


NANOTECHNOLOGY WITHIN HALAL LEGAL FRAMEWORK: CASE STUDY OF NANO-BASED FOOD PRODUCTS

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Abstract

'Halal' is currently being pursued in many consumer products, including those that containing nanomaterials or regular materials manipulated at nano-scale level. As the governor of Halal affairs in Malaysia, the Department of Islamic Development Malaysia (JAKIM) is responsible to ensure regulatory approval for nano-based products must be consistent with the Halal parameter set out under Syariah law. Despite Halal certification in this area also remains low in Malaysia, there is a need to investigate the approach to regulating nanotechnology products in order to see if protection of consumers is guaranteed; and whether Halal and safety mechanisms for consumer products are vigilant enough. In realising these aims, this paper takes nano-based food products as a case study. Through analysis, this paper provides an original perspective of how can the existing Halal legal framework adequately covers nanotechnology products. It will involve, firstly, the discussions of the Trade Description Act 2011 or TDA 2011 (as well as the Trade Description (Definition of Halal) Order 2011 and the Trade Description (Certification and Marking of Halal) Order 2011) and legislations governing the two specific sectors. Secondly, it examines whether the existing Halal legal framework is capable of dealing with more complex and sophisticated technology-based products like foods that contain nanomaterials or using nanotechnology. In setting out the parameter of whether the existing regulation is adequate to protect consumers, it highlights legal and regulatory issues relevant to safety regulation of nano-enabled food and cosmetic products. The paper finds that the current Halal legal framework has covered all consumer goods and products, including nano-based products. Indeed, the products are also subject to specific Halal monitoring and enforcement similar to other Halal approved products. This is also in tandem with the concept of Halal Thoyyiban that permits any goods for consumption as long as they are safe and do not cause harm. However, within this it should not be forgotten that such products/technology remain the subject of considerable research as this technology is relatively nascent and the safety/ risk threshold has not been fully ascertained.

Keywords: nanotechnology, food, Halal, regulation.

INTRODUCTION

The existing regulated sectors, food included, are experiencing expansion in terms of size, productivity rate, and variety of production methods is used. The status of '*Halalan thoyyiban*' is now globally accepted norms for product consumption across communities of different religions and cultures (Abdul Majid, Zainal Abidin, Mohd Abd Majid & Tamby Chik, 2015). In Malaysia, the nation is growing fast with its *Halal* regulatory programmes. Halal sector is also recognised as one of the most potential engines for creating national economic growth (Othman, Sungkar, & Hussin, 2009). As regards promoting the Halal industry, Malaysia is recognised as the first nation which incorporates Halal into a comprehensive long-term economic plans. The government announce its ambition to become a global Halal hub and create specific agency for monitoring Halal-related activities and develop plans for the national Halal industry (Othman, Sungkar & Hussin, 2009). In Malaysia, concerns over applications of nanotechnology, either in the forms of products or processes, closely relate to *Halal* status for the consumers. Despite the increasing number of available consumer nano-based products, they have been subject to Halal and safety regulatory debates.

The innovation of nanotechnology has been valorised as delivering ambitious promises to scientific breakthroughs and improving quality of human lives. Ahmad Zewail (2009) calls nanotechnology as the technology of twenty-first century. The global trading trend, the Nanotechnology Forecast Market reported, is expected to have grown at a compound annual growth rate (CAGR) of about 19% between 2011-2013. Over 1800 applications of nanotechnology across regulated sectors have already entered the market, while more complex applications from the third and fourth generation are being developed at various stages. It is also reported that more than 200 companies worldwide are currently active in research and development (R&D) (Project on Emerging Nanotechnologies, 2015). The global market explains that the promises of nanotechnology are no longer fictions; it is now being increasingly deployed at the forefront of national economic development.

