

## Research Article

# Strategy for Implementation of Carrageenan Quality Assurance System through ISO 9001:2015, HACCP and HrACCP

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### ABSTRACT

The research objective is to find out the preparation, implementation and evaluation of ISO 9001 2015 certification, Food Safety with HACCP and Halal Assurance System with HrACCP at PT. Galic Bina Mada. The data analysis used is descriptive qualitative, namely analyzing data in the form of data reduction, data presentation, conclusion drawing and verification. The results show that the preparation of ISO 9001 2015 certification, Food Safety with HACCP and Halal Assurance System with HrACCP at PT. Galic Bina Mada was categorized as good. This is indicated by the completeness of all documents and the sequence of steps taken to obtain certification. The implementation of the ISO 9001:2015 quality assurance system, HACCP, HrACCP at PT. Galic Bina Mada showed a good or appropriate result, which was indicated by achieving the standard of achievement to document completeness. The implementation of the quality assurance system at PT. Galic Bina Mada could increase the number of production and improve product quality (kappa carrageenan grade). The results of the evaluation which included internal and external audits provided assurance of the achievement of the quality standard system. Suggestions that the authors can give are for PT Galic Bina Mada to make continuous improvements to ensure the operation of an effective quality management system and for future researchers to conduct further research for the running of the HACCP system at PT. Galic Bina Mada Pasuruan, after the certification process.

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## INTRODUCTION

Seaweed is a marine plant that is one of the commodities that have high economic value (Ratoe Oedjoe et al., 2019). Seaweed has the potential to be developed, because seaweed cultivation is relatively easy, does not require a lot of cost in planting, has a very low risk of crop failure and has many health benefits for humans. The age of harvesting seaweed is between 45-60 days or 4 harvests in a year. Seaweed has a fairly high

selling price. This is one of the driving factors for the community in seaweed cultivation. Seaweed cultivation business can absorb a lot of labor and create large and broad economic multiplier effects (Aslan, 2008; Astruli, 2014; Central Statistics Agency, 2015; Dahuri, 2014).

Seaweed is generally traded in the form of: (1) dried seaweed; (2) hydrocolloid products; and (3) products that can be directly consumed. So far, seaweed still dominates with a share of 60.7 percent of the total national aquaculture production. According to KKP (2019), national seaweed production reached 9.9 million tons. According to the Indonesian Seaweed Industry Association (Astruli, 2014), about 64.31% of the total production of seaweed in Indonesia is still exported, while the remaining 35.69% is used by the domestic industry (Kordi, 2011; Prahadi, 2015; Prawirosentono, 2004). Several factors are suspected to be the cause of the low absorption of the domestic seaweed industry, among others are the price of seaweed for the domestic market is higher than that for abroad (Hikmah, 2015). This phenomenon makes it difficult for the seaweed processing industry to develop, while domestically it is difficult to obtain raw materials at low prices.

Seaweed produces hydrocolloid products in the form of carrageenan, jelly and alginate. Carrageenan as one of the semi-finished products of seaweed is a hydrocolloid compound consisting of esters of potassium, sodium, magnesium, and calcium sulfate, galactose, 3,6-anhydrogalactose copolymer. Kappa type carrageenan has a 6-sulfate group (Tecson et al., 2022), which can reduce the gelation power of carrageenan, but with proper alkali application it can cause trans-elimination of the 6-sulfate group which results in the formation of 3,6 anhydro-D galactose. Iota type carrageenan has 2 ester sulfate groups which cannot be removed by the alkali treatment process. The functions of carrageenan, among others, are as a stabilizer, a thickener, a gelling agent, and an emulsifier (Jiang et al., 2022; Kelco, 2007).

