

The concern and awareness of consumers and food service operators towards food safety and food hygiene in small and medium restaurants in Surabaya, Indonesia

*Sienny, T. and Serli, W.

*Hotel Management Program
Faculty of Economics
Petra Christian University
121-131 Siwalankerto Surabaya 60236, Indonesia*

Abstract: Consumers and food service providers have an important role in preventing food-borne illness. The purpose of the study was to investigate the concern and awareness of consumers and food service operators toward food safety and food hygiene practices in small and medium restaurants in Surabaya. Observations, survey, and interview methods were used in this study. The findings show that about 64 percent of small restaurants and 72 percent of medium restaurants comply with the requirements requested by the legislator. Consumers have the most concern about the dining area. The owners of small restaurants give the highest priority to the food ingredients and ready-to-eat food, while the owners of the medium restaurants give the highest priority to the kitchen.

Keywords: Food safety, food hygiene, small restaurants, medium restaurants

Introduction

People have meals every day, either at home or away from home. When people spend their money on meals outside, they expect to have good quality food with an acceptable food hygiene level, which eliminates food-borne illness. As food is a primary need for human beings, it should be put into account in terms of nutritional content, pre-requisite of healthy and hygienic food that is safe to consume. According to Sampurno, the Head of the National Agency of Drug and Food Control, about 80% of food-borne illnesses that happen in Indonesia are caused by a lack of hygiene in processing the food.

Some cases of food-borne illnesses that have happened in Surabaya should increase the awareness of people and food service businesses about the importance of food safety and food hygiene practices. Consumers and food service providers have an important role to play in preventing food-borne illness. According to World Health Organization report in 2002, food borne disease caused by microbiological hazards is a large and growing public health problem in Europe and worldwide (Clayton *et al.*, 2003). Consumers are not in the position to accurately assess food risk themselves. However, they rely on the food industry and government to minimize the risk for

them. Delivering safe and clean food to consumers is the responsibility of operators at all levels of the food production chain. Increasingly, primary producers are being required to guarantee that their products are free from chemical residues, growth hormones, diseases and other health risks such as lead. Marketers have always played an important part in guaranteeing food safety and quality (Smith and Riethmuller, 2000).

Surabaya is the second largest city in Indonesia, after Jakarta, where dining-out has increasingly become the metropolitan life-style for people spending their leisure time. They are so eager to dine out and try new exciting restaurants in town. As a result, new restaurants are opening regularly. Indeed, in recent years, small and medium food service operators dominate the restaurant business. Therefore, the identification of food service providers in small and medium restaurants with respect to food safety is important as it can inform consumers how safe and hygienic the food they consume at those restaurants is.

The rapid growth of food service establishments in Surabaya attracts researchers to further analyze food safety and food hygiene practices as well as to examine consumers' and food service operators' concern and awareness of food safety and food hygiene in both small and medium food businesses in

Surabaya. Moreover, this study also aims to examine the compliance of small and medium restaurants with food safety legislation using guidance from the Decree of the Minister of Health Republic of Indonesia No. 1098/MENKES/SK/VII/2003 about the requirement of the kitchen, dining-room, food ingredients and processed food, the processing of the food, the storage of the food ingredients and ready-to-eat foods, food serving and the utensils used.

Food safety risk defined

According to Australia New Zealand Food Authority (2001), “food is not safe if it would be likely to cause physical harm to a person who might later consume it”. Yeung and Morris (2001) describe that the analysis of risk relating to food safety can begin with the identification of food hazards. Furthermore, a hazard is defined as “an event or occurrence associated with an activity or process, which can result in negative consequences and thereby provide a source of risk to a receiving environment or population”. Norton (2002) notify that there are three basic types of hazards that can cause food-borne illness, namely: (1) Microbiological hazards caused by bacteria such as *Salmonella*, *Campylobacter coli*, *Listeria monocytogenes*, etc; (2) Chemical hazards associated with the use of chemical additives, processes and controls in the agricultural and food industries such as pesticides, toxic metals, or toxic cleaning products; (3) Physical hazards which can exist when food products may contain particles of glass, metal, plastic, wood, hair, jewellery or dirt. In addition, food-borne disease outbreak is defined as “two or more related cases of illness caused by consumption of food or drink containing infectious agents, or a single case of chemical or toxic poisoning if laboratory evidence indicated food to be contaminated by the chemical or toxin”.

Consumer's perspective

From the customer's perspective, food safety risk refers to food safety and risk perception with respect to potentially hazardous and harmful consequences to them (Yeung and Morris, 2001). Thus, the goal of food safety is to acquire food products which have the desired consumption attributes, are safe to eat, and are free of contamination and therefore free of worry to the customer. Through consumer's food choice decisions and consumption behavior, consumers may be exposed to a number of potential food hazards, associated with different degrees of harm (Miles *et al.*, 2004). According to the research conducted by Leach *et al.* (2001), there are some factors highlighted by customers as the most important factors in providing

food, namely: flies being kept away from food; personal hygiene issues: cleanliness of equipment, surfaces and premises; and the temperature control of food. Additionally, eating safe food will help people avoid food-borne illness and financial burdens, such as lost production owing to sickness-related absences from work that ultimately affect individuals and their families (Miles *et al.*, 1999).

In order to create a better food hygiene environment, according to Morrison *et al.*, (1998), the driving force for change in a commercial world must be the customer who must see hygiene accreditation as a pre-requisite to doing business. It is important that customers are educated, as well as providers. When hygiene is highly demanded, market forces will prevail and hygiene will be supplied. In other words, customer awareness of food hygiene will drive a better hygienic food service business.

Food service operator's perspective

Food service operators should have a better knowledge about food safety and hygiene since consumers spend money on a meal and expect that eating the meal should not make them sick. Despite better knowledge, a clear understanding of how and why consumers perceive food safety risk cannot be neglected since the uncertainty of achieving food safety goals may lead to some possible consequent losses for consumers (Yeung and Morris, 2001). According to Roselius (1971) as cited in Yeung and Morris (2001), consumers tend to adopt one of four actions in order to reduce perceived risk in a purchase, they are: (1) Stop permanently or temporarily, the purchase of offending product; (2) Reduce the purchase of the offending product; (3) Shift from one product to another similar type of product with less perceived risk; and (4) Continue to purchase and absorb the unresolved risk.

It is obvious that the reduce purchase by customers will lead to the reduce profit of food service operators. This matter should be acknowledged by the food service operators and cause them to pay more attention to the food safety and hygiene practices in their business. Additionally, for food service companies with established brands, preparing and serving safe food is vital to enjoying continued success in a global economy. A failure to ensure the consistent quality and integrity of goods and services delivered to the public under registered proprietary marks may result not only in lawsuits, but also in potentially much more devastating globally negative publicity and brand erosion (Fournaris, 2002). Therefore, food service operators should always ensure that food is delivered safe, clean and free of contamination to consumers

in order to increase restaurant's profitability and create consumer confidence in the safety of the food (Morrison *et al.*, 1998). Food service operators should guarantee their consumers that their products are free from chemical residues, growth hormones, diseases and other health risks by handling and displaying the food in a hygienic condition (Smith and Riethmuller, 2000).