Besides the wonderful figures representing the deployment of nanotechnology industry and applications, the *Halalness* of nano-based products remains underexplored. Following the basic principle of Halal regulation, as it similarly applies to nano-based products, a Halal product must be safe, of quality products and is not a danger to the health of consumers (*toiyyiban*). Given growing interest among Halal industry players in the production of consumer products based on nanomaterials, this paper contends that there is a need to investigate whether the legal mechanism or

regime is adequate for protecting consumers. The discussion will touch on relevant regulations for nanobased food products. It will also assess approaches to regulating nano-based products in order to ensure only *Halal* and safe products are produced and sold in the consumer market.

Relevant Legal Provisions Governing *Halal* Products in Malaysia

The genesis of *Halal* authority in Malaysia started in 2004 from the initiatives of the Research Centre of the Islamic Affairs Division ('BAHEIS'), the Prime Minister's Department to produce *Halal* certification for products. In 1994, the certification came with a *Halal* logo by a unit under the supervision of Research Division, Department of Islamic Development Malaysia ('JAKIM'). JAKIM was responsible for issuing *Halal* certificate. At one time, the certification programme was privatised through *Halal* Industry Development Corporation Sdn. Bhd. ('HDC') and individual state religious authorities pursuant to the List II of the Federal Constitution, and was later handed back to JAKIM (Badan Pengeluar Sijil *Halal*, 2012). Legal controls over *Halal* products fell under the general provisions of the Trade Description Act 1972. To supplement the operation of the Act, two regulations were introduced, the Trade Descriptions (Use of Expression *Halal* Order) 1975 and the Trade Descriptions (Marking of Food) Order 1975. In relation to governance, it was assigned to the Ministry of Domestic Trade, Cooperative and Consumerism (the then Ministry of Domestic and Consumer Affairs).

The 1972 Act was not without flaws. Several criticisms were levelled against the efficiency of law in regulating *Halal* in Malaysia. This largely related to the unclear scope of regulatory agencies over powers and jurisdictions to enforce the provisions on *Halal*. The case of *Halal* certification is an exquisite example. While JAKIM was the responsible agency to issue *Halal* certificates, the legal authority to enforce against abuse of *Halal* certificates was vested with the Ministry of Domestic, Trade and Consumer Affairs ('the Ministry'). On the ground, JAKIM has been carrying out *Halal* audit and monitoring across the country. The absence of statutory authority limited JAKIM's ability to exert full control over the activities within the *Halal* industry since they cannot be involved in the enforcement without the presence of the Ministry officials. Prior notice from the Ministry was mandatory should there be any complaint against the abuse of *Halal* certificate or logo. In fact, there were several other agencies that may issue *Halal* certificates.

Given the widening abuse of *Halal* logo, the government came up with a proposal to regulate *Halal* industry throughout its whole value chain. In 2011, the TDA1972 was amended and repealed. Within the scope of *Halal*, the new Trade Description Act 2011 (TDA2011) applies to only *Halal* certification, and the related process, and with the purpose of standardising and

streamlining the enforcement of Halal in Malaysia. Supplementary to the law is the subsidiary legislations relating to Halal enforcement: the Trade Description (Definition of Halal) Order 2011 (TDODH2011) and Trade Description (Certification and Marking of Halal) Order 2011 (TDCMH2011). The new law clarified the delegation of Halal enforcement power to the relevant authorities, and the control over uses and abuses of Halal logo. According to sections 28 and 29, the Minister of Domestic Affairs has the power to appoint a 'competent authority' to issue the certification and marking of 'Halal'. 'Competent authority' is recognised under the Trade Description (Marking of Halal) Order 2011. The 'relevant authority' here has been mandated to JAKIM as the sole issuer of Halal certification, together with the Islamic Religious Departments (JAIN) or the State Islamic Religious Councils (MAIN). Halal Hub Division, a sub-entity of JAKIM, is entrusted to examine and certify foods and non-food products for consumption of Muslim consumers and to issue Halal certification consistent with Islamic principles. The certification is done on voluntary basis, where any business operators can apply to get their products Halal certified.