Product quality improvement must always be done by participating in maintaining the quality assurance system. Several efforts to improve quality were carried out with ISO 9001: 2015, HACCP (Hazard Analysis Critical Control Point), and HrACCP (Haram Analysis Critical Control Point). Susanto et al. (2017); Wulandari (2009) states that one of the efforts to improve product quality is to apply ISO standards, because by implementing the quality assurance system, the products produced will be better, especially to ensure product quality for consumers. The quality assurance system is the basis for consideration in preparing to enter the food industry (Kadarisman, 2012) and the quality of the products produced (Muhandri & Kadarisman, 2005). The application of a standardized and effective management system is the need of all parties involved in food processing products (Kusuma et al., 2017; Robert & John, 2001).

This study aims: 1) to find out the preparation of ISO 9001 2015 certification, Food Safety with HACCP and Halal Assurance System with HrACCP at PT. Galic Bina Mada; 2) to explore the implementation of ISO 9001:2015, HACCP and HrACCP as quality standards at PT. Galic Bina Mada; 3) to find out the evaluation carried out by the company on the implementation of ISO 9001: 2015, HACCP and HrACCP.

## METHOD

Research on the strategy of implementing quality assurance through ISO 9001: 2015, HACCP and HrACCP was carried out on carrageenan products. This research was conducted at PT. Galic Bina Mada which is located in Dusun Krajan, Desa Gerongan, Kecamatan Kraton, Kabupaten Pasuruan. This research was conducted on the basis of consideration that it is a company in the food sector that focuses on product quality assurance. The research was carried out from April to December 2020.

The research design is intended to provide systematic instructions by referring to procedures or guidelines in research planning that are useful as a guide for building strategies that produce research models. The design of this research is descriptive explanatory research, namely research that carefully describes a phenomenon that occurs based on the characteristics and facts that occur.

The data used are in the form of primary and secondary data collected by the authors through direct field observations, interviews with related parties (Shodiq et al., 2020), and literature studies. As for the research instruments used are: researchers, interview guides, recording tools, camera and writing instruments. Analysis of data used by researchers in qualitative descriptive research are in the form of data reduction, data presentation, conclusion drawing and verification (Miles & Huberman, 1992).

Data reduction was related to the process of summarizing various things obtained during observations, interviews and documentation at PT. Galic Bina Mada. The summarizing process carried out was adjusted to the topics and objectives of the research carried out, which was related to the process of preparation, implementation and evaluation of ISO 9001:2015, HACCP and HrACCP. Data reduction was carried out

continuously in accordance with the various data or information obtained to become a clear sequence and in accordance with the objectives of this study.

The next step after analyzing the data is to present the data in a clear, detailed and informative manner. Miles & Huberman (1992) defines data presentation as a collection of research information that is arranged in such a way that it can be used for the process of drawing conclusions. The presentation of data in this study was carried out in various forms, from tables, graphs to descriptions.

The final step in the data analysis process is drawing conclusion and verifying the results. The conclusion in this study provides an overview or general description of the product quality assurance system including ISO 9001: 2015, HACCP and HrACCP after the research process was completed. While verification in this study is intended as an effort to find, test, re-check or understand the meaning or definition, regularities, patterns, explanations, coherence, causes and effects, or prepositions (Wandi et al., 2013) from the various results of this study with various theories or the results of previous research.

## RESULTS AND DISCUSSION

### Preparation Process of ISO 9001 2015, HACCP dan HrACCP Certification

In planning the quality management system, PT. Galic Bina Mada had to consider and examine internal and external issues and determine the risks and opportunities that need to be identified to provide assurance that the quality management system could achieve the desired results, enhance the desired effects, prevent and reduce unwanted effects, and achieve the desired improvement. Estiasih & Ahmadi (2018) state that internal and external considerations of an industry must be highly taken into account in an effort to implement a quality management system, this is intended so that the implementation of quality assurance in the future will be better.