Reduce food risk

In food service businesses, risk will always exist and therefore food service operators need to identify preventive measures that can be taken at each level on their premises in order to eliminate or reduce such risks to an acceptable level (Norton, 2002). There are some actions which can be taken by food service operators to reduce food safety risks. In general, Hernandez (2001) suggests that food must be held, displayed and served at temperatures that will keep it safe and sanitary at all times. It is therefore critical for food service operators to train staff who serve food about proper food serving and handling techniques so that the risk food safety can be minimized. Similarly, Food service operators should make sure that food handlers are supervised, instructed and/or trained in food hygiene to an appropriate level (Miles *et al.*, 1999). Wilson *et al.* (1997) offer another suggestion to reduce food risk by monitoring the use of a number of approaches including systematic observation, measurement and recording of the significant factors for controlling the hazards. The monitoring procedures chosen must enable action to be taken to rectify an out of control situation, either before or during other operations.

Furthermore, food handlers have a crucial role in any food service businesses. The importance of food safety education for improving food-handling behaviors has been increasingly recognized during the past 10-20 years (Redmond and Griffith, 2006). According to Howes *et al.* (1996) cited in Worsfold and Griffith (2003), food handler's malpractices contributed to 97% of food-borne illness in food service establishments. As a result, such mistakes place consumers at considerable risk of contracting food borne illness, leading to increased individual and societal costs due to pain and suffering, loss of economic productivity and pressures on primary and public health resources (Kennedy *et al.*, 2005). Therefore, in every food service businesses, food handlers should have the skill and knowledge of food safety and hygiene to ensure that food is safe to be consumed by the public.

Methods

For the purposes of the study, the objects in this paper were categorized into two types of restaurants, called small restaurants and medium restaurants, depending on the number of seats and staff. Restaurants that have 10-25 seats with 2-5 staff are categorized as small restaurants, while restaurants with 26-50 seats and 6-10 staff are categorized as medium restaurants.

The data used in the analysis presented in this study were collected by utilizing three kinds of data collection methods, called observations, survey, and face-to-face interviews. First, observations were held in 10 small restaurants and 10 medium restaurants. A cluster sampling technique was used to ensure that the selection of small and medium restaurants was equal. As Surabaya is divided into 5 territories, called North Surabaya, South Surabaya, Central Surabaya, West Surabaya, and East Surabaya, the observations were undertaken in each of these territories. Further, the type of observation used in this study was an undisguised observation where the owners of the restaurant gave permission to the observers to investigate the practice of food safety and food hygiene in their establishments. Observations were conducted in 50 small restaurants and 50 medium restaurants using a survey checklist that was already prepared and adjusted referring to the Decree of the Minister of Health Republic of Indonesia No: 1098/MENKES/SK/VII/2003 about sanitation hygiene requirements for restaurants in Indonesia. It was categorized into 29 requirements in the following 7 areas: (1) kitchen; (2) dining-room; (3) food ingredients and processed food; (4) the processing of the food; (5) the storage of the food ingredients and ready-to-eat foods; (6) food serving; and (7) the utensils used. The data collected from the observations was analyzed using descriptive statistics to examine whether the restaurants comply with the requirements in their food establishments.

Second, surveys were undertaken of the consumers of small and medium restaurants. Quota sampling was applied to determine that in each territory 50 respondents were selected for each type of restaurant. The survey was done by using a questionnaire as an instrument. The questionnaire used in this study was aimed to identify the concern and awareness of consumers toward food safety and food hygiene. The questions used in the questionnaire were also referred to in the Decree of the Minister of Health Republic of Indonesia No: 1098/MENKES/SK/VII/2003. It consisted of observing 7 (seven) areas in the restaurant with 29 quotations in total using a 5 (five) likert scale ranging from very important to very unimportant.

The questionnaire was distributed to 500 consumers of small and medium restaurants in Surabaya. The data collected from the questionnaire was analyzed by using descriptive statistics to calculate frequency distribution and Mean.

Third, face-to-face interviews were conducted by interviewing 2 small and 2 medium restaurants in each territory. Non probability sampling was applied using a convenience sampling technique. The interviews used in this study were aimed to examine the concern and awareness of food service operators toward food safety and food hygiene. There were 20 restaurant owners of small and medium restaurants interviewed. The interviews took place in the restaurant of food service operators and each interview lasted approximately 10-15 minutes. The restaurant owners were asked a set of questions on their knowledge about food safety and hygiene, the need of training in their establishment, the obstacles in implementing food safety and hygiene practices and their priority scale of the 7 (seven) areas set by the Decree of the Minister of Health Republic of Indonesia No: 1098/MENKES/SK/VII/2003.

Results

The observations were conducted in 50 small restaurants in Surabaya. Each small restaurant was observed using the checklist which consists of 29 quotations over 7 areas. Nine of the quotations had a higher percentage of non-compliant than those of compliant restaurants in regards to the implementation of food safety and food hygiene practice in their establishments. They are air ventilation; fruit/vegetables washed properly; all the requirements of processing food; temperature control of the food; cleanliness in storing food ingredients and temperature of food served (Table 1).

While, from the observations in 50 medium restaurants, it was found that only 4 out of 29 quotations had a higher percentage of non-compliant than those of compliant under the criteria set by the legislator. They are air ventilation; fruit/vegetables washed properly; personal hygiene; and temperature of food served (Table 2).

Data shown in table 3 indicates that medium restaurants have carried out the practice of food safety and food hygiene better than in small restaurants where in medium restaurants, all areas have a higher compliant percentage than non-compliant. Processing of the food had the greatest percentages of non-compliant requirements in both small and medium restaurants, 63 per cent in small restaurants and 47 per cent in medium restaurants. The highest

compliance of food safety and hygiene practices in small restaurants was the area on the utensil used, while in the medium restaurants they were the dining room and food serving. In average, only 64 percent of small restaurants and 72 percent of medium restaurants comply with the requirements set by the legislator.

A total of 500 respondents took part in fulfilling the questionnaire. Of the respondents, 53.8 percent were female, 66.6 percent were in the age of 17-30, and 50.4 percent had senior high school background (Table 4). The questionnaires were distributed evenly in West, East, Central, South, and North Surabaya.

In order to examine the concern and awareness of consumers towards the practice of food safety and food hygiene in food service establishments, questionnaires were distributed with five possible responses, ranging from very unimportant to very important. Data in Table 5 shows that all requirements in medium restaurants had a higher mean score rating than in small restaurants. The overall mean of small and medium restaurants were 4.16 and 4.36 respectively.

