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# Giving Various Concentrations of Mangosteen Peel Extract by Spraying Method to Rice Quality in Perum Bulog, Cianjur Regional Subdivision

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ABSTRACT

As the main food commodity in Indonesia, the quality of rice is an important thing that must be considered, including postharvest handling during storage. Improper storage conditions can trigger pest and microbial contamination which has the potential to accelerate rice quality degradation during storage. Mangosteen peel is rich in antimicrobial and antifungal compounds, but their use is still limited. This study aims to determine the effect of mangosteen peel extract at concentrations of 2.5%, 5%, and 7.5% on the quality of rice in the medium class category for 30 days of storage at the Cianjur regional sub-division BULOG warehouse The research design will be experimental. We will be using a randomized complete block design (RCBD) with four treatments and three replications. The results show that the decline in the quality of rice including moisture content, broken kernel, chips, yellow kernel and the presence of pests could not be slowed down by administering mangosteen peel extract. Until the end of the storage period, Ahasverus advena was the most commonly found pest. The percentage of water content, broken grains, groats, and yellow grains in rice at the end of storage in all treatments can still be categorized into the medium class according to SNI with an average value of respectively 12.53%, 13.36 %, 4.02%, and 1.27%

## INTRODUCTION

One of the main food sources for the people of Indonesia is rice which is further processed into rice. Rice still ranks first as a staple food source despite the shift in consumption patterns to non-rice products such as cereals and bread but the amount is still far below rice consumption. Rice consumption is the most at the household level which reaches 20,685,619 tons or 77.5 kg per capita per year while rice consumption in the industrial scope reaches 465,835 tons or 1.75 kg per capita per year (BPS, 2019). In addition, rice consumption also occurs in the scope of Horeka (hotels, restaurants, catering, restaurants and others) and services which reach 6,548,638 tons or 24.5 kg per capita per year (BPS, 2019). The high consumption of rice is supported by the amount of national rice production which is also high reaching 54.42 tons. If converted into rice, the total rice production will reach 31.36 million tons in 2021 (BPS, 2022).

The availability of rice in the community, including its quantity and quality, is the authority of state-owned public companies, namely BULOG with the main task of managing the supply, distribution and control of rice prices (Presidential Decree No. 29 of 2000). Rice storage conditions before distribution must be managed appropriately to be able to maintain the quality and quantity of rice supplies in BULOG warehouses so that the quality of rice does not decrease during the storage period so that it can still meet the requirements of SNI 6125:2015 concerning rice.

Rice is one of the most important staple foods in many parts of the world, particularly in Asia. As such, there is a constant need to improve its quality, not only to meet the increasing demand for rice but also to ensure its nutritional value. In recent years, the use of natural plant extracts has gained significant attention as a means of improving rice quality.

One such extract is the mangosteen peel extract, which is known for its high levels of antioxidants, phytochemicals, and other beneficial compounds. Mangosteen is a tropical fruit that is widely cultivated in Southeast Asia, and its peel has been used traditionally in folk medicine for centuries.

In this study, we aim to investigate the effect of giving various concentrations of mangosteen peel extract by spraying method on rice quality in Perum Bulog, Cianjur Regional Subdivision. We will explore the potential of mangosteen peel extract as a natural alternative to synthetic chemicals and fertilizers that are commonly used in rice farming.

The findings of this study could have significant implications for rice farmers in the region, as well as for the broader agricultural industry. By utilizing natural plant extracts like mangosteen peel extract, we could potentially improve rice quality while reducing the use of harmful chemicals and promoting sustainable agriculture practices.

Storage of rice with improper conditions can result in a decrease in quality such as pest and insect attacks such as rice aphid or Sitophilus oryzae, Liposcelis spp., Cryptolestes spp., Carpophilus spp., Tribolium spp., dan Rhyzopertha dominica (Wiranata, Himawan, & Astuti, 2013) serta pertumbuhan jamur Aspergillus spp. Aspergillus flavus, dan Aspergillus niger (Bagus, Widaningsih, & Sudarma, 2017). The risk of contamination is influenced by environmental factors such as temperature, aeration, air humidity and also the moisture content of rice. Research (Bagus et al., 2017) suggests that the risk of contamination is even greater if the storage conditions of rice in the package are improper and the rice is stored for a long period of time in the package. Therefore, it is necessary to strive for postharvest handling to prevent contamination and damage to rice during storage in warehouses.

Mangosteen (Garcinia mangostana L.) is a native plant in Indonesia whose skin is still not widely used. Mangosteen peel is rich in xanthones which have properties as antimicrobial, antifungal, antiviral, and antioxidant. In addition to xanton, mangosteen peel contains other active compounds such as tannins, terpenoids, flavonoids, tannins and saponins which also have properties as antimicrobials (Saepudin, Budiono, & Halimah, 2019) (Widyarman et al., 2019). Based on this description, this study was conducted to determine whether or not there is an effect of giving mangosteen peel extract by spraying method on the quality of rice during storage in the BULOG perum warehouse of Cianjur egional sudividing.