External issues faced by PT. Galic Bina Mada was an issue that came from external factors and had an influence on the sustainability of the company's operations. Meanwhile, the internal issues faced by the company were issues that originated internally and had an influence on the sustainability of company's operations. The stages of preparation in the framework of the product quality system include:

#### ISO 9001:2015

Preparations made by PT. Galic Bina Mada for ISO 9001;2015 certification involved sending some representatives for external training held by "Premysis" on ISO 9001;2015. The representatives would be assigned as the ISO 9001;2015 team at PT. Galic Bina Mada. Training activities were carried out through several stages, namely the ISO 9001; 2015 team establishing, identifying and compiling quality system documents as required in the SMM ISO 9001: 2015 document. In addition to training on the preparation of quality system documents, institutions needed to include the ISO 9001;2015 team in internal audit training in order for them to understand the assessment procedures and evaluate things that were considered inappropriate/deviant in the quality system.

Representatives who had attended external training were obliged to organize dissemination and internal meetings to all employees so they could prepare themselves for the implementation of ISO 9001;2015. Through these activities, all employees understood, knew, and were able to cooperate in the implementation of ISO 9001;2015 in accordance with their respective roles and duties.

Preparation of quality system documents at PT. Galic Bina Mada included preparing Work Instructions (IK), Work Order (SPK), and SOPs. The preparation of this document was carried out by each department. The steps include:

#### 1. Determination of SK ISO 9001;2015 Team

The Decree (SK) was a statement of legitimacy and commitment from the institution leader in the form of determining the duties, responsibilities and authorities of each personnel/employee appointed to be actively (directly involved) to prepare and succeed in the ISO 9001:2015 QMS program at PT.Galic Bina Mada . The leader of the institution as the top management determined the Decree of the ISO 9001:2015 QMS Implementation Team and the internal auditor.

#### 2. Identification of Organizational Resources

This step included identifying and ensuring the readiness of organizational resources (personnel/employees, facilities/infrastructure, budget) as well as the readiness of ISO 9001:2015 quality

system documents. Preparation of personnel or employees, could be done by arranging programs related to improving the competence of human resources of each department at PT. Galic Bina Mada.

### **HACCP**

Preparation in implementing HACCP at PT. Galic Bina Mada included ensuring that facilities and infrastructure support the HACCP process and participating in HACCP training organized by external parties. The management appointed several company representatives to attend HACCP training. These representatives would be one of the company's HACCP Teams; HACCP Document Design. Quality Manual Guideline BSN 1004:2002 concerning Guidelines for Planning a Hazard Analysis System and Critical Control Point (HACCP) were used as a reference in writing a quality manual. The preparation of the HACCP manual was needed to provide basic information regarding the implementation of HACCP by PT. Galic Bina Mada and facilitate workers in carrying out processing processes according to standards; Making Procedures. Procedures designed were intended to meet HACCP standards during the process of producing safe food products; Making Work Instructions. This work instruction was a detailed or detailed guide that explained how a process or procedure shall be carried out; and Form Creation. The form could function for supervising workers regarding the implementation of the HACCP system at PT. Galic Bina Mada during the production process until it became a finished product.

### **HrACCP**

Halal policy was established and disseminated to all company stakeholders through internal memos and training. The establishment of a halal policy was the initial stage in the preparation and implementation of a halal assurance system. The halal policy itself was a written statement about the commitment of PT. Galic Bina Mada to produce halal products consistently, in accordance with the company's business processes (Government Regulation Number 39 of 2021 concerning Implementation of the Halal Product Assurance Sector, 2021). Halal policy had to be disseminated to management, halal management team, employees and suppliers.

The top management appointed the Halal Management Team and the Structure of the Halal Management Team consisting of all sections involved in critical activities. Halal management was a group of people who are responsible for planning, implementing, evaluating, and improving HAS in the company (Government Regulation Number 39 of 2021 concerning Implementation of the Halal Product Assurance Sector, 2021). The organizational structure involved represents top management, Quality Control, production, Research and Development, purchasing and warehousing.

The halal management system was led by an Internal Halal Auditor (AHI) coordinator who carried out internal-external coordination in maintaining product halal-ness. The responsibility of the halal management team was to carry out internal training, ensure all materials used for halal production are equipped with sufficient supporting documents and had been approved by LPPOM MUI, ensure selection of new materials related to halal, and carry out inspection of incoming materials. The composition of the halal management team at PT. Galic Bina Mada.