Of the 500 respondents taking part in the research, more than 90 per cent of consumers perceived the practice of food safety and food hygiene in small and medium public eating-places as important and very important (Table 6). Only less than 3 per cent of respondents stated that food safety and food hygiene were not important.

A total of 20 restaurant owners participated in the interviews that took place within the business premises. The interviews used the same interviewer throughout the research in order to achieve consistent interpretation in regard to the implementation of food safety and food hygiene in their business. From the interviews, it was found that about 50% of small and medium restaurant operators did not know that there was a guideline or requirements set by the legislator to maintain food safety and food hygiene. More than half (60 per cent) of the owners stated that it was necessary to have guidelines on food safety and food hygiene in order to provide safe food to consume and attract consumers to come. However, when it was asked whether they need food safety training, 13 out of 20 restaurant owners who were interviewed said that they did not need any training for their staff as well as for themselves in regards to the practice of food safety and food hygiene in their establishments.

Based on priority scale for those 7 areas of food safety and hygiene practice, the owners of small restaurants gave the highest priority to the requirements of the food ingredients and ready-to eat food and the lowest priority to the utensil used. As for

Table 1. Observation towards food safety and hygiene in small restaurants

Area of Concern	Quotation	Non-Compliant (%)	Compliant (%)
The kitchen	Kitchen roof	34	66
	Air ventilation	78	22
	Kitchen area	34	66
	Washing area	14	86
The dining room	Cleanliness of tables and chairs	14	86
	Food display facilities	38	63
	Free of insects, rats, etc	38	62
Food ingredients and ready-to-eat food	Cleanliness of floor, roof, wall	46	54
	The good condition of food ingredients	0	100
	The good condition of ready-to-eat foods	0	100
	Fruits/vegetables washed properly	95	5
The processing of the food	Avoid direct body contact in handling food	68	32
	Use utensil, gloves in handling food	60	40
	Personal hygiene	69	31
	Hygienic food handling	54	46
The storage of food ingredients and ready-to-eat food	Protection of foods	42	58
	Temperature control of food	58	42
	Cleanliness in storing food ingredients	58	42
	Store separately between food ingredients & ready-to-eat food	24	76
Food serving	Avoid food contamination	32	68
	Cleanliness of serving utensil	18	82
	Touch ready-to-eat foods with clean utensil	8	92
	Temperature of the food served	55	45
	Serve food with appropriate manner	16	84
	Facilities provided by the restaurants (clean water, sink for washing hands, trash bins, etc)	8	92
The utensil used	Appropriate utensil	12	88
	Utensils are clean before using them	6	94
	Wash utensil in a proper way	16	84
	Store utensil in a proper way	36	64

Table 2. Observation towards food safety and hygiene in medium restaurants

Area of Concern	Quotation	Non-Compliant (%)	Compliant (%)
The kitchen	Kitchen roof	37	63
	Air ventilation	54	46
	Kitchen area	19	81
	Washing area	10	90
The dining room	Cleanliness of tables and chairs	4	96
	Food display facilities	25	75
	Free of insects, rats, etc	23	77
	Cleanliness of floor, roof, wall	25	75
Food ingredients and ready-to-eat food	The good condition of food ingredients	0	100
	The good condition of ready-to-eat foods	4	96
	Fruits/vegetables washed properly	87	13
The processing of The food	Avoid direct body contact in handling food	46	54
	Use utensil, gloves in handling food	42	58
	Personal hygiene	61	39
	Hygienic food handling	37	63
The storage of food ingredients and ready-to-eat food	Protection of foods	25	75
	Temperature control of food	40	60
	Cleanliness in storing food ingredients	50	50
	Store separately between food ingredients and ready-to-eat foods	12	88
Food serving	Avoid food contamination	10	90
	Cleanliness of serving utensil	15	85
	Touch ready-to-eat foods with clean utensil	4	96
	Temperature of the food served	54	46
	Serve food with appropriate manner	25	75
	Facilities provided by the restaurants (clean water, sink for washing hands, trash bin, etc)	8	92
The utensil used	Appropriate utensil	13	87
	Utensils are clean before using them	17	83
	Wash utensil in a proper way	23	77
	Store utensil in a proper way	31	69

Table 3. Summary of food safety and hygiene practices in small and medium restaurants

Areas of Concern	Small restaurant		Medium restaurant	
	Non-Compliant (%)	Compliant (%)	Non-Compliant (%)	Compliant (%)
The kitchen	40	60	30	70
The dining room	34	66	19	81
Food ingredients and ready-to-eat foods	32	68	30	70
The processing of the food	63	37	47	53
The storage of the food ingredients and ready-to-eat Foods	45	55	32	68
Food serving	23	77	19	81
The utensil used	18	82	21	79

Table 4. Characteristics of respondents

Characteristics	Frequency	Percentage
Gender		
Male	231	46.2
Female	269	53.8
Age		
<17	15	3.0
17-30	333	66.6
31-50	124	24.8
>50	28	5.6
Education background		
Junior high school	27	5.4
Senior high school	252	50.4
Diploma/bachelor degree	206	41.2
Master/doctorate degree	15	3.0
Note: n = 500		

Table 5. Mean of consumers' awareness towards food safety and hygiene

Scale	Areas of Concern	Mean	SD
Small Restaurant	The kitchen	4.04	0.86
	The dining room	4.33	0.74
	Food ingredients and ready-to-eat food	4.27	0.75
	The processing of the food	4.06	0.85
	The storage of the food ingredients & ready-to-eat Food	4.20	0.77
	Food serving	4.07	0.73
	The utensil used	4.18	0.77
Medium Restaurant	The kitchen	4.14	0.77
	The dining room	4.48	0.62
	Food ingredients and ready-to-eat food	4.44	0.66
	The processing of the food	4.25	0.76
	The storage of the food ingredients & ready-to-eat Food	4.38	0.67
	Food serving	4.36	0.63
	The utensil used	4.32	0.66

Table 6. Consumers' response towards the importance of food safety and food hygiene

	Number of responses	Very unimportant (%)	Unimportant (%)	Neither (%)	Important (%)	Very important (%)
Small Restaurant	250	0.8	2.8	6.0	39.6	50.8
Medium Restaurant	250	0.0	0.8	4.4	40.0	54.8

the owners of the medium restaurants, they gave the highest priority to the kitchen and the lowest priority for food serving.

Discussion

The practice of food safety and hygiene in small and medium restaurants

Without a better understanding of the risks and hazards in their business, it could be difficult for the restaurants' owners to provide foods which are safe to be consumed and reduce the incidence of food poisoning. From the observations, it was indicated that both small and medium restaurant owners in Surabaya have not yet complied with sanitation hygiene requirements for restaurants set by the legislator. This supports previous research which mentions that SMEs usually have poor knowledge and understanding of legislative requirements and food safety principles and do not always implement requirements as the legislator intended (Yapp and Fairman, 2005).

However, the result shows that the owners of medium restaurants have more concern in implementing food safety and food hygiene practices in their premises than small restaurants owners. It could be true since owners in medium restaurant are more likely to have a better knowledge and understanding of what constitutes compliance compared to owners of small restaurants. Hence, the legislator should deliver assistance for the restaurants owners by providing regular training programs in order to improve their knowledge about food safety and food hygiene in their business.

Of the requirements in the 7 specific areas set out by the legislator, both in small and medium restaurants, the area of processing of the food which included personal hygiene had the greatest percentage which was in non-compliance with the food safety standards (Table 3). While, the requirement on the utensil used, the dining room and food serving have the higher compliance among other requirements. It can be indicated that food service operators give more attention to the areas that can be seen directly by consumers. Food handlers were required to carry out decontamination actions on numerous occasions (Clayton and Griffith, 2004). Previous research conducted by Clayton *et al.* (2003) shows that food handlers believe the pressure of time may prevent them from carrying out food safety actions and give the high number of requirements for decontamination activities (Clayton and Griffith, 2004). Furthermore, Harrison *et al.* (2001) suggests that encouraging food handlers to think about the order of their work activities

and ways in which the need for decontamination can be reduced may help in order to minimize the spread of pathogens and thereby lower the risk of food-borne illness.

The concern and awareness of consumers towards food safety and hygiene practices

Further, from the consumers' perspectives, the survey results illustrate that the most important factor for consumers to be considered when they eat-in at small and medium restaurants was the dining area, where chairs and tables should be clean, and free of insects or rats (Table 5). By contrast, kitchen areas had the least attention since consumers were not concerned with what they cannot see. The overall mean score (> 4.0) reveals that consumers' concern and awareness towards the food safety and food hygiene actions are relatively high and even become higher when they eat-in at medium restaurants.

It is interesting to note that consumers still keep coming to restaurants which have poor food safety and food hygiene practices. It appears that consumers take standard of food safety and food hygiene for granted because, according to Smith and Riethmuller (2000), consumers rely on the food service operators and government to remove the food risk from them. Moreover, Leach *et al.* (2001) states that food hygiene only featured in the choice of an eating establishment when there was a recommendation from friends. Food safety and food hygiene matters become less powerful when consumers visit particular premises since food quality, food types, ambience, and restaurant location become preferred factors when choosing a restaurant.

This study shows that the concern and awareness of consumers in regard to food safety and food hygiene exceed the concern and awareness of food service providers. Consumers regard that providing food in a safe way is very important. However, they do not mind to consume food even though the food safety standard is low. It is important that consumers are more educated in choosing an eating-place. When hygiene is highly demanded, market forces will prevail and hygiene will be supplied. In other words, consumers concern and awareness of food safety and food hygiene will drive a better hygienic food service business.

The concern and awareness of food service operators towards food safety and hygiene practices

From the interviews undertaken, one point that could be underlined was that most of the food service operators did not completely apply the standard of food safety because they failed to understand the

requirements and how they needed to be applied to their own business. Also, small and medium restaurants also failed to relate the requirements being made to general food safety and food hygiene principles. They just know how to run the restaurants without knowing how to maintain and keep food safe to consume. In other words, it can be said that the concern and awareness of small and medium food business operators in Surabaya are considered low since the majority of them has a lack of knowledge and does not understand the general food safety and food hygiene principles and cannot relate to why it is needed in their business.

The finding of the interviews were contradictory in which most restaurant owners stated that it was necessary to have guidelines of food safety and food hygiene but they refused to get any food safety and food hygiene training. The reason of their reluctance is that they do not have enough time to implement the food safety and hygiene in their establishment. They are more concerned about how to serve consumers fast and not make consumers wait too long for food ordered than they are concerned about the hygiene of the food. The other reason is lack of employees. It is common in small and medium restaurants in Surabaya that owners of restaurants are also involved in the restaurant operation. The owners do not want to employ more staff to save costs.

According to Worsfold and Griffith (2003), food handlers have a crucial role in the food service business. Food handlers should have the skill and knowledge of food safety and hygiene to ensure that food is safe to be consumed. Therefore, it is highly expected that the Indonesian government through local councils should have a food safety program and training to assist food service operators in order to ensure that all the food they sell is safe. It is a responsibility of the government to legislate and monitor the food industry to ensure that an acceptable health standard is maintained and food safety risks are minimized.

The awareness about the importance of practicing food safety and hygiene should be cultivated from early education by including it into the national curriculum and by conducting a food hygiene campaign in the local community. Food safety education should be able to provide knowledge and an increased awareness of food safety issues to consumers as well as food service operators. It should also be noted that staff as well as restaurant owners should be trained in food hygiene, offering a real opportunity to provide a safer food. Besides that, restaurant owners and staff should also be motivated to increase their concern and knowledge to put the

safety of the food into consideration, particularly when processing the food.

Conclusions

The result of this research study supports the need for more effective information and creative ways to disseminate the food safety principles for food service providers that can be easily interpreted and implemented, particularly by small and medium restaurant owners who are usually less educated. Inadequate information and knowledge about food safety are known to contribute to non compliance of food service operators in implementing food safety practices in their business. In this matter, the government plays an important role through the local community in providing wide-ranging information about food safety and food hygiene to both consumers and food service operators in running their business to ensure that all food sold is safe to consume, and eventually lead to a better food safety operation.

Acknowledgements

The authors gratefully acknowledge the financial support provided by Indonesian Higher Education Directorate. A grateful appreciation is also expressed to Michael and Henny Holbrook for editing English language.

References

- Australia New Zealand Food Authority. 2001. Safe food Australia. 2nd edn. Canberra, Australia: Australia New Zealand Food Authority.
- Clayton, D., Griffith, C.J. and Price, P. 2003. An investigation of the factors underlying consumers' implementation of specific food safety practices. *British Food Journal* 105(7): 434-453.
- Clayton, D. and Griffith C, J. 2004. Observation of food safety practices in catering using notational analysis. *British Food Journal* 106 (2/3): 211
- Fournaris, C. 2002. Monitoring food safety and security threats during times of high risk. *Franchising World* 34(1): 57-59.
- Harrison, W.A., Griffith, C.J. and Tennant, D. 2001. Determining exposure assessment and modelling risks associated with the preparation of poultry products in institutional catering and the home. CSA Reference 5075, Food Standards Agency, London.

- Hernandez, J. 2001. To keep food safe, serve it safe. *Food Management* 36 (8): 84-86.
- Kennedy, J., Jackson, V., Cowan, C., Blair, I., McDowell, D. and Bolton, D. 2005. Consumer food safety knowledge: Segmentation of Irish home food preparers based on food safety knowledge and practice. *British Food Journal* 107 (7): 441-453.
- Leach, J., Mercer, H., Stew, G. and Denyer, S. 2001. Improving food hygiene standards-a customer focused approach. *British Food Journal* 103(4): 238-252.
- Miles, S., Braxton, D.S. and Frewer, L. J. 1999. Public perceptions about microbiological hazards in food. *British Food Journal* 101 (10): 744-762.
- Miles, S., Brennan, M., Kuznesof, S., Ness, M., Ritson, C. and Frewer, L. 2004. 2004. Public worry about specific food safety issues. *British Food Journal* 106 (1): 9-17.
- Ministry of Health Republic of Indonesia. 2006. The Decree of the Minister of Health Republic of Indonesia No: 1098/MENKES/SK/VII/2003 about sanitation hygiene requirements for restaurants in Indonesia.
- Morrison, P., Caffin, N. and Wallace, R. 1998. Small food service establishments still on amber light for adopting Australian HACCP-based food safety code. *British Food Journal* 100 (8): 364-370.
- Norton, C. 2002 . Conducting a hazard analysis. *Restaurant Hospitality* 86 (9): 82-84.
- Redmond, E. C. and Griffith, C.J. 2006. A pilot study to evaluate the effectiveness of a social marketing-based consumer food safety initiative using observation. *British Food Journal* 108(9): 753-770
- Smith, D. and Riethmuller, P. 2000. Consumer concerns about food safety in Australia and Japan. *British Food Journal* 102(11): 838-855.
- Wilson, M., Murray, A., Black, M. and McDowell, D. 1997. The implementation of hazard analysis and critical control points in hospital catering. *Managing Service Quality* 7 (3): 150-156.
- Worsfold, D. and Griffith, C. J. 2003. A survey of food hygiene and safety training in the retail and catering industry. *Nutrition & Food Science* 33 (2): 68-79.
- Yapp, C. and Fairman, R. 2005. Assessing compliance with food safety legislation in small businesses. *British Food Journal* 107 (3): 150-162.
- Yeung, R. M. and Morris, J. 2001. Food safety risks: Consumer perception and purchase behavior. *British Food Journal* 103(3): 170-186.

INTERNATIONAL FOOD RESEARCH JOURNAL

[Home](#)[Editorial Board](#)[Author's Guide](#)[Code of Ethics](#)[List of Issues](#)[Contact Us](#)[FOOD Website](#)

OPEN ACCESS



Now Indexed in SCOPUS, EBSCO, CHEMICAL ABSTRACT, ProQuest, CABI, AGRICOLA & WORLD ISLAMIC SCIENCE CITATION, MYCITE CITATION Report

SUBMIT YOUR MANUSCRIPTS - <http://mc.manuscriptcentral.com/upm-ifrj>

ISSN (Print): 1985 4668

ISSN (Online): 2231 7546

RECENTLY PUBLISHED ISSUES

- [2017 - Volume 24 Issue 3](#) **NEW!**
- [2017 - Volume 24 Issue 2](#)
- [2017 - Volume 24 Issue 1](#)
- [2016 - Volume 23 Supplementary Issue](#)

[SEE ALL ISSUES](#)



[SCImago Journal and Country Rank](#)
[MyJurnal - Malaysian Citation Centre](#)

The International Food Research Journal (IFRJ) publishes papers in English, six (6) issues a year with the coverage of:

- Food Science and Technology
- Nutrition and Dietetics
- Agriculture, multidisciplinary
- Chemistry, multidisciplinary

The scope of the Journal includes:

- Food Science, Food Technology and Food Biotechnology
- Product Development and Sensory Evaluation
- Food Habits, Nutrition, and Health
- Food Safety and Quality
- Food Chemistry, Food Microbiology, Food Analysis and Testing
- Food Engineering
- Food Packaging
- Food Waste Management
- Food Entrepreneur
- Food Regulatory
- Post-Harvest Food Management
- Food Supply Chain Management
- Halal Food and Management

Review Article

1. Malaysia's strategic food security approach.
◦ Tey, Y. S.
2. Surimi-like material: challenges and prospects.
◦ Tina, N., Nurul, H. and Ruzita, A.

Research Article

3. FTIR spectroscopy combined with chemometrics for analysis of lard mixtures with body fats of lamb, cow, and chicken.
◦ Rohman, A. and Che Man, Y. B.
4. Potential use of Malaysian rubber (*Hevea brasiliensis*) seed as food, biofuel.
◦ Eka, H. D., Tajul Aris, Y. and Wan Nadiah, W. A.
5. Characteristics and properties of rice starch films reinforced with palm fibers.
◦ Phattaraporn, T., Waranyou, S., Fazilah, A. and Thawien, W.
6. Development and performance evaluation of a motorized globulator production.
◦ Soladoye, O. P., Ola, I. A., Adebawale, A. A. and Sanni, L.
7. Fructooligosaccharides in honey and effects of honey on growth of *Bifidobacterium longum* BB 536.
◦ Jan Mei, S., Mohd Nordin, M. S. and Norrakiah, A. S.
8. Biochemical and microbial changes during traditional spontaneous lactic acid fermentation process using two varieties of cassava for production of "Alladian" starter.
◦ Abodjo Kakou, C., Tagro Guehi, S., Olo, K., Akissi Kouame, F., Koffi Nana, Marina Koussemon, C.
9. Rheological characterization of exopolysaccharides produced by two strains of *Streptococcus thermophilus*.
◦ Purwandari, U. and Vasiljevic, T.
10. Antioxidant and antimicrobial activities of crude extracts from mangosteen (*Garcinia mangostana* L.) parts and some essential oils.
◦ Palakawong, C., Sophanodora, P., Pisuchpen, S. and Phongpaichit, S.
11. Electrical impedance for bacterial metabolic activity screening - evaluation of single and mixed bacterial consortia for wastewater Biodegradation.
◦ Lasik, M. and Nowak, J.
12. Moisture sorption isotherm and isosteric heat of sorption characteristics of starch based edible films containing antimicrobial preservative.
◦ Chowdhury, T. and Das, M.
13. The effects of blanching treatment on the radical scavenging activity of saffron (*Curcuma mangga* Val.).
◦ Pujimulyani, D., Raharjo, S., Marsono, Y. and Santoso, U.
14. Investigation of water vapour permeation and antibacterial properties of silver loaded cellulose acetate film.
◦ Varsha, C., Bajpai, S. K. and Navin, C.
15. The concern and awareness of consumers and food service operators on food safety and food hygiene in small and medium restaurants in Surabaya, Indonesia.
◦ Sienny, T. and Serli, W.
16. Factors affecting milk consumption among school children in urban areas of Selangor, Malaysia.
◦ Babolian Hendijani, R. and Ab Karim, M. S.
17. Comparison of meat quality characteristics between young and spent gilts.
◦ Boni, I., Nurul, H. and Noryati, I.
18. Non-Muslims' awareness of Halal principles and related food products in Malaysia.
◦ Golnaz, R., Zainalabidin, M., Mad Nasir, S. and Eddie Chiew, F.C.
19. Detection of *Vibrio cholerae* in raw cockles (*Anadara granosa*) by polymerase chain reaction.
◦ Suzita, R., Abu Bakar, F., Son, R. and Abdulmir, A.S.
20. Detection of virulence genes and enterobacterial repetitive intergenic consensus-PCR (ERIC-PCR) analysis among raw vegetables isolates.