Prior to 2010, the scenario of governing Halal certification in Malaysia was fragmented. The lack of authority on the part of JAKIM amidst being expert on Halal matters has been described as 'restricting the enforcement of Halal'. In 2010, the Ministry delegated the power of enforcing Halal to JAKIM by way of appointing its Halal Monitoring and Enforcement Section officers (also known as Islamic Affairs Officers) as 'Assistant Controllers of Trade Descriptions'. Consequently, all goods and services can only be marked with Halal logo issued by JAKIM, JAIN or MAIN as the competent authorities.

In terms of the authority of JAKIM personnel, the amended law vests them with statutory delegated power to carry out Halal enforcement on their own. The delegation of power qualifies them 'Assistant Controller of Trade Descriptions (for Halal), with the issuance of an 'authorisation card' from the Ministry. At State level, Islamic Affairs Officers are appointed as Assistant Controllers of Trade Descriptions at JAIN/ MAIN. Taking another way, the Ministry remains the 'Controller' which allows him to make intervention whenever necessary in order to facilitate the implementation of any trade description, Halal products included, as prescribed by the 2011 Act (Department of Islamic Development Malaysia, 2011). During the first appointment, the Ministry appointed a total of 62 JAKIM officers led by the Director of Halal Hub Division together with all Islamic Affairs Officers and Islamic Affairs Assistants under the enforcement unit (Department of Islamic Development Malaysia, 2015). Since Halal power and jurisdictions have been delegated to JAKIM, Assistant Controllers of Trade Descriptions have been increased. As of March 2014, a total of 181 officers have been appointed, with 143 placed at JAKIM and 38 to the JAIN/MAIN throughout Malaysia.

Relating to the abuse of Halal logo, section 28 TDA2011 protects the consumers against misleading or deceitful expressions in the use of 'Halal' logo in goods and services. Within the spirit of the Act, the term 'Halal' is considered a type of trade description. The description of 'Halal' or any other expression is not required under the previous law. In the new law, the TDO2011 contains a legal prescription which requires all goods to contain expression of 'Halal' for the purpose of consumption. This must be read together with MS1500:2009 Halal Food – Production, Preparation, Handling and Storage – General Guidelines. The Standard specifies that the foods or other goods shall satisfy the specified requirements in order to be 'Halal':

- (a) does not contain any part of an animal or thing prohibited by Islamic law for Muslims to eat, nor slaughtered according to Islamic law;
- (b) does not contain anything that is unclean (*najs*) according to Islamic law;
- (c) safe for consumption, non-intoxicating or non-hazardous according to Islamic law (Department of Standards Malaysia, 2009).

It must not contain any part of a human limb or product thereof which is not permitted by Islamic laws and not being toxic or injurious to human health. It must also not be prepared, processed or manufactured using any fecal contaminated equipment. Whenever a particular service relates to food or goods, including transportation, storage and processing of raw materials, catering and retail foods or goods as described as Halal, the expression means that the service must be carried out in accordance with Islamic Law. Any self-declaration of Halal is illegal under this Order. Examples of self-declaration include 'Muslims' food,' *'Halal guarantee'*, 'Ramadhan Buffet', '*Halal toyyiban'*, (merely means allowed and permissible for consumption with relation to Syariah law as long as they are safe and not harmful).

NANOTECHNOLOGY DEVELOPMENT AND SAFETY INITIATIVES IN MALAYSIA

What is nanomaterials?

'Nano' owes its origin from the Greek that means 'dwarf' as representative of the particle size. It engages with the manipulation of materials on atomic or molecular level. It is developed from the merger of diverse scientific disciplines (Aitken, Creely and Tran, 2004) through the process of manufacturing, ranging from molecular chemistry, protein engineering, molecular biology, physics or microscope technology. The manipulation process requires the use of nanomaterials – that refers to structures sizes from 1 and 100 nanometres in at least one dimension. (United States National Nanotechnology Initiative, 2001).

