Products Research Institute (HPRI), UPM and Halal Industry Research Centre (HIRCen), IIUM along with other Malaysian agencies are able to consolidate and integrate the opportunities to optimize resources and increase competitiveness to contribute towards the goal to develop Malaysia as an international Hub for Halal products and services.