- Campylobacter jejuni.**
- Sahilah, A.M., Tuan Suraya, T. S., Noraida., I., Ahmad Azuhairi, A., C Son, R.
21. **Molecular typing of Aeromonas species using RAPD and ERICPCR Fin**
 - Yousr, A.H., Napis, S., Rusul, G.R.A., Alitheen, N.B. and Son, R.
 22. **Effect of processing procedures on the colorimetry and viscoelastic p cassava starch, flour and cassava-plantain fufu flour.**
 - Oduro-Yeboah, C., Johnson, P-N.T., Sakyi-Dawson, E. and Budu, A.
 23. **Cytotoxic effect of damnacanth, nordamnacanth, zerumbone and acid isolated from Malaysian plant sources.**
 - Alitheen, N.B., Mashitoh, A.R., Yeap, S.K., Shuhaimi, M., Abdul Manaf Nordin, L.
 24. **Effect of spontaneous fermentation of cowpea leaves (Vigna unguicu proximate composition, mineral content, chlorophyll content and bet content.**
 - Kasangi D. M., Shitandi. A. A., Shalo P.L. and Mbugua S. K.
 25. **Optimization of concentration process on pomelo fruit juice using res surface methodology (RSM).**
 - Keshani, S., Luqman Chuah, A., Nourouzi, M. M., Russly A.R. and Jan
 26. **Influence of initial pH and sulfur dioxide content in must on wine fer by immobilized yeast in bacterial cellulose.**
 - Ton, N.M.N., Nguyen, M.D., Pham, T.T.H. and Le, V.V.M.
 27. **Effect of green tea (Camellia sinenses) extract and onion (Allium cep lipid degradation and sensory acceptance of Persian sturgeon (Acipe persicus) fillets.**
 - Sarah, H., Hadiseh, K., Gholamhossein, A. and Bahareh, S.
 28. **Role of carboxypeptidases to the free amino acid composition, methy formation and sensory characteristic of underfermented cocoa beans**
 - Jinap, S., Lioe, H. N., Yusep, I., Nazamid, S. and Jamilah, B.
 29. **Chemical composition, antinutrients and extractable minerals of Sick (Cassia obtusifolia) leaves as influenced by fermentation and Cookin**
 - Nuha, M. O., Isam, A. M. A. and Elfadil, E. B.
 30. **Effect of egg yolk substitution by sweet whey protein concentrate (V physical properties of Gelato ice cream.**
 - Alfaifi, M.S. and Stathopoulos, C.E.
 31. **Nutrient contents and thermal degradation of vitamins in organically fluted pumpkin (Telfairia occidentalis) leaves.**
 - Kajihaua, O. E., Sobukola, O.P., Idowu, M.A. and Awonorin, S. O.
 32. **Physicochemical properties of gelatins extracted from skins of differ freshwater fish species.**
 - See, S. F., Hong, P. K., Ng, K. L., Wan Aida, W. M. and Babji, A. S.
 33. **Changes in the functional properties as a function of NaCl concentrat legumes protein isolate by transglutaminase cross linking.**
 - Salma, H. A., Nahid, A. A., ElShazali, A. M., Isam, A. M. A. and Elfadil,

International Food Research Journal Volume 17 Issue 2, 2010

Review Article

1. **Shelf stable meat pickles- a review.**
 - Gadekar, Y. P., Kokane, R. D., Suradkar, U. S., Thomas, R., Das, A. K Anjaneyulu, A. S. R.

Research Article

2. **Physical, chemical and fungal phenology associated with thecomposi 'wawa' sawdust (Triplachiton scleroxylon) used in the cultivation of mushrooms in Ghana.**
 - Obodai, M., Amoa-Awua, W. and Odamtten, G. T.
3. **Diversity of bacterial flora of Indonesian ragi tape and their dynamic tape fermentation as determined by PCR-DGGE.**
 - Sujaya, I. N., Nocianitri, K. A. and Asano, K.

INTERNATIONAL FOOD RESEARCH JOURNAL

Home Editorial Board Author's Guide Code of Ethics List of Issues Contact Us FOOD Website

EDITORIAL BOARD

Editor-in-Chief

Dr. Jinap Selamat
Professor
International Food Research Journal (IFRJ)
Food Safety Research Centre (FOSREC)
Faculty of Food Science & Technology Universiti Putra Malaysia.

Editorial Associate Editors

Dr. Son Radu
Professor
Department of Food Science
Faculty of Food Science and Technology
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor, MALAYSIA

Dr. Nazamid Saari
Professor
Department of Food Science
Faculty of Food Science and Technology
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor, MALAYSIA

Dr. Tan Chin Ping
Professor
Department of Food Technology
Faculty of Food Science and Technology
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor MALAYSIA

Board Members

Dr. Abd. Karim Alias
Professor
School of Industrial Technology
Universiti Sains Malaysia
11800 USM, Pulau Pinang MALAYSIA

Dr. Mohd Yazid Abdul Manap
Professor
Faculty of Food Science and Technology
Universiti Putra Malaysia
43400 Serdang, Selangor MALAYSIA

Dr. Karamatollah Rezaei
Professor
Faculty of Agricultural and Engineering Technology
College of Agriculture and Natural Resources
University of Tehran, Karaj IRAN

Dr. Olga Martin-Belloso
Professor
Department of Food Technology
University of Lleida Alcalde Rovira Roure,
191 Lleida 25198 SPAIN

Dr. Erwin Wasowicz
Professor
Poznan University of Life Sciences
Faculty of Food Science and Nutrition
Institute of Food Technology of Plant Origin
Research Unit of Food Concentrates
Wojska Polskiego 31,
60-624 Poznan POLAND

Dipl.-Ing. Jochen Weiss
Professor
Department of Food Science and Biotechnology
University of Hohenheim
Garbenstrasse 21
70599 Stuttgart GERMANY

Dr. Gulum Sumnu
Professor
Department of Food Engineering
Middle East Technical University TURKEY

Dr. Stefan Kasapis
Professor
School of Applied Sciences, RMIT University
LaTrobe Street, Melbourne,
VIC 3000 AUSTRALIA

Dr. Hansi.P. Marvin
Research Coordinator
RIKILT, Postbus/ P.O. Box 230
6700 AE Wageningen
Gebouwnummer/ Building No. 123
THE NETHERLANDS

