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CORRELATION OF AGE AND WORKING PERIOD TOWARDS PRODUCTIVITY IN THE CRAB (*Portunus Pelagicus*) PEELING PROCESS AT THE HARIYANTO MINIPLANT, LABUHAN MARINGGAI, EAST LAMPUNG

Korelasi Usia Dan Masa Kerja Terhadap Produktivitas Pada Proses Pengupasan Rajungan (*Portunus Pelagicus*) Di Miniplant Hariyanto Labuhan Maringgai, Lampung Timur

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ABSTRACT

The purpose of this study was to analyze the influence of age and length of service on employee productivity in the crab peeling process. The product observed was peeled crab meat as a raw material for canned crab canning. The practical method used was observation of the crab peeling process flow, as well as observation of the influence of age and length of service on employee work productivity by also observing the yield produced. The results showed that the correlation between age and length of service in peeling had no correlation with productivity in crab peeling. The proportion of meat included jumbo meat of 4.5%, claw meat of 6.4%, flower 9.9%, and special 6.4%. The yield produced from crab peeling was 37.78%.

Keywords: Productivity, crab peeling, correlation, yield

ABSTRAK

Tujuan penelitian ini adalah menganalisis pengaruh dari faktor usia dan masa kerja terhadap produktivitas karyawan pada proses pengupasan rajungan. Produk yang diamati adalah daging rajungan kupas sebagai bahan baku pengalengan rajungan kaleng. Metode praktik yang digunakan adalah pengamatan alur proses pengupasan rajungan, serta pengamatan pengaruh usia dan masa kerja terhadap produktivitas kerja karyawan dengan mengamati juga rendemen yang dihasilkan. Hasil penelitian menunjukkan bahwa korelasi usia dan masa kerja pada pengupasan tidak memiliki korelasi terhadap produktivitas pada pengupasan rajungan. Proporsi daging meliputi daging jumbo sebesar 4,5%, daging capit 6,4%, flower 9,9%, dan spesial 6,4%. Rendemen yang dihasilkan dari pengupasan rajungan sebesar 37,78%.

Kata kunci: Produktivitas, pengupasan rajungan, korelasi, rendemen

INTRODUCTION

East Lampung waters are home to a diverse range of marine life, including the blue swimming crab. Market demand for blue swimming crab commodities in Lampung increases annually, accounting for 10-12% of Indonesia's total exports (Jailani *et al*., 2022). Blue swimming crabs resemble crabs in appearance, but differ in color, meat, and shell (Baswantara *et al*., 2021). They are a class of crustaceans that live on the seabed, but they swim toward the surface to forage (Yusran *et al*., 2023). In 2020, blue swimming crabs reached USD 367.5 million, representing 6.8% of national revenue (Kurniawan, 2021).

Crab is generally a perishable food (easily damaged/rotten). Enzyme and bacterial activity can cause a decrease in the quality of crab meat, therefore, proper handling and maintaining sanitation and hygiene are necessary (Maurina, 2021). One of the fishery products produced is canned crab. The crab processing process involves separating the meat from the shell, requiring human labor, and human labor is related to productivity (Jumiati, 2019).

Productivity is a measure of how productively a workforce produces output. Productivity is also defined as the ratio of input to output that results in a process (Panjaitan *et al*., 2019). Productive work requires skills appropriate to the job content, allowing for improvements in work methods or at least maintaining existing ones.

Supporting factors for productive work include a willingness to work that aligns with the content of the work, a comfortable work environment, income that can meet living needs, adequate social security, humane working conditions, and harmonious work relationships (Siregar, 2020). Productivity is influenced by several factors, including labor, raw materials, and the facilities and infrastructure used. Crab in East Lampung waters undergoes simple processing, namely boiling, to produce semi-finished products that are processed in mini-plants (Awami *et al*., 2018).

Based on a survey of existing miniplants in East Lampung with abundant crab potential, the author conducted a final practice on "*Correlation of Age and Length of Service to Productivity in the Process of Peeling Crab (Portunus Pelagicus) at the Hariyanto Labuhan Maringgai Miniplant, East Lampung*" as a guide in using labor based on age and work experience. This way, miniplants can increase productivity by improving or hiring appropriate employees.

RESEARCH METHODS

This research was conducted from January 20 to March 20, 2025. The final practical activity was carried out at the Miniplant for peeled cooked crabs, Labuhan Maringgai – East Lampung.

The tools used in the process of cooking peeled crabs include a table, fiber box, scales, plastic bucket, aluminum steamer, stove, tray, fan, Styrofoam box, knife, jar, basket, chair. Meanwhile, the tools for collecting data include a pen, book, quality table sheet, productivity table sheet. The materials used in the process of cooking peeled crabs include crab, water, and ice.

The study was conducted through surveys and observations at a crab miniplant in Labuhan Maringgai, East Lampung. This study aimed to determine the process flow and the correlation between employee productivity and age and length of service at the crab miniplant in Labuhan Maringgai, East Lampung.

The population in this study was employees of the Labuhan Maringgai crab miniplant in East Lampung. The sample observed in this study included employees aged 20 to 40 years and with a work period of less than 12 months to employees with more than 24 months of service. To clarify the age and length of service of employees at the crab miniplant, see Table 1:

Table 1 Age and Length of Service of Employees

No	Age (Years)	Working period (Months)
1	20 – 30	<12
2	30 - 40	>12

The data collection method in this final practice is by observation and direct observation. Observation and observation are carried out on the observation of the process flow of peeled cooked crab processing in the peeled cooked crab miniplant to obtain information related to the required practical data. To find out the peeled cooked crab process, it is done by visiting, following production activities, conducting and interviewing directly the owner of the Peeled Cooked Crab Miniplant. To collect labor productivity data, this is done at the peeling stage in the following way: Visiting and practicing at the crab miniplant, namely the miniplant owned by Mr. Ariyanto, Productivity observations are carried out by asking the age and length of work of employees. After that, take the boiled crab, then peel the crab using your hands and the meat is put in a jar. Before peeling, set a stopwatch to find out how long it takes to peel the crab meat, then record the productivity results that have been obtained. After knowing the initial weight and final weight as well as the peeling time, the calculation of productivity observations is carried out using the following formula:

$$\text{Productivity (kg/hour/person)} = \frac{Amount\ of\ production\ results}{unit\frac{time}{org}}$$ (Baharuddin *et al*., 2022)

Employee productivity observations were carried out 10 times with 3 repetitions for each variable.
The variables in this study consist of 2 variables, namely:

1. Independent variables, namely age (X1) and length of service (X2).
2. Dependent variable, namely productivity (Y).

The data analysis method uses multiple linear regression based on Isnaini *et al*. (2021), which is an analytical tool for forecasting the value of the influence of two or more independent variables on the dependent variable to prove whether or not there is a functional relationship between two or more independent variables with one dependent variable (Amrul, 2020). Data analysis uses multiple linear regression and is carried out with the help of the SPSS application program. Based on the regression model, several t-tests and F-tests can be carried out. This t-test is to determine whether or not there is a partial (alone) effect given by the independent variables (X1, X2) individually on the dependent variable (Y). Meanwhile, the F-test aims to determine whether or not there is a simultaneous (together) effect given by the independent variables (X1 and X2) on the dependent variable (Y). The coefficient of determination (R2) is used to determine the percentage of independent variables together that can explain the dependent variable. The value of the coefficient of determination is between zero and one. If the coefficient of determination (R2) = 1, it means that the independent variables provide all the information needed to predict the variation of the dependent variable. If the coefficient of determination (R2) = 0, it means that the independent variable is not able to explain the dependent variations.

RESULTS

The process of peeling crab meat at the Hariyanto miniplant consists of receiving raw materials, weighing, separating crab parts, washing, peeling, weighing, storage, and distribution.

Table 2 Crab temperature observations

Process	Temperature	Standard SNI 4224:2021
BB acceptance	10,05±0,83	
Peeling	19,46±0,53	4^0C
Storage	9,62±0,97	

Based on Table 2, temperature observations made on cooked crab raw materials at the time of receiving the raw materials were 10.05±0.83, while at the time of peeling the crab the temperature observed was 19.46±0.53 and for observations of the crab temperature during storage, it was 9.62±0.97. This is not in accordance with that stipulated by SNI 4224:2021, namely 40C. The temperature that does not comply with SNI 4224:2021 occurs due to a lack of awareness of employees in the use of ice to maintain the cold temperature of raw materials during the peeling process.

DISCUSSION

The purpose of receiving raw materials is to obtain good quality raw materials according to the standards set by the company.

Figure 1. Raw material acceptance process

The raw materials received are cooked crabs with the aim of maintaining the quality of the crab meat (Sipahutar, 2024). from Lampung waters, Bangka waters, and Kalimantan waters. The temperature of the crab meat is 80C – 120C. The size of the cold cooked crab received by the miniplant ranges from 250g-300g. Receipt of raw materials is carried out at night or early morning. The raw material receiving room consists of an outer raw material receiving room and an inner raw material receiving room. The incoming raw materials are unloaded from the car and then removed from the fiber box (Siregar, 2020). Then wait for the morning for weighing 1 and the peeling process.

Weighing 1 aims to re-confirm that incoming raw materials match the data provided by the supplier and also to determine the amount to be peeled for each group of fish. This weighing process is carried out by weighing the crabs received by the miniplant from the supplier to determine whether the weight of the crabs matches the recorded weight and also to determine the initial and final weights (Maryani, 2019).

Weighing is done outside the processing room by moving the crabs in the fiber into a large basket with a basket capacity of 12-15 kg, then weighed using a spring scale, then each basket is weighed and its weight is recorded, then it is put into the processing room through a small door towards the processing room to be distributed to each picker table for sorting and separating the crab parts.

Figure 2. Sorting process

Sorting is done by separating the crabs whose quality still meets the standards by checking them one by one by separating the crab parts, namely by removing each part such as the top shell, legs and claws manually using hands, then putting them in a basket for washing. There is no size sorting process in this stage at the miniplant, all crabs of various sizes are put together for peeling. Sorting is also a process of separating the quality of a raw material, in crab sorting is done by separating the crabs based on the type of crab meat, namely lump, jumbo, special, and clawmeat (Simbolon *et al*., 2022).

Washing is done to remove dirt attached to the raw materials. Washing is done quickly, cleanly, and carefully by maintaining the temperature of the fish ≤50°C. The washing water uses a mixture of water and ice (Mulyani, 2022). Washing is done by dipping the basket containing the crab parts into a tub of water, then lifting the basket and pouring water again. Then, draining the water by shaking the basket and placing it on the picker table for peeling/separating the meat from the shell.

Peeling/separating the meat from the shell is done manually, using hands and a knife. The meat is separated into six sections: Jumbo, Flower, backfin, special, clawmeat, and clawfinger. Each peeled section is then placed into small jars with a capacity of 900 g - 1000 g for easy weighing and storage. Each peeling section is carried out by a different person.

Figure 3. Peeling process

Peeling the crab involves separating the meat from the shell. The proportion of the crab body after peeling is 52.59% shell, 35.68% meat, and 11.73% innards. Therefore, more than 50% of the crab's composition is shell, which will become waste and disrupt the environment (Anggraeni *et al*., 2023).

Weighing II aims to determine the final weight of the peeled crab. Weighing is done by weighing the jar containing the crab meat and recording each result of the crab meat weighing II. The purpose of this weighing is to obtain a weight that matches the predetermined size and is free from pathogen contamination (Purnomo, 2023).

Figure 4. Weighing process ll

Storage aims to maintain the product temperature to remain low until it reaches the crab meat canning company. Storage is done by arranging the jars in a fiber box, before the jars are arranged in the fiber, the bottom of the fiber is given bulk ice and then the jars are arranged in a lying position, then bulk ice is added to the jars to maintain the temperature of the product, then the fibers are arranged in a corner near a small door for further distribution or collection by the canning company.

Figure 5. Storage process

The crab meat supplied to the industry is already separated from its shell. The meat is received in plastic jars and placed in plastic bags covered with ice (Erawati, 2015). Loading is the process of transferring product from the storage area to the distributor's vehicle. Loading is done by removing the fibers from the processing area through a small door and then loading them into a pickup truck to be transported to a crab meat canning company. Loading takes place in the afternoon or evening because the peeling process is completed in the afternoon and the crab meat should not be stored for too long.

The process of delivering crab meat using pick-ups and trucks and adding ice. Functions to maintain the temperature of the crab meat so that it does not experience a decline in quality. The ratio of fish and ice must be considered because in principle, ice is made by lowering the temperature to reach a temperature below the freezing point of water in sanitary conditions, handling fish during the distribution and transportation process must be in low temperature conditions <50C, the ratio of ice to fish is 1:1, arranged in layers, protected from the effects of heat, dust, insects, and other dirt (Pramono, 2018).

Temperature monitoring aims to determine how the miniplant applies temperature controls, from raw material receipt to product distribution. Crab is a fishery product that is susceptible to quality deterioration, so its quality must be maintained by maintaining the temperature to prevent microbial growth. Temperature is a primary factor in bacterial growth, alongside pH, humidity, and water content (Rahmawati *et al.,* 2022).

Crab temperature was measured using a thermometer. The temperature of the crab meat was measured by inserting the thermometer into the meat. The meat was taken from several angles: the top, middle, and bottom. The temperature of the crab meat in the jar was measured by inserting the thermometer into the meat using three different jars. The following are the results of the crab temperature measurements in Table 2.

Figure 6. Crab temperature measurement

Productivity observations aim to determine how much product employees can produce per unit of time (hour). Productivity observations were conducted on the crab peeling process at the miniplant by employees (piker). Productivity observations were conducted by calculating how long employees took to peel a jar of crab or 0.9 kg to 1 kg. Productivity observations consisted of several peeling sections including jumbo meat, claw meat, flower meat, and special meat. Productivity observations were conducted three times with two observations. The following are the results of productivity observations of the crab peeling process at the miniplant in Table 11.

Table 3d. Productivity of crab meat peeling

No	*Jumbo(kg)*	*Capit(kg)*	*Flower(kg)*	*Spesial(kg)*
1.	2,813	1,508	0,941	1,112
2.	2,840	1,471	0,944	1,163
3.	1,964	1,818	1,126	2,014
4.	3,423	2,298	0,959	1,801
5.	3,069	1,702	0,980	1,741
6.	3,391	2,124	1,246	1,565
7.	2,935	1,570	1,052	1,868
8.	3,306	1,502	1,121	1,683
9.	3,038	1,865	0,945	1,921
10.	3,082	2,106	1,253	1,790
11.	2,443	1,762	1,100	1,372
12.	2,624	1,279	1,106	1,471

Based on Table 3, the lowest productivity for jumbo meat peeling was 1,964 kg and the highest was 3,423 kg. For claw meat, the lowest was 1,279 kg and the highest was 2,298 kg. For flower meat, the lowest was 0.944 kg and the highest was 1,253 kg. And for specialty meat, the lowest was 1,112 kg and the highest was 2,014 kg. The high and low productivity is due to differences in the number of employees peeling. There is no standard set by the miniplant for employees in achieving productivity, but the higher the productivity, the better and higher the income earned by employees.

Hulu *et al*., (2022) stated that "productivity is sometimes viewed as the intensive use of conversion resources such as labor and machines that are measured precisely and truly show an efficient performance." Work productivity is part of the obligation of the level of work results that workers must provide to employers. Increasing labor productivity is the responsibility of various companies providing tools, training facilities, and other work infrastructure.

Based on the results of the correspondence, data was obtained from 48 employees at the Hariyanto miniplant, Labuhan Maringgai - East Lampung. Those who met the criteria were grouped according to age 20-30 years, 40-50 years and work experience under 2 years and over 2 years. Correspondent observations of 48 employees on productivity were carried out at the stage of peeling cooked crabs, where employees who worked on peeling cooked crabs were female.

Figure 7. Peeling crab meat

Observations on the productivity of this mini-plant of crabs in the process of peeling jumbo meat, a correlation analysis was conducted between age and work period in the process of peeling the crab. Jumbo meat is the largest meat in the crab, located in the chest area related to the swimming legs. In peeling jumbo meat, it is done by cutting it into two parts, then attaching a knife to the ring of the swimming legs of the crab, then rotating it until the crab shell is peeled off and the jumbo meat is removed carefully and sanitary. Analysis of the influence of age and work period on the peeling of jumbo meat can be seen in Table 4.

Figure 8. Jumbo crab meat

Table 4. Observation of jumbo meat productivity

Name	*age*	*years of service*	*Time (hour)*	*Output (kg)*	*Average Productivity (kg/jam/org)*
Yus	35	1	0,353	0,993	2,813
Wasilah	52	4	0,351	0,997	2,840
oya	46	4	0,502	0,986	1,964
Dewi	35	7	0,286	0,979	3,423
Ismawati	32	7	0,303	0,930	3,069
Opiana	42	7	0,276	0,936	3,391
rumi	49	3	0,323	0,948	2,935
nani	31	2	0,288	0,952	3,306
maryati	27	1	0,319	0,969	3,038
yunia	47	4	0,317	0,977	3,082
susi	30	2	0,402	0,982	2,443
ayu	32	2	0,372	0,976	2,624

Based on the F test, the results obtained show that the significant value for the influence of age (x1) and length of service (x2) on productivity (y) simultaneously is 0.328>0.05. And the calculated F value is 1.264<4.10, there is no influence of age (x1) and length of service (x2) on productivity (y). The close range of differences causes age and length of service to have no significant correlation with work productivity.

Furthermore, a determination coefficient analysis was carried out to determine the percentage of correlation given by age (x1) and length of service (x2) to productivity (y). The R Square value was 0.219, which means that the influence of age (x1) and length of service (x2) on work productivity (y) of jumbo meat peeling employees at the miniplant was 21.9% and the remaining 78.1% was influenced by other factors outside this research.

In the jumbo meat study, age and length of service were not correlated with productivity. This may be due to the precision and complexity of peeling jumbo meat. Furthermore, there are many other factors that could influence employee productivity at Hariyanto's miniplant, such as the condition of the raw materials, the environment, and the

individual employee's personal well-being. Therefore, the effect of age and length of service on productivity is small.

Kumbadewi *et al*., (2021) stated that employee productivity is influenced by factors such as age, work experience, wages, technology, and the work environment. Employees who work at a productive age will be able to work better. The higher the wages received and the more experience and skills possessed by employees, the higher the productivity obtained. Other factors that can influence productivity include education, training, and work discipline. In addition, technology and a comfortable work environment will motivate employees to improve their work. Thus, it can be concluded that employees who have a good age, work experience, wages, technology, and work environment will be able to increase their productivity.

Yield calculation is done by counting the number of whole, boiled crabs in the miniplant with the meat produced or those that have been shelled. The following observations on yield for peeled crabs in Hariyanto's miniplant are in Table 5.

Table 5. Crab Yield

Crab meat part	*Percentage (%)*
Whole meat	37,78
Jumbo	11,85
Clawmeat	12,55
Claw finger	4,10
Backfin	1,07
Flower	5,15
Spesial	6,18

Based on Table 5, the total crab yield was 37.78%. The normal crab meat yield is between 25-30%. The high or low meat yield is determined by the peeler's skill in peeling the shell and the correct cooking process (Jumiati, 2019). The jumbo meat yield was 11.85%, the clawmeat yield was 12.55%, the blackfin yield was 1.07%, the flower yield was 5.15% and the special yield was 6.18% of the total whole crab. From the results of the yield observations, the size of the yield is influenced by several factors including the quality of the fresh and cooked crabs, the size of the crabs, the length of the boiling process and the skill of the workers in peeling the crabs.

The yield value of processed food products is an important parameter to understand as a basis for calculating financial analysis, estimating the amount of raw materials needed to produce a given volume, and determining the efficiency of a processing process (Vebrianti *et al*., 2023). The process of harvesting crab meat leaves behind a significant amount of shell or hard skin waste, reaching 40 to 60 percent of the total weight of the crab (Natalia *et al*., 2021).

CONCLUSION

This study concluded that for jumbo crab meat, age and length of service did not correlate with work productivity. Furthermore, the average yield was 37.78%. Therefore,

further research is needed to investigate the correlation between productivity and other crab meat stripping techniques, such as clawn, backfin, and special types.

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