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## AN OVERVIEW OF *BUDU* PRODUCTION IN KELANTAN FROM HALAL AND POLICY ASPECTS

<sup>i</sup>Nursyamimi Zawani Mohd Shoid, <sup>\*,ii</sup>Zalina Zakaria, <sup>i</sup>Adibi M. Nor

<sup>i</sup>Institute for Advanced Studies, Universiti Malaya, Kuala Lumpur

<sup>ii</sup>Universiti Malaya Halal Research Centre & Academy of Islamic Studies, Universiti Malaya, Kuala Lumpur

\*(Corresponding author) email: [zalina\\_jsu@um.edu.my](mailto:zalina_jsu@um.edu.my)

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### ABSTRACT

*Budu* or fish sauce is a traditional food of the East Coast communities in Peninsular Malaysia that is produced through a fermentation process between 6 to 12 months in the covered containers known as unprocessed *budu*. Meanwhile, the processed *budu* is prepared by grounding coarsely unprocessed *budu* before mixing with tamarind paste, palm sugar, sugar, monosodium glutamate (MSG), food colouring, and then boiled. Once the mixture is filtered, processed *budu* is cooled, bottled and marketed all over Malaysia. Currently, there are 30 *budu* manufacturers in Kelantan and four in Terengganu. However, based on the recent data, only one brand of *budu* is halal-certified as compared to other Malaysian fermented fish products, i.e., *belacan* (64), *pekasam* (14), and *cencaluk* (13). The study offers some important insights into the issues that arise in *budu* production from the halal and policy aspects that may hinder the manufacturers from applying halal certification. The use of qualitative studies is a well-established approach in this study. Five broad themes emerged from the analysis, the low quality of raw materials (anchovies), as well as lack of awareness and knowledge base in food safety and hygiene practices among the manufacturers and workers are identified as the main factors contributing to scare-mongering against halal certification. In addition, we found shortage of raw materials (anchovies), lack of incentive and specification standards for the quality of *budu* were the bottleneck of halal application among the *budu* entrepreneur. Therefore, more outstanding efforts are needed to ensure the involvement and cooperation from the government agencies and regulators as well as *budu* manufacturers to help them penetrate the international market. Indeed, a desire is needed to boost the exportation of *budu* globally following the market demand and opportunities.

**Keywords:** *budu*, fish sauce, halal, policy, fishery products

## Introduction

Fish sauce is a local heritage food, and traditional condiment found abundantly in Southeast Asian countries and various continents. The fermentation of fish sauce assists in preserving and enhancing the value of small pelagic species that are often underutilized or abandoned. In Malaysia, this home-grown dish is known as *budu*, with different names in the other countries, as shown in Table 1.1.

**Table 1** Fish sauces from around the world (Shivanne Gowda, S. G., Narayan, B., & Gopal, S., 2016)

Name	Fish spp. used	Fish:Salt	Fermentation time	Country
Aek Jeot	<i>Astrosopus japonicas</i> <i>Engraulis japonica</i>	3-4:1	12 months	Korea
Anchovy	<i>Engraulis encrasicolus</i>	2:1	6-7 weeks	France
Bakasang	<i>Sardinella</i> spp.	5:1	5-6 weeks	Indonesia
Budu	<i>Stolephorus</i> spp.	3-5:1	3-12 months	Malaysia
Colombo-cure	<i>Ristelliger</i> spp. <i>Cybium</i> spp. <i>Clupea</i> spp.	6:1	12 months	India and Pakistan
Garum	<i>Tunnus thynnus</i> <i>Scomber scombrus</i>	4:1	9 months	Roman
Garos	<i>Scomber colias</i> (liver)	9:1	8 days	Greece
Gau-ca	<i>Ophicephalus</i> spp.	3:1-3:2	2-3 months	Cambodia
Ishiru	<i>Astrosopus japonicas</i> <i>Clupea pilchardus</i>	5:1	6 months	Japan
Ketjap-ikan	<i>Stolephorus</i> spp. <i>Clupea</i> spp. <i>Leiagnathus</i> spp. <i>Osteochilus</i> spp.	6:1	6 months	Indonesia
Mahyaveh	<i>Sardinella</i> spp.	3:1	6 months	China
Nam-pla	<i>Stolephorus</i> spp. <i>Ristrelliger</i> spp. <i>Cirrhinus</i> spp.	1-5:1	5-12 months	Thailand
Nouc-mam	<i>Clarius</i> spp	3:1-3:2	2-3 months	Vietnam
Patis	<i>Stolephorus</i> spp. <i>Clupea</i> spp. <i>Decapterus</i> spp. <i>Leianathus</i> spp.	3-4:1	3-12 months	Philippines
Pissala	<i>Ahya pellucid</i> <i>Gobius</i> spp. <i>Engraulis</i> spp. <i>Atherina</i> spp.	4:1	2-8 weeks	France
Yeesui	<i>Sardinella</i> spp. <i>Engraulis pupapa</i>	4:1	3-12 months	Hong Kong
Yu-lu	<i>Stekophorus</i> spp.	3:1	6 months	China