## METHODS

This study used a Complete Randomized Design with 4 levels of treatment, namely the concentration of mangosteen peel extract of 0 (control / K0), 2.5% (K1) 5% (K2) and 7.5% (K3) with 6 repeats. The research was carried out in the warehouse of Perum BULOG Cianjur Subdivision, the Testing Laboratory of the Agricultural Postharvest Research and Development Center, and the Basic Laboratory of the Faculty of Agriculture, Siliwangi University. The ingredients used are medium quality BULOG Perum rice and mangosteen peel obtained from the traditional market in Tasikmalaya. The chemicals used include 96% ethanol, and aquaades. The equipment used is a grain moisture tester, hygrometer, digital scales, CR-300 chromameter, rice cooker, flonder or wooden mat pallet for the base to store rice sacks, canvas tarpaulin, mini hand sprayer pump, oven, waterbath, blender, and camera.

## RESULTS AND DISCUSSION

### A. Research Results

#### 1. Test Classical Assumptions

#### a. Normality Test

Table 1. Normality Test Results

| One-Sample Kolmogorov-Smirnov Test | | |
|---|---|---|
| | | Unstandardized Residual |
| N | | 39 |
| Normal Parameters[a,b] | Mean | .0000000 |
| | Std. Deviation | 2.59312558 |
| Most Extreme Differences | Absolute | .122 |
| | Positive | .122 |
| | Negative | -.070 |
| Test Statistic | | .122 |
| Asymp. Sig. (2-tailed) | | .149[c] |
| a. Test distribution is Normal. | | |
| b. Calculated from data. | | |
| c. Lilliefors Significance Correction. | | |

Based on the results of the normality test with Kolmogorov-Smirnov in the table above, the probability value of p or Asymp is known. Sig. (2-tailed) of 0.149. Because the probability value of p, which is 0.149, is greater than the significance level, which is 0.05. This means that the assumption of normality is met. Normality tests can also be seen using histograms and normal P- Plots (Afiezan, Wijaya, & Claudia, 2020).

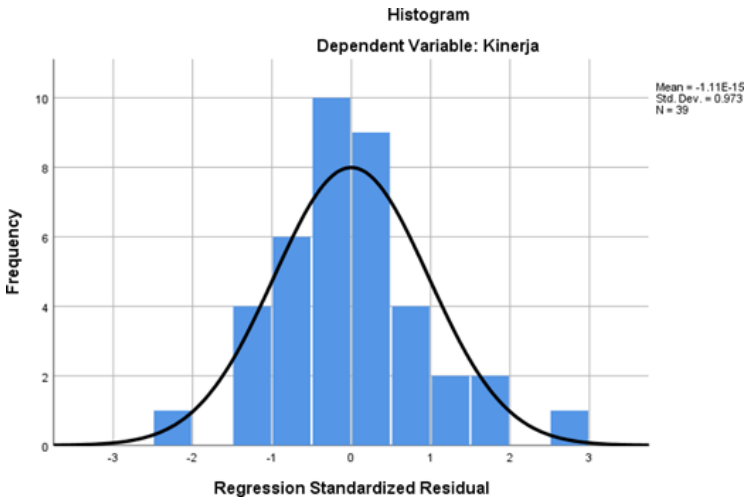


Figure 1. Grafik Histogram

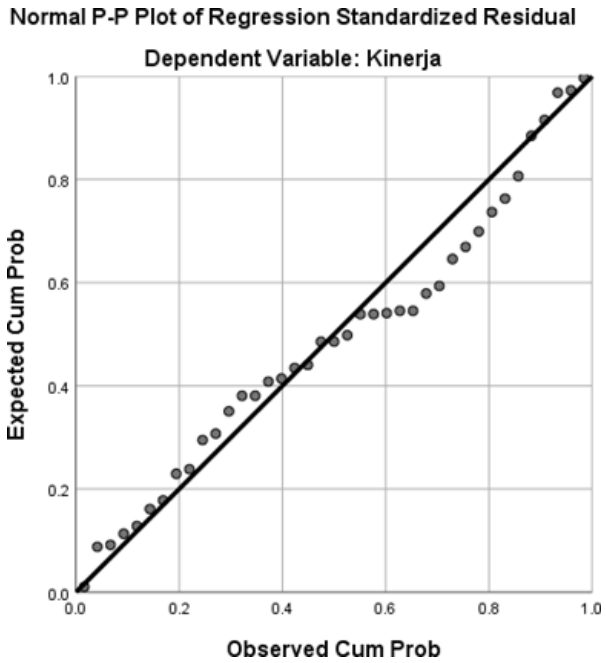


Figure 2. Grafik Normal P-Plot

Based on the histogram graph above, it can be seen that the distribution of data is in the form of bells. Whereas in the normal p-plot chart it can be seen that the sample points follow a diagonal line from the bottom left to the upper right. Based on this, it can be concluded that the data are normally distributed and the assumption of normality is met.