Because of its small sizes, the manipulation of nanomaterials may exhibit physiochemical properties distinct from the rest of bulk materials. This includes changes in optical properties (colours), material, length, conductivity, and surface to volume ratio of nanomaterials. Molecules at the surface of a material do not have full quotient of covalent bonds and are in an energetically unstable state. As the size of the materials transit from micro-scale to nano-scale, there is a dramatic increase in the surface area of nanomaterials in which the properties of the more reactive surface molecules dominate and gives rise to the creation of novel properties – considered as ‘nanomaterials’.

Nanotechnology Safety Initiatives in Malaysia

The manipulation of nanomaterials into existing products and process in Malaysia has begun over past few decades. It was the Eight Malaysia Plan (2001-2005) that became an important driver for accelerating nanotechnology as one of the strategic research domains under the project of the Intensified Research Priority Areas (IRPA) (Economic Planning Unit, 2006, para. 12.39). The focus of IRPA, the Ministry of Science, Technology and Innovation (MOSTI) as the sole funder, was directed on building scientific and expert database in this area, in which it gauged a multidisciplinary array of scientific disciplines to be reflected in the research methodology, and of expertise and institutions in the research projects. The goals of IRPA were aimed at addressing socio-economic aspects of nanotechnology-related research, and proliferate scientific breakthroughs for commercial applications of the technology.

From an industry perspective, making nanotechnology applications available for industrial use is relatively nascent in Malaysia. In the Third Industry Master Plan (2006-2020), nanotechnology is grouped as one of ‘the new and emerging technologies’ together with biotechnology, advanced manufacturing, advanced materials, information and communication technology, and solar energy (Economic Planning Unit, 2006, para 1.63). In 2009, National Nanotechnology Initiative Malaysia (MNNI) was released to promote nanotechnology research by clustering local resources and knowledge between Malaysian researchers, industry and the government. Although the MNNI does not widely address safety issues, one of its strategies highlights the importance of ‘enhancing societal and environmental contribution from nanotechnology’, alongside the positioning of the technology as an engine of economic growth and competitiveness.

The MNNI paved way for the genesis of the National Nanotechnology Directorate (NND) in 2010. NND was created under the auspice of the Ministry of Science, Technology and Innovation. As a national coordination agency, NND is responsible to ensure the safety aspects of nanotechnology

development is addressed across various legislations and industrial sectors, particularly in positioning of Malaysia's nanotechnology industry and products in the global supply value chain. In the meanwhile, the NND is in the process of aligning the current legislations to address activities relating to nanotechnology research, development and commercialisation either under the proposed NanoMalaysia Centre in Iskandar Malaysia (NanoMalaysia, 2014), among the National Nanotechnology Centres of Excellence, or the emergent industry nano-players. (Hamdan, 2014; Hashim, 2009).

The National Nanotechnology Statement (NNS) was announced in 2010 (Ministry of Science, Technology and Innovation, 2014). It contains a general approach to regulating nanotechnology across its value chain in Malaysia. It also becomes the cornerstone of the National Nanotechnology Strategic Direction and Roadmap, the reference document for the draft National Nanotechnology Policy (National Nanotechnology Directorate, 2014). The NNS has made clear of the government's commitment to provide the law and policies which are geared towards protecting the investors' commercial interests and public health. With this in mind, more specific regulatory measures of assessing hazards related to nanotechnology-based products and process are being developed by relevant agencies. According to Hashim et al, 2009, about 1% of the value of products are using nanomaterials as critical components or uses nanotechnology in manufacturing steps. This is not surprising given nanotechnology are still being developed at laboratory stages. In the next coming ten years, technological deployment in four jumpstart sectors identified in the NNS in 2009, environment, food and agriculture, palm oil and energy, electric and electronic products, will bring Malaysia into another phase of wealthy nation. (NanoMalaysia Berhad, 2015). It is realised that the nation's competitiveness advantage is largely dependent on its native requirements and leverage upon strengths within the realm of selected sectors. In order to become a global and regional hub for the industry, the nation ought to step up nanotechnology investment to keep other with striking distance. By deploying the enabling potentials of nanotechnology across the sectors, Malaysia therefore is poised to transform its economy into a high-income nation status by 2020.

Interests over safety of nanomaterials are gradually gaining currency in Malaysia as a result of publication of national statements and initiatives, and ongoing nanotechnology negotiation at international fora impacting on national nanotechnology development. Besides the recognisable potentials, the documents highlight the importance of addressing the legal and regulatory aspects of nanotechnology. There is a positive progression towards developing safe and response approach to the technology. However, Malaysia must have appropriate laws in Malaysia. At the moment, there is no comprehensive review whether the nation would require a piecemeal

legislation to deal with nanotechnology as a whole or follow inherited regulatory environment in the identified base sectors.

REGULATING NANO-BASED FOOD PRODUCTS WITHIN HALAL LEGAL FRAMEWORK

Regulatory approaches to nanotechnology

The use of nanomaterials across various industries raises the concerns about position of nano-based products or nanomaterials itself as a substance as a regulatory category. It is generally understood that regulatory approach to nanotechnology is based on product category (Feitskans, 2013). As explained in the application of nanotechnology in the food sector, nanomaterials are increasingly used in foodstuffs rather than creating a distinct physical look of a food product. The need for having specific definition of nanomaterials in the existing food law depends on the approached taken by regulatory authority. At the moment, two major approaches exist: inclusive approach and exclusive approach. The proponents of inclusive approach contend that the existing legislations are in principle cover nanomaterials together with aspects of health and environmental risks. As Fender (2008) notes, definition of a subject matter is not particle size-specific in most legislations. The issue of specific regulation would only arise if there is unique health risk found in nano-based products (Bawa, 2007). Given the scarcity of scientific data, the government's position to rely on the existing legislations to address the products and processes coming from nanotechnology is understood.

On the other hand, the advocates of exclusive approach disagree with a mere implementation of the legislations. The chief reason relates to, citing the opinion of the European Parliament Committee on the Environment, Public Health and Food Safety (2008), the failure of applying the existing laws to capture the actual nature of nanomaterials. The regulatory authorities are expected to come up with 'a clear regulatory and policy framework' (European Parliament, 2009) so that the investors participating in the nanotechnology industry can safely pour their money in developing the products which are not detrimental human health. Issues lingering around technology regulation is generic – that there is always insufficient data to explain the data profiles of a nanomaterial property, hence it is difficult to determine the safety status of nanomaterials according to the requirement of law. These two approaches are currently being practised in many countries. Majority of the nations are inclined to utilise the current legal framework and develop necessary responses to be tailored made to the perceived risk-profile presented by the technology.

The question of setting the Halal parameter for nano-based products remains little studied. The existing literatures generally inform us that the Shariah has been accommodative of capturing the advances of sciences and

technology, particularly relating to consumable goods. Nanotechnology in particular, by way of definition, relates to matters of size. Size alone, between the range of 1 to 100 nanometres, is not the sole determinant for safety of the products (Lövestam et al., 2011). The smaller the particles are the better impact the particle would have on the taste and technological function in the product.

Halal and haram are essential to Muslims, including products containing novel materials and giving enhanced functions different from regular products. The lack of discussion on the Halal status and legal standard for safety (*toyyiban*) deserve considerable attention in the realm of Halal governance. Certification for nano-based products is an emerging issue for Halal regulatory authority despite relatively low application compared to other regular products. It is timely that JAKIM/ MAIN/ JAIN determine whether the requirement for certification, particularly those involving the technical aspects. Therefore, this paper intends to look at the adequacy of law and regulations concerning safety of food products would capture the use of nanomaterials as ingredients and additives in the products.