*Budu* is a Malaysian traditional fermented fish sauce produced by mixing anchovies with salt with the ratio of 2:1 or 3:1 or 3:2 before undergoing a fermentation process up to 12 months. As a result of the long fermentation process, the appearance of *budu* is a turbid brown liquid with a salty taste, and it plays a significant role as a cheap source of protein in the daily dietary intake. In addition, the strong umami flavor produced by this traditional fish sauce is often used as a condiment in Malay dishes, such as 'singgang ikan' and 'nasi kerabu' or as a dipping source for raw vegetables (*ulam*) and grilled fish eaten together with white rice. As Malaysia is well-known as a country rich with a tremendous variety of food, the consumption of *budu* is no longer restricted mainly to the people of the east coast state of Malaysia but widely consumed by the people of all over parts of this country.

In terms of halal, the consumption of halal food has been emphasised repeatedly in the Quran, for example:

Translation: “O mankind, eat from whatever is on earth [that is] lawful and good and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy”

(Surah Al-Baqarah: 168)

Since there is only one halal-certified budu (*Budu Cap Ketrereh*) in the market, there is an urgent need to promote the importance of producing more halal budu to cater the people’s demands. At once, after this brand is certified halal, the products will successfully penetrate the international market, Europe and Saudi Arabia. As in the budu processing industry, the main ingredient used in budu is a type of fish (anchovies) which is categorized in the family of marine animals, so there is no issue on halal status of budu. However, in the concept of *halalan toyyiban*, which means lawful, safe, good quality and wholesome, the aspect of *toyyiban* itself compromises the safety and quality of the product (JSM, 2013). As in the budu processing industry, there is no issue on the source of raw materials, which is lawful (halal). However, the budu production processes involve *toyyiban* aspect and are generally unhygienic, lack quality controls and have the possibility of microbial contamination occurrence that can affect the safety and quality of the budu. Food hygiene is vital to safeguard public health as failure to comply may cause food poisoning thus, not safe for human consumption.

Meanwhile, according to Food Regulations 1985, “*Fish sauce shall be the fish product in the form of liquid prepared from fresh fish, other than shellfish, with salt fermentation and includes budu. For the purpose of these Regulations, budu shall be the fish product obtained by salt fermentation of anchovies of *Stolephorus* species or a mixture of anchovies with other small fish. Fish sauce shall contain not less than 15% of salt and 5% of protein, may contain other food and shall be clean and wholesome and shall not contain other extraneous matter. Fish sauce may contain permitted preservative, permitted colouring substance and permitted flavor enhancer.*” However, as referred to this Regulation 164, most budu in the market do not contain any information on nutritional values regarding the amount of salt and protein permitted as stated above.

Hence, more issues related to the *toyyiban* aspect and need to be explored to enable the marketability of budu in the future. Thus, the budu product must be under strict hygiene practices to ensure their quality and safety in the market competition.

## **Research Methodology**

Content analysis of a systematic review of literature has been used in this study to analyze the issues involved in budu industry. Further, the findings from previous studies have been categorized either under the theme of halal or policy aspects (Cavana et al., 2001). Inductive content analysis has been used to advance the understanding of both halal and policy issues that arise in the budu production in Kelantan since there are no previous studies on this topic accordingly (Moldavska & Welo, 2017; Moretti et al., 2011). The advantage of this kind of analysis is that information is gained directly from the data without imposing any preconceived theories.

## **Review of study**

In this paper, a comprehensive review and analysis of various issues associated with the budu processing industry have been discussed and summarised. This review concentrates on the halal and policy issues that usually involve the correlation between the budu production processes, budu entrepreneurs, government agencies and regulators and government policies related to this economic sector. This paper aims to explore the issues and challenges that may hinder the budu entrepreneurs from applying for halal certification. Besides, this study is also conducted to find the best recommendations and suggestions that could be done to improve the safety and quality of the budu industry. This paper will discuss five main issues on halal and policy aspects; 1) Insufficient supply and low quality of raw

materials; 2) Lack of awareness and knowledge base on food safety and hygiene practices; 3) Poor processing techniques; 4) Inadequate incentive and financial aid; and 5) Lack of specification standard for *budu* production.

### **Insufficient supply and low quality of raw materials**

The main factor that affects and interrupts the whole production of *budu* is the supply and quality of raw materials, i.e. the anchovies (*Stolephorus* spp. or *Sardinella* spp.) (Soon-Eong & Sen-Min, 2002). Since the local supply of anchovies in Kelantan is only available for six months prior to North-East Monsoon, it would be difficult for *budu* entrepreneurs to obtain and adequately store their raw materials to fulfill the local demand throughout the year (Wan Ahmad, 2014). Without an appropriately designated area of standardised storage, the quality of the anchovies will be degraded over time.

On the other hand, some *budu* entrepreneurs get their anchovies from the neighbouring country, Thailand (Tan Sali, 2009). They acquired the supply without any restriction to the monsoon weather at a much lower price. Nonetheless, this alternative source of anchovies' supply should be monitored closely with the involvement of regulators; the Royal Malaysian Customs Department (RMCD) and the Malaysian Quarantine and Inspection Services (MAQIS) on whether the supply is received illegally with the association of smuggling activities at the border of both countries. Apart from that, the research has been done with replacing of anchovies from the other part of Malaysia, Pulau Pangkor. However, due to geographical factors in which Kelantan is surrounded by the South China Sea while Pulau Pangkor located in the Straits of Malacca, the taste of *budu* results differently from the original (Tan Sali, 2009). Thus, the role of the Department of Fisheries Malaysia (DOF) is significant in maintaining a reliable supply towards the sustainability of the *budu* industry.

Besides that, the quality of raw materials (anchovies) also influences the fermentation process involved in *budu* production. Good quality of raw materials is crucial as it is a part of *toyyiban* aspect of the halal concept. The source and quality of anchovies should be safe from heavy metals and chemical residue, as well as in fresh condition to prevent any microbial contamination and uncontrolled formation of histamine that may cause health risks (Ghazali et al., 2011). The market price of anchovies is unstable depending on the catch, demand, supply, species and quality of anchovies. Regarding this issue, some *budu* entrepreneurs tend to buy anchovies later in the evening to get a lower price offered by local fishermen (Eong, Hariono & Sulit, 2011). Even so, the freshness of anchovies might be reduced and, in some cases, has already rotten. This incident will result in low value and quality, although this product must comply with minimum food safety requirements.

Since the production and marketing activities of the *budu* industry are culturally inherited from one generation to another generation, the enforcement and monitoring of the product's price are challenging due to the market price solely depending on the fluctuating cost of raw materials. This scenario, in turn, lowering the chance to penetrate the international market. Therefore, the responsibilities of government agencies are needed in developing a great fisheries management system to enhance the quality and consistency of raw materials supply in line with the food security of fish utilisation.

### **Lack of awareness and knowledge base in food safety and hygiene practices**

Another significant issue in *budu* processing industry is a lack of awareness and knowledge base in food safety and hygiene practices. The case of botulism caused by fermented fish products has been reported once and might pose a harmful risk to individual health (Wan Ahmad, 2014). The importance of participating in food handling courses is still unattended among *budu* entrepreneurs and their workers. The course initiated by the Food Safety and Quality Division, Ministry of Health Malaysia (MOH), aims to provide awareness and exposure to all food handlers on the aspects of food hygiene and safety, food handlers, food premises and also to lower the occurrence of nationwide food poisoning

(Ministry of Health (MOH), 2021). It is an introductory course for small-scale businesses before they can apply for Food Safety and Responsibility of the Industry (MeSTI) and halal certifications.

The hygienic and safety factors of the product are essential to fulfil the requirements of the *toyyiban* aspect in applying for halal certification. Once the industry has been halal and MeSTI certified, it is a good start to establish Good Manufacturing Practices (GMP), Hazard Analysis Critical Control Point (HACCP) and quality control requirements for *budu* production (Bagarinao, 2005). As a result, the safety and quality of *budu* could be enhanced and public health could be safeguarded. Shortly, the possibility to bring this product regionally or internationally is undeniable.