The halal guideline is a brief explanation of the rules of halal-haram in Islamic law that can be understood by all levels of management and company employees, which includes the notion of halal-haram, the basis of the Qur'an/hadith and MUI fatwas, as well as halal-haram guidelines for the materials used and the production process being run. Regarding the legal basis for consuming what is halal and staying away from what is haram, Islam strictly stipulates to consume food and drinks that are halal and good. The output of this halal guideline was in the form of a list of ingredients and their critical points, a flow chart of the production process along with its critical points and the precautions taken by the company.

This halal SOP (Standard Operational Procedure) was used as an operational guide in production. Production procedures were made in accordance with the situation and conditions that exist in each company, covering all activities in each department. All employees were required to comply with the established procedures, and each person in charge of each division ensured that their employees follow the existing procedures.

The halal assurance system was implemented by related fields in the halal management structure. The implementation of the halal assurance system required a technical reference that functioned as a document to assist the work of related fields in carrying out their work functions. The output of this technical reference was in the form of documents, forms, specifications and material matrices that can assist the implementation of the halal assurance system. The administrative system functioned to assist in tracing the halal-ness of the raw

materials used. This system describes a system for recording the use of raw materials that can be traced for each type of product. The implementation of the halal assurance system at PT. Galic Bina Mada was supported by informative documents and could be easily accessed by all parties involved in halal production, including the LPPOM MUI (Institute for the Assessment of Food, Drugs and Cosmetics of the Indonesian Ulema Council) as a halal certification agency in Indonesia.

Training is an activity done to increase knowledge, skills, and attitudes to achieve the desired level of competence. Training on the implementation of the halal assurance system had to involve all personnel whose work might affect the halal status of the product. The training aimed to increase employees' understanding of Islamic law about the importance of halal products. The employee's understanding was expected to be able to raise awareness of the halal policy and implement it at the operational level.

Halal assurance system training consisted of two categories, namely external and internal training. External training is organized by LPPOM MUI. External training had to be attended by one of the halal management teams at least once every two years. Internal training was carried out by the company's internal which was done at least once a year.

Internal Audit at PT. Galic Bina Mada was carried out at least once every six months or when there were changes that might affect the halal status of products such as: changes in management, policies, formulations, ingredients, processes or complaints from consumers. Internal halal audit could be carried out simultaneously with other system audits, but the reporting had to be made separately. The Internal Halal Audit was conducted by the Internal Halal Auditor Team. Internal audit was carried out by AHI from different departments (cross audit).

## The Implementation of ISO 9001:2015, HACCP and HrACCP

### ISO 9001:2015

#### a. Reporting Quality Goals

Each section / department at PT Galic Bina Mada had different quality goals. The determination of quality objectives was in accordance with the relevant functions and processes required in the quality management system. The setting of these quality objectives must be consistent with the quality policy and can be measured by taking into account the applicable requirements, and relevant to the suitability of products and services in increasing customer satisfaction. Quality target reporting was carried out once a month by each department. The result of 2017-2018 quality goal achievement is shown in Figure 1.



Figure 1. Graph of Quality Goals (PT. Galic Bina Mada, 2018)

Figure 2 shows the achievement of quality goals in 2017 and 2018. The quality assurance system at PT. Galic Bina Mada began to be actively implemented in March 2017, so that the data from January and February 2017 could not be displayed. The achievement of the quality targets in 2017 as a whole could be achieved, but in 2018 the achievement of the quality targets relatively decreased. This was due to an increase in the target every year for all departments if it had been achieved. Increasing the target is one of the efforts by updating the quality goals of each department. Updating quality goals could be used as an effort to improve quality, namely by continuously making improvements to achieve the best. This statement is in accordance with the opinion of

(Robert & John, 2001) which states that the quality assurance system works well, if there is continuous upgrade.