Dr. Didier Montet
HDR, CIRAD
UMR 95 Qualisud TA B-95/16
73, rue Jean-Francois Breton
34398 Mont pellier cedex 5
FRANCE

Dr. Siree Chaiseri
Associate Professor
Kasetsart University
50 Ngamwongwan Road
Ladyao, Chatuchak
Bangkok 10900, THAILAND

Dr. John Gillbert
Foodlife International Ltd
ODTU Teknokent Ikizler Binast
Zemin Kat No: Ara-1 Cankaya
06800 Ankara, TURKEY

Dr. Anton Apriyantono
Department of Food Science & Technology
Faculty of Agricultural Technology
Bogor Agricultural University (IPB)
Jl. Lingkar Akademik
Kotak Pos 220 Kampus IPB Darmaga
INDONESIA

Dr. Clare Narrod
Joint Institute of Food Science and Nutrition
(JIFSAN)
University of Maryland
5201 Paint Branch Parkway
Suite 2134 (Patapsco Building)
College Park, MD 20742
U.S.A.

[Home](#)[Journal Rankings](#)[Country Rankings](#)[Viz Tools](#)[Help](#)[About Us](#)

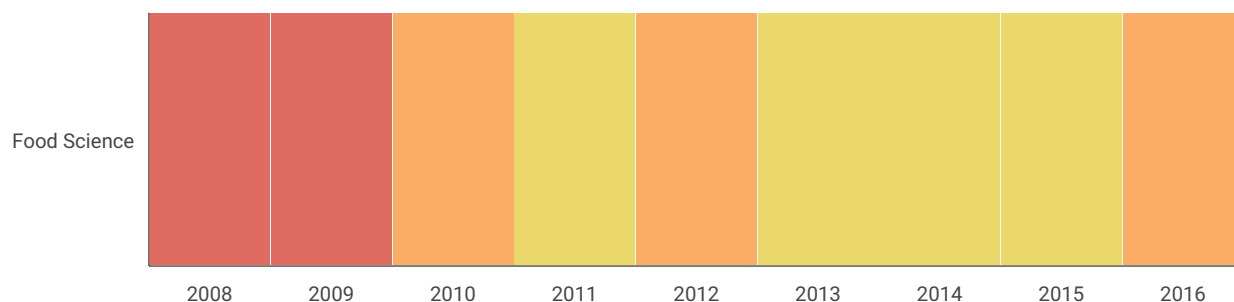
International Food Research Journal

Country	Malaysia
Subject Area and Category	Agricultural and Biological Sciences Food Science
Publisher	Universiti Putra Malaysia
Publication type	Journals
ISSN	19854668
Coverage	2007-ongoing

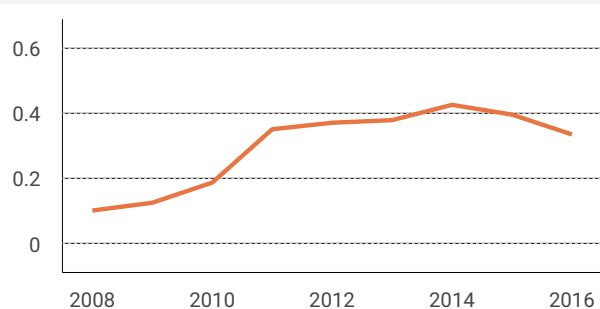
27

H Index

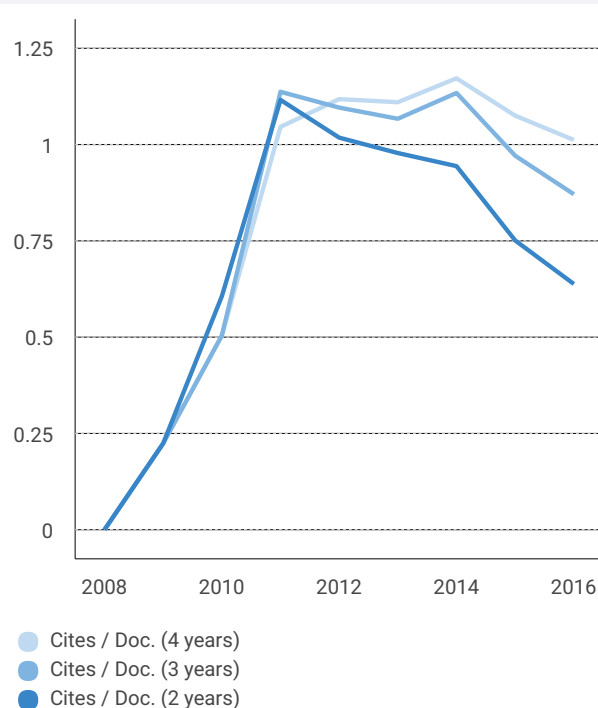
Quartiles



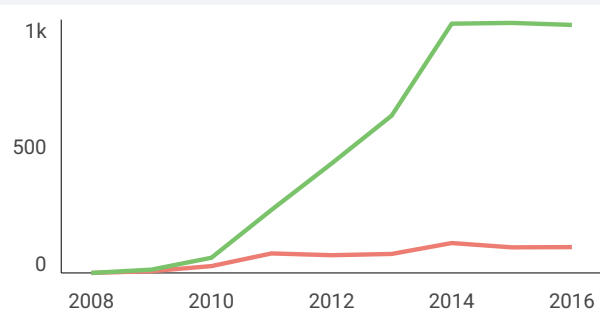
SJR



Citations per document



Total Cites Self-Cites

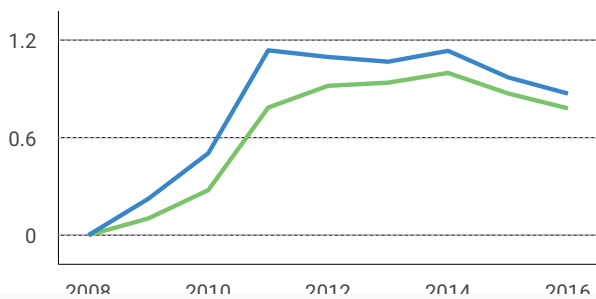


External Cites per Doc Cites per Doc

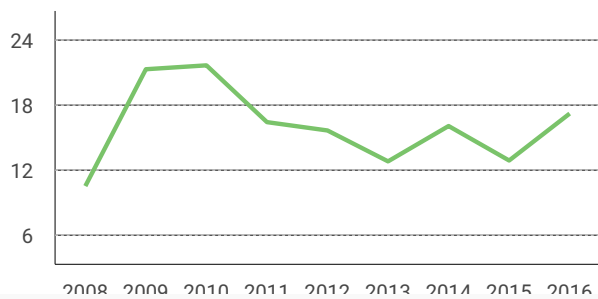
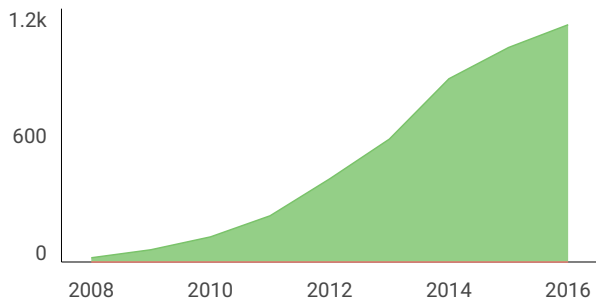