The safety governance for food products in Malaysia fall under the jurisdiction of the Food Safety and Quality Division, Ministry of Health. In the Ministry's (personal communication, 20 February 2012) opinion the present law does not discriminate products containing nanomaterials from other regular or novel products. In fact, there is nano-pointer at the time of law drafting. Consistent with the approach taken by most authorities, the Ministry will seek to draw regulatory lessons from other countries and amend the current law to embrace the nanotechnology application and products containing nanomaterials (National Nanotechnology Directorate & NanoMalaysia, 2013). The general concept of safety in food law, section 13 of the Food Act 1983 provides, is succinctly clear which capture the legal control of safety along the the food value chain from preparation to production. The Ministry submission of report to the Joint FAO/WHO Expert Meeting also concedes to the same point that:

'At present there are no specific regulations applicable to the risk assessment of nanotechnology. All food imported or produced domestically including those containing nanoscale particles, must comply with the Food Act 1983 and related regulations, and must be safe for human consumption. In addition, risk assessment is conducted to address potential health risks and is not limited to nanotechnology.' (FAO/WHO, 2013)

By all means, food products containing nanomaterials will not be left in regulatory void. The safety concept is horizontal, dismissing the fact that the law only covers certain types of products. The challenging part is the risk

assessment which requires the Ministry to ensure that there is adequate safety research and testing for human consumption and only food fit for human consumption sold to the public (Ministry of Health, personal communication, 20 February 2012).

CASE STUDY: NANO-BASED FOOD PRODUCTS

The preceding part has explained that the Ministry find the most suitable way, at the moment, to deal with nano-based products is to rely on the existing legislations. The usual standard and procedure for putting products in the market, including the imported substance, shall pass the approval of the Ministry. The regulatory treatment over such products however remains unclear. As the nodal agency, the Ministry is aware that the functional property of nano-particle ingredients (active ingredient) needs to be proven safe through the study of toxicology, both for short and long terms (Ministry of Health, personal communication, 20 February 2012). In this regard, Regulation 3A of the Food Regulation 1985 requires the import, preparation or advertisement for sale or selling of food products and foodstuffs obtained through modern technology to acquire the written approval of the Ministry. As Abdullah (personal communication, 20 February 2012) further reinforces, risk assessment of products will still be based on the standard regulatory approval, unless there is tacit evidence of adverse risk which require additional safety resting.

The broad margin of safety, section 13(1) of the Food Act 1983 states, already encapsulate the advances of food science and technology that products coming into the market must not be poisonous, harmful or injurious. It sufficiently includes the probable cumulative effects of food consumed in similar composition on health of a person consuming the food in ordinary quantities in the subsection (2) of the same section. The parameter of what determines safe or injurious products however is not clear. Malaysian courts in this instance follows the interpretation of the UK Food and Drugs Act 1875. In *Cullen v. McNair*, (1908) 99 LT 358 the court dealt with question whether the safety level of cream boric acid for consumption among children and handicapped persons could be compared to other ordinary adults in similar quantities. Children is considered disadvantaged category of people; hence the exposure to the acid could be more injurious to health unlike other groups. Relating the safety standard to nanotechnology, the challenge for the Ministry is to decide the acceptable level of risk and safety on their own, or to adopt any other countries' standard of similar consumption with Malaysia.

a) Food additives

Food additives has two functions: to improve the quality, texture, consistency, appearance, odour, taste or alkalinity; and to bring other technological

functions in food supply chain encompassing the manufacture, processing, treatment, packing, packaging transport or storage of the food.

Regulation 19 defines 'food additives' as 'any safe substance intentionally introduced in or on a food in small quantities'. The determination of what is safe lies in the types of the additives.