#### b. Risk Management

Risk identification in ISO 9001:2015 was applied at PT. Galic Bina Mada by making risk registers for each department. The identification of these risks can be seen in the Risk Register table. Risk register monitoring was carried out once a year. This condition was intended as a periodic control effort, so that if various indications that could be detrimental were found, they could be addressed as soon as possible.

#### HrACCP

The implementation of the halal assurance system was carried out by PT. Galic Bina Mada. The implementation of the halal assurance system began with the dissemination of the halal policy that had been made by the company to all employees and external parties. Raw materials were checked by the QC (Quality Control). The check included supporting documentation, and the QC had to ensure that the raw materials and supporting materials did not come from haram/*najis* materials. Checking by the QC was assisted by using a material matrix made by the R&D. Material matrix. The critical activity procedure was to ensure that every material that would be used for the production process until the product was produced had obtained approval from LPPOM MUI. The critical activities are listed in Table 1.

**Table 1** Critical Activities

No.	Critical Activities	Procedure
1.	Use of New Materials	SPK Use of New Materials
2.	Materials Purchase	SPK Purchasing
3.	Product Formulation Procedure	SPK Product Development
4.	Incoming Goods Inspection	SPK Incoming Goods Inspection
5.	Production Procedure	SPK Halal Production
6.	Washing Procedure	SPK Facilities Washing Procedure
7.	Material Storage Procedure	SPK Raw Material Storage

Source: PT. Galic Bina Mada (2018)

#### HACCP

HACCP is used by companies or industries on the basis of trends in the needs of people who need safe food. HACCP in the company is also a proof that the company always prioritizes good quality. HACCP was first implemented at PT.Galic Bina Mada Cibitung in 2016 along with the issuance of the HACCP certificate by the System Certification Institute (SGS), so HACCP would soon be implemented at PT.Galic Bina Mada Pasuruan. With the issuance of this HACCP certificate, it means that the company had committed to ensure the safety of its products from hazards in the field of food safety in both Cibitung and Pasuruan companies.

HACCP in the company was carried out and controlled throughout the production chain and product distribution, from the arrival of raw materials, the production process to the distribution of finished products into the hands of consumers. Control of all these activities was carried out by the company by maintaining the cleanliness of the entire production chain and product distribution. One thing that supports the maintenance of the HACCP system was the implementation of personal hygiene involved in the product. The comparison before and after the implementation of HACCP food safety quality assurance can be seen from the amount of production. This indicates that a good quality improvement will increase the number of consumers.

**Table 2.** Data of Production Increase PT. Galic Bina Mada Pasuruan

Year	Production Capacity (Kg)
2017	14425,00
2018	66408,67

Source: PT. Galic Bina Mada (2018)

In terms of implementing the HACCP food safety system, the company has gone through the steps and principles to achieve the implementation of HACCP in accordance with SNI 01-4852-1998, namely: setting up a HACCP team, describing products, identifying usage instructions, creating flow charts, verifying flow charts,

hazard analysis, determining CCP, determining CCP critical limit, establishing monitoring system, determining corrective action, verification, making record keeping and documentation.

**Evaluation of the Implementation of ISO 9001:2015, HACCP and HrACCP**

This evaluation activity was carried out to determine quality system improvement actions in order to improve quality assurance at PT. Galic Bina Mada consistently and continuously. Evaluation of the quality system at PT. Galic Bina Mada was expected to be able to provide concrete solutions to improve services and improve the image of the carrageenan industry in the community. One form of evaluation is through a Quality System Audit.

One of the evaluation results is derived from the audit findings. Auditing is a systematic, independent and documented process to obtain audit evidence and evaluate it objectively to determine the level of compliance with audit criteria. The audit criteria include a set of policies, procedures, or requirements. Some examples of internal and external audit findings in the QC section that need to be followed up by PT. Galic Bina Mada are as follows.

**Table 3.** Internal Audit Findings

Quality Assurance System	Audit Finding	Incompatibility	Corrective Action
1. ISO 9001;2015	Minor	The competency matrix that had been created did not explain the required laboratory personnel competencies.	To revise the competency matrix that had been created by adding competencies for laboratory personnel.
	Minor	Moisture Analyzer, Viscometer and pH meter had not been calibrated.	To make requests related to the calibration of these tools and carry it out according to the SOP, namely external calibration once a year.
	Minor	Kappa testing work instructions were not yet updated.	To revise the work instructions
	Observation	There was no record of weighing seaweed before the extraction process.	To fix the Extraction Batch Record form.

Source: PT. Galic Bina Mada (2018)

The second form of evaluation was the Management Review Meeting (RTM). This RTM activity aimed to review the results of the implementation of the quality system in the company, both direct observation of the routine (daily) activities of PT. Galic Bina Mada as well as the results of audit activities (internal and external). The implementation of the quality system RTM was carried out based on the scope of management review as stated in the quality guidance document, namely:

- a. Audit findings;
- b. Customer feedback (customer satisfaction analysis results);
- c. Process performance and service product compatibility;
- d. Status of corrective and preventive actions;
- e. Follow up on previous management review;
- f. Changes that may affect the improvement of service quality system
- g. Suggestions for improvement (ISO 9001:2015).

The results of the third evaluation were by looking at the quality of the products being produced. Product quality itself can be defined as a strength of a product when compared to competing products from the customer's point of view. Product quality is always associated with the specifications, features, functions, or performance of a product (Ferrara et al., 2019). Product quality is also an opportunity to add value to the company so that it can be used to achieve even greater profit margins. Quality is a factor of interest based on

logic or considerations (Antonetti et al., 2019). If consumers feel that they will get satisfaction from a product, they will be interested in buying the product. This is in line with (Alnawas & Aburub, 2016; Kalinić et al., 2021) who state that if someone expresses satisfaction with consuming an item, in the future they will prioritize the item for re-consumption.

**Table 4.** External Audit Findings

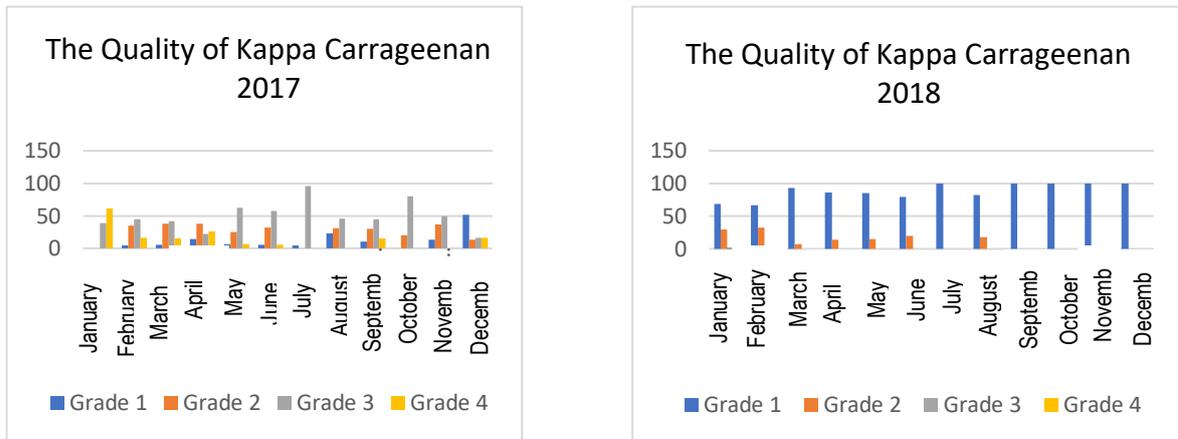
Quality Assurance System	Audit Finding	Incompatibility	Corrective Action
ISO 9001:2015	Minor	Verification of drinking water used in the production process by an external laboratory on 12 September 2017 was incomplete for all <i>Permenkes</i> 492 parameters, e.g., Arsenic, Cadmium, Selenium.	1. The PIC will review the requirements of <i>Permenkes</i> 492 and request to assess the water with additional parameters in the next water test. If the current external laboratory is unable to run the test, the PIC will contact another laboratory.
	Minor	Measurement equipment that were found were not always verified/calibrated as it should be 1. Incubator set for 36°C (Yeast & Mold Incubation) was not calibrated 2. Micropipette for <i>E. coli</i> analysis was not calibrated 3. Electronic balance for analyzing <i>E. coli</i> was calibrated at 20g - 100g. However, it was only used for 1 g samples per analysis 4. The electronic balance for gel strength analysis was calibrated at 200 g. However, it was only used for 7.5 g of sample per analysis.	1. Calibration of the incubator and micropipette would be carried out in February 2019. 2. The second calibration of the electronic balance would be carried out in February 2019 and ensure that the calibration point was in accordance with the measurement range
Halal Assurance System/ HrACCP		In the SOP for inspection of incoming materials, it is stated that the inspection process refers to the list of materials, but in its implementation the party inspecting the materials did not yet receive a copy of the list of materials.  SPK GBM.QCL.003 product definition did not meet the criteria, it was still not correct, and how to handle it was not yet explained.	To provide a copy of the material list/matrix that had been made by the RND to QC  To improve/revise SPK GBM.QCL.003 in accordance with the criteria for the halal assurance system, and the handling process shall be explained more.

Source: PT. Galic Bina Mada (2018)

Kappa carrageenan flour of PT. Galic Bina Mada Pasuruan consists of 4 Grades. Grade 1: 1000 g/cm<sup>2</sup>, Grade 2: 801 g/cm<sup>2</sup> - 999 g/cm<sup>2</sup>, Grade 3: 400 g/cm<sup>2</sup> - 800 g/cm<sup>2</sup>, Grade 4: < 400 g/cm<sup>2</sup>. The quality of kappa carrageenan products at PT. Galic Bina Mada was achieved in 2017 and 2018.

The increase in the quality of kappa carrageenan products can be shown by the increase in the quality of carrageenan in 2018 as compared to 2017. Figure 2 shows that in 2017, the average grades produced were grades 3 and 4. The production of kappa carrageenan in 2017 was 14,425 tons with QC rejects of 1525 tons (10.57%). Grades less than grade 1 were included in the QC reject criteria. To overcome this, the company

made new breakthroughs by optimizing engine performance, carrying out all processes according to existing procedures and standards, conducting product development to improve the quality by the Research and Development department, participating in quality assurance certification for kappa carrageenan products. Production results in 2018 could reach 66408.67 kg with 0% reject QC status.



**Figure 2** The Quality of Kappa Carrageenan in 2017 and 2018 2017 dan 2018

Improvements in quality could be found in early 2018, the products produced could reach grade 1. An increase in quality indicates that the quality assurance system at PT. Galic Bina Mada was running well. This is supported by Robert & John (2001), that the quality assurance system will run well, if there is continuous improvement and the increase of the quality of the services offered.

## CONCLUSION

Based on the results of the discussion, it can be concluded as follows. Preparation for ISO 9001 2015 certification, Food Safety with HACCP and Halal Assurance System with HrACCP at PT. Galic Bina Mada was categorized as good. This is indicated by the completeness of all files and the sequence of steps taken to obtain certification. The results of the implementation of the ISO 9001:2015, HACCP, HrACCP quality assurance system at PT. Galic Bina Mada were good or appropriate, which was marked by achieving the standard of achievement and completeness of documents. Implementation of the quality assurance system at PT. Galic Bina Mada could increase the amount of production and improve product quality (kappa carrageenan grade). The results of the evaluation which included internal and external audits provided assurance of the achievement of the quality standard system.

Suggestions that can be given by the authors are for PT Galic Bina Mada to make continuous improvements to ensure an effective quality management system and for future researchers to conduct further research for the running of the HACCP system at PT. Galic Bina Mada Pasuruan, after the certification process.

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