% International Collaboration

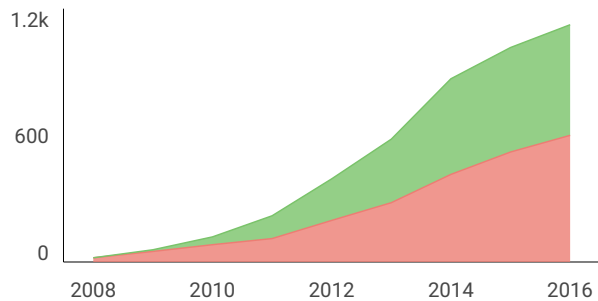




● Citable documents ● Non-citable documents +



● Cited documents ● Uncited documents +



← Show this widget in your own website

Just copy the code below and paste within your html code:

```
<a href="http://www.scimagojr.com" style="color: red; text-decoration: none;">

```

Developed by:



Powered by:

Scopus

Follow us on Twitter

Scimago Lab, Copyright 2007-2017. Data Source: Scopus®

EST MODUS IN REBUS

Horatio (Satire 1,1,106)

SJR		Scimago Journal & Country Rank					Enter Journal Title, ISSN or Publisher Name				
Home		Journal Rankings		Country Rankings		Viz Tools		Help		About Us	
Agricultural and Biological Sciences		Food Science		Asiatic Region		All types		2016			
<input type="checkbox"/> Display only Open Access Journals		<input type="checkbox"/> Display only SciELO Journals (In Progress)		Display journals with at least 0		Citable Docs. (3years)		Apply			
								Download data		1 - 30 of 30	
Title	Type	SJR	H index	Total Docs. (2016)	Total Docs. (3years)	Total Refs.	Total Cites (3years)	Citable Docs. (3years)	Cites / Doc. (2years)	Ref. / Doc.	
1 Food and Nutrition Bulletin	journal	0.884 Q1	55	59	230	2251	389	218	1.54	38.15	🇯🇵
2 Journal of Health, Population and Nutrition	journal	0.811 Q1	45	8	214	99	345	205	1.12	12.38	🇧🇩
3 Journal of Food and Drug Analysis	journal	0.793 Q1	32	177	265	3996	670	250	3.10	22.58	🇹🇼
4 Nutrition Research and Practice	journal	0.614 Q2	19	82	263	2988	503	257	1.90	36.44	🇰🇷
5 Asian-Australasian Journal of Animal Sciences	journal	0.559 Q2	38	229	665	7291	844	664	1.30	31.84	🇰🇷
6 Journal of Food Science and Technology	journal	0.544 Q2	37	450	1499	16286	2091	1442	1.39	36.19	🇮🇳
7 Preventive Nutrition and Food Science	journal	0.395 Q2	12	58	140	1864	172	140	1.34	32.14	🇰🇷
8 Korean Journal of Food Science and Technology	journal	0.384 Q2	15	96	348	2829	190	348	0.52	29.47	🇰🇷
9 Food Science and Biotechnology	journal	0.376 Q2	25	274	867	8514	793	860	0.83	31.07	🇰🇷
10 International Food Research Journal	journal	0.335 Q3	27	418	1124	13656	979	1124	0.64	32.67	🇲🇾
11 Journal of the Korean Society of Food Science and Nutrition	journal	0.318 Q3	17	241	786	7606	377	782	0.44	31.56	🇰🇷
12 Pakistan Journal of Agricultural Sciences	journal	0.297 Q3	12	122	399	4757	260	399	0.65	38.99	🇵🇰
13 Shokuhin eiseigaku zasshi. Journal of the Food Hygienic Society of Japan	journal	0.263 Q3	24	33	155	363	55	154	0.32	11.00	🇯🇵
14 Journal of Oil Palm Research	journal	0.249 Q3	13	55	127	1812	81	126	0.58	32.95	🇲🇾
15 Korean Journal for Food Science of Animal Resources	journal	0.232 Q3	12	105	327	3566	181	324	0.53	33.96	🇰🇷
16 Indian Journal of Natural Products and Resources	journal	0.223 Q3	21	45	163	1589	81	163	0.49	35.31	🇮🇳
17 Malaysian Journal of Nutrition	journal	0.182 Q4	15	42	90	1200	36	89	0.28	28.57	🇲🇾

18	Pakistan Journal of Nutrition	journal	0.179 Q4	26	157	487	4645	125	487	0.25	29.59	
19	Modern Food Science and Technology	journal	0.158 Q4	6	584	1843	10250	514	1843	0.31	17.55	
20	Asian Journal of Clinical Nutrition	journal	0.149 Q4	10	3	22	71	5	22	0.24	23.67	
21	Journal of the Chinese Cereals and Oils Association	journal	0.149 Q4	4	339	908	4539	146	908	0.13	13.39	
22	Japan Journal of Food Engineering	journal	0.147 Q4	6	28	77	548	14	66	0.21	19.57	
23	Current Research in Nutrition and Food Science 	journal	0.139 Q4	3	56	71	1973	17	71	0.08	35.23	
24	Nippon Shokuhin Kagaku Kogaku Kaishi	journal	0.120 Q4	19	79	260	809	30	252	0.08	10.24	
25	Taiwanese Journal of Agricultural Chemistry and Food Science	journal	0.119 Q4	3	20	73	486	4	73	0.00	24.30	
26	Journal of Chinese Institute of Food Science and Technology	journal	0.118 Q4	3	415	1266	6033	123	1266	0.08	14.54	
27	Seibutsu-kogaku Kaishi	journal	0.118 Q4	9	50	294	294	14	147	0.02	5.88	
28	Japanese Journal of Crop Science	journal	0.118 Q4	17	50	123	281	13	121	0.07	5.62	
29	Range Management and Agroforestry	journal	0.106 Q4	3	0	69	0	6	68	0.00	0.00	
30	BioTechnology: An Indian Journal	journal	0.102 Q4	5	0	1366	0	253	1366	0.03	0.00	

1 - 30 of 30



Developed by:



Powered by:

Scopus

Follow us on Twitter

Scimago Lab, Copyright 2007-2017. Data Source: Scopus®

EST MODUS IN REBUS

Horatio (Satire 1.1.106)