It contains prohibition against any modes of commercial dealing other than permissible food additives. The permissibility criteria is further laid down as:

- (a) the ingredient is authorised as additive under the Regulations
- (b) the proportion of the additive does not exceed the maximum residue limits
- (c) the total proportion of the additive also does not exceed the maximum residue limits
- (d) the food containing additive not in greater quantity than those made under proper technological conditions and in line with sound manufacturing practices, and
- (e) the additive carried over is present in the food is significantly less than normally required for those to achieve an efficient technological function in its own right.

The criterias inform the limits by reference to quantity, but it is silent about denotation of particular size of particles or characteristics of particulate materials. There is no maximum residue limits (MRLs) specified for nano-based food products or foodstuffs. Given the safety of a product relates to toxicological concern, unique health risk is likely to arise in process of regulatory approval.

b) Preservatives and colouring

Prior regulatory approval is applicable to preservatives in Regulation 20. The category of approved substances can be found in the Second Column of Second Table to the Sixth Schedule of the Regulation. Regulation 20(5) further limits the permissible uses of additives must not exceed one hundred. Regulation 21 defines 'colouring substance' as 'any substance that when added to food, is capable of imparting colour to that food and includes colouring preparation. The MRLs for colouring preparation must not exceed than four percent of the allowed colouring substance, and 400 miligrams of benzoic acid, and acidity regulator as permitted food conditioner. The statutory definitions include the limits of MRLs and this arguably may include preservatives and colouring substance produced at nano-scale level would cover in principle the safety of nanomaterials within the scope of current food law.

c) Flavouring substance

The relevant MRLs for flavouring substance are provided in Table 1 to the Eight Schedule. For the imported flavouring substance, an applicant is required to obtain certification issued by national food authorities in the country of its origin and manufacture, and approval from the Director-General of the Ministry of Health. The import procedure must be made consistent with the sanitary obligation under the Agreement on Sanitary and Phytosanitary Measures Agreement (WTO SPS) (Awang, 2014).

The necessity for ensuring the *Halalness* of nano-enabled products is not without challenges. Given insufficient scientific evidence and uncertain risks that are typically thought as the principal barrier to regulation of new and emerging technologies, whereas nanotechnology is included, responses to regulating nano-enabled products within the *Halal* legal framework should be tailored to the perceived risk-profile presented by the technology. At the moment, the assessments of nano-products and their associated risks are not carried out based on the fact that it will continue to be regulated similar to other conventional food products. This is confirmed by the relevant agencies that there is at the moment no unique health risk has been found in approving nano-based products (Ministry of Health, personal communication, 20 February 2012). The agencies' stance is that the current regulatory practice is strongly based on sound science, regulating nano-based products on the basis of *Halal* parameter included. In fact, the approach is similarly applicable to the importation of food products containing nanomaterials. Risk assessment decisions are also made consistent with the available risk data that sourced from other importing members. Unless the use of nanomaterials exceeds the permitted amount, it may give rises to the case of separate risk assessment.

CONCLUSION

The legal case for regulating nano-based products within *Halal* legal framework is critical for Muslims, and not limited to Malaysia alone. *Halalness* of a product, nano-type included, are consistent with the aim of protecting of public health and wellbeing (*maqasid shar'iyah*). The paper has found that the current *Halal* legal framework has covered all consumer goods and products, regardless of the materials used comes from new technologies and of different particle size. Regulation of nano-based products, as applied to other conventional products, is also subject to specific *Halal* monitoring and enforcement similar to other *Halal* approved products. This is also in tandem with the concept of Halal Thoyyiban that permits any goods for consumption as long as they are safe and do not cause harm. While there is limited number of nano-based products are *Halal* certified in Malaysia, they have satisfied the requirement of safety regulation to be under the category of thoyyiban. As nanotechnology safety research in Malaysia is still little studied, the determination of *Halal* status on nano-based products at JAKIM requires

cross-platform agencies to regulate the governance of products containing nanomaterials. It is hoped that the Halal Hub Division, JAKIM as the expert body dealing with *Halal* industry would take seriously nanotechnology development and safety in products, and also process, into their regulatory programme and enforcement of *Halal* involving such products.

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