### **Poor processing techniques**

On the other hand, the *budu* industry is also facing the problem of poor processing techniques during the production phase. Therefore, there is a need to standardise the processing techniques and improve the packaging of the products so that the *budu* entrepreneurs may realise the optimal prices for their products (Soon-Eong & Sen-Min, 2002). However, as the processing techniques involved in *budu* production have been practised and inherited since years ago, there is a lack of standardised processing techniques that have been documented and verified by the local authority, Fisheries Development Authority of Malaysia (LKIM). This will result in inconsistent quality and taste of the *budu* from one to another production batch due to the fermentation process exceeding beyond the standard fermentation period (6-12 months). Additionally, the poorly hygienic processing areas will contribute to microbial contamination that later will affect the quality of the product and is harmful for human consumption (Rosma et al., 2009).

Moreover, the cleanliness of the water supply used in the production, which is directly pumped from the nearby rivers, is not guaranteed, and will affect the product safety (Lee et al., 2012). The *budu* industry is usually commenced as a small-scale family business located at the open space in the backyard of the owner's house. So, the fermentation process is usually carried out in this open space without appropriate control and monitoring of optimum temperature and moisture that achieves standards of the final product. The controlled fermentation needs to be emphasised to preserve the nutritional value and comply with the safety and quality requirements stated in Food Act 1983, Food Regulations 1985 and Food Hygiene Regulations 2009. For instance, Thailand's fish sauce (*nampla*) is the exemplary model of a booming traditional industry that experienced a long journey of improvement and enhancement of the product to reach international standards and currently dominates the market demand globally (Eong, Hariono & Sulit, 2007).

### **Inadequate incentive and financial aid**

The fermented fishery products including *budu*, are still trapped in the traditional processing sector due to the irrelevance of quality to enter the global market. Thus, they have low value in terms of the quality of the product and processes involved. In order to overcome this issue, an adequate amount of incentive and financial aid is required to revamp this local heritage dish (Soon-Eong & Sen-Min, 2002). The provision of incentives is necessary to assist the improvement of quality and processing method of *budu*. Hence, the *budu* industry and fishery products generally could be listed as one of the main contributors to the country's economic resource.

Through its agency, Fisheries Development Authority of Malaysia (LKIM), the government should be concerned about the significance of providing incentives not merely in the form of financial, but also in the aspect of training courses on skills and awareness, research and development activities and market promotion strategies. Furthermore, the cooperation of the Council of Trust for the People (MARA) in the field of training, coaching, mentoring and consultancy; the Malaysian Agricultural Research and Development Institute (MARDI) in the area of research and development activities; and Kelantan State

Economic Development Corporation in the matter of market promotion strategies could assist the betterment of *budu* processing industry in Kelantan.

### **Lack of specification standard for *budu* production**

As mentioned in the early part of this article, the production of *budu* was done through the methods and knowledge inherited from one generation to another. However, most *budu* entrepreneurs did not emphasise on the storage and packing equipment to preserve their products better (Sim, Chye & Anton, 2015). This scenario is due to the absence of standardised procedures, resulting in various final product qualities differing from one entrepreneur to another (Wan Ahmad, 2014).

Furthermore, the absence of scientific protocols in the processing operations of *budu* will lead to difficulty in maintaining the whole fermentation process. The fermentation period is also determined by previous practices and not based on scientific studies. The quantity and quality of the substrates and raw materials used and the process of cooking *budu* after the maturity phase are also not standardised (Bagarinao, 2005). This case results in inconsistent product quality and makes commercialisation difficult on a large scale due to the absence of fermentation standards that meet international requirements. (Tan Sali, 2009).

However, the Food and Agriculture Organization of the United Nations (FAO) together with the World Health Organization (WHO) have provided the international food standards specifically on the fish sauce (Codex) that serve as an excellent guideline for *budu* standardisation. This standard contained all the scopes that need to be highlighted in the product of fish sauce for example the essential and quality factors, food additives, contaminants and sample analysis (Codex, 2011). Despite the slight difference of product definition which stated; “*Fish sauce is a translucent, not turbid liquid product with a salty taste and fish flavor obtained from fermentation of a mixture of fish and salt.*” which clearly opposite with *budu* itself as a turbid liquid product, the regulator involved in the development of *budu* standardisation could investigate more on this matter.

### **Conclusion**

*Budu* is a tremendous traditional local relish in Kelantan cultural heritage. It serves as a significant source of cheap protein in the people’s dietary intake in Kelantan and Malaysia, in general. Considering the importance of this local condiment to the diet of the people and the significance of a safe food supply to food security, there is a strong urge to improvise the quality and safety of this product. Thus, a stable supply of good quality raw materials, enhancement of processing and operational infrastructure, strengthening of research and training activities, and developing a specific standard of *budu* production will be impactful to this industry and assist the journey of applying for halal certification in Malaysia.

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