**b. Uji Multikolinearitas**

Table 2 Multikolinearitas Test Results

| Coefficients[a] | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Unstandardized Coefficients | | Standardized Coefficients | | | Collinearity Statistics | |
| Model | B | Std. Error | Beta | t | Sig. | Tolerance | VIF |
| 1 (Constant) | .238 | 3.556 | | .067 | .947 | | |
| Job Satisfaction | .683 | .116 | .704 | 5.909 | .000 | .305 | 3.283 |
| Motivation | .357 | .173 | .246 | 2.067 | .046 | .305 | 3.283 |
| a. Dependent Variable: Performance | | | | | | | |

In this study, the data used in this multicholinearity test were data from independent variables. Based on the table above, each VIF value is known as follows:

1) The VIF value for the Independent variable Job Satisfaction is 3.283 < 10 with the Tolerance value is 0.305 > 0.10 then the Independent Job Satisfaction variable can be declared to have no symptoms of multicoloniearity.
2) The VIF value for the Independent Motivation variable is 3.283 < 10 with the Tolerance value being 0.305 > 0.10 then the Motivation variable can be declared no symptoms of multicoloniality

**c. Heteroskedastisitas test**

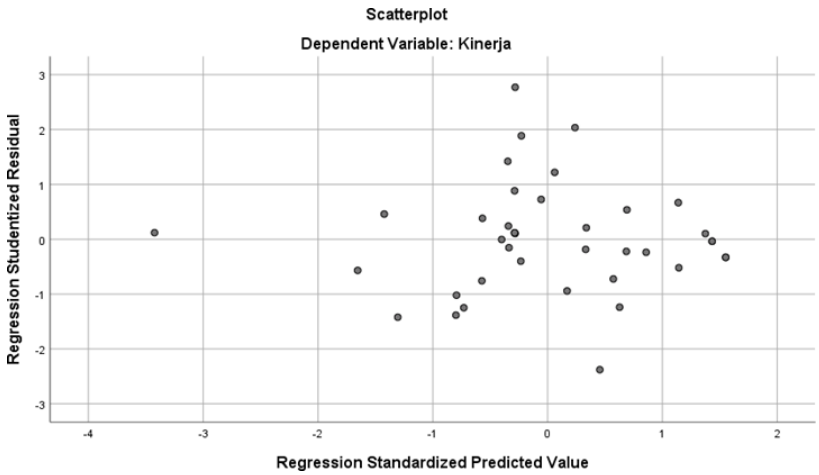


Figure 3. Scatterplot

It can be seen in the scatterplot chart display above, that the dots spread above and below the number 0 on the Y axis, and the data spreads randomly. It can be concluded that there is no heteroskedasticity problem in regression models, analysis using scatter plots has a significant drawback because the number of observations affects the plotting

results. The smaller the number of equalization samples, the more difficult it is to interpret the scatter plot results. Therefore, a more accurate statistical test is needed to ensure the accuracy of the results obtained, namely using the glesjer test. The glesjer test is carried out by regressing the absolute residual value (AbsRes) against independent variables, the following is the basis for decision making of the heteroskedasticity test through the Glejser test.

3) If the value of Sig. > 0.05 then There are no symptoms of heteroskedasticity

4) If the value of Sig. < 0.05 Symptoms of heteroskedasticity occur

The following are the results of the Heteroskedasticity Test presented in the Table below.

Table 3. Heteroskedastisitas Result Test

| Model | | t | Sig. |
|---|---|---|---|
| 1 | (Constant) | 1.045 | .303 |
| | Job Satisfaction | -.818 | .419 |
| | Motivation | .460 | .649 |

The probability value (Sig) of the Job Satisfaction variable is 0.419, and from the Motivation variable is 0.649. Since the probability value (Sig) of all variables is more than 0.05 or 5% significance, it can be concluded that the assumption of homoskedasticity is met, which means that there are no symptoms of heteroskedasticity.

**2. Hypotesis test**

**a. Uji T (Uji Parsial)**

Tabel 4. T Result Test

| Model | UnstandardizedCoefficients | | StandardizedCoefficients | | |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | t | Sig. |
| 1 (Constant) | .238 | 3.556 | | .067 | .947 |
| Job Satisfaction | .683 | .116 | .704 | 5.909 | .000 |
| Motivation | .357 | .173 | .246 | 2.067 | .046 |

Based on the table above, the following information is obtained:

1) The Job Satisfaction variable has a significance value of 0.000, the value is less than 0.05. As for the calculated t, a value of 5,909 > t table (2,028) was obtained. Based on this, it can be said that the Job Satisfaction variable affects the Performance variable. Thus the first hypothesis,

H1 : The Job Satisfaction variable has a partial significant effect on the "accepted" Performance variable.

2) The Motivation variable has a significance value of 0.046, the value is less than 0.05. As for the calculated t, a value of 2,067 > t

table (2,028) was obtained. Based on this, it can be said that the Motivation variable affects the Performance variable. Thus the second hypothesis,

H2 : The Motivation variable has a partial significant effect on the "accepted" Performance variable.

**b. Uji F (Uji Simultan)**

Table 5. Simultan result test

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 1388.066 | 2 | 694.033 | 97.780 | .000[b] |
| | Residual | 255.523 | 36 | 7.098 | | |
| | Total | 1643.590 | 38 | | | |

a. Dependent Variable: Ferformance

b. Predictors: (Constant), Motivasi, Job Statification

Based on the table above, information on significance values such as 0.000 < 0.05 and calculated F values of 97,780 Ftabel > 3,251 are obtained, which means that independent variables in the form of job satisfaction and motivation affect dependent variables in the form of performance. Thus, it can be concluded that there is a simultaneous significant influence of independent variables in the form of Job Satisfaction and Motivation on dependent variables in the form of Performance.

**3. Multiple Linear Regression Analysis**

Table 6. Multiple Linear Regression Analysis Result

**Coefficients[a]**

| Model | Unstandardized Coefficients | | Standardized Coefficients | | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | B | Std. Error | Beta | t | Sig. | Tolerance | VIF |
| 1 (Constant) | .238 | 3.556 | | .067 | .947 | | |
| Job Statification | .683 | .116 | .704 | 5.909 | .000 | .305 | 3.283 |
| Motivation | .357 | .173 | .246 | 2.067 | .046 | .305 | 3.283 |

a. Dependent Variable: Fermormance

**4. Anlysis Multiple Correlation (R)**

Table 7. Multiple Correlation Results

| Model Summary[b] | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error ofthe Estimate | Durbin-Watson |
| 1 | .919[a] | .845 | .836 | 2.664 | 1.893 |
| a. Predictors: (Constant), Motivation, Job statification | | | | | |
| b. Dependent Variable: fermormance | | | | | |

Based on the table of SPSS version 26 output results above, it can be seen that the value of the correlation coefficient (R) is 0.919. According to (Sugiyono, 2018) the value of 0.80 – 1,000 is interpreted very strongly, so the R value is very strong which means that the relationship between job satisfaction and work motivation to performance is very strong.

**5. Coefficient of Determination**

Table 8. Coefficient of Determination Result

| Model Summary[b] | | | | | |
|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error ofthe Estimate | Durbin-Watson |
| 1 | .919[a] | .845 | .836 | 2.664 | 1.893 |
| a. Predictors: (Constant), Motivation, Job Statification | | | | | |
| b. Dependent Variable: ferformance | | | | | |

Based on the results of the coefficient of determination test above, the R2 (Adjusted R Square) value of the regression model is used to determine how much the ability of a free (independent) variable to describe a bound (dependent) variable. Based on the table above, it is known that the R2 value is 0.836, this means that 83.6% of the variation of the performance dependent variable can be explained by the variation of the two independent variables, namely Job Satisfaction and Motivation. While the rest (100% - 83.6% = 16.4%) is influenced by other variables outside this study.

**B. Disscussion**

**1. Effect of Job Satisfaction (X1) on Employee Performance (Y)**

Based on the results of hypothesis testing that has been carried out using the t test (partial test) the results were obtained that Job Satisfaction has a significant influence on employee performance, this is known from the t value of the Job Satisfaction variable count of 5,909 which is greater than the t table value (2,028) and the significance that shows a value of 0.000 which is smaller than $\alpha$ = 0.05. Based on this, it can be said that the first hypothesis in the research is proven to be true and acceptable. Based on the results of multiple linear regression testing, there is a

partial and significant influence between job satisfaction variables on employee performance during the pandemic, this is known from the regression coefficient on the Job Satisfaction variable (X1) of 0.683 and positive (Utari et al., 2021). This positive influence direction shows that there is a unidirectional relationsetween Job satisfaction and Employee Performance (Sampaio, 2018).

The results of this study are in line with previous research conducted by (Larenza & Nirawati, 2019) regarding the effect of Job Satisfaction that affects Employee Performance. Job Satisfaction has a positive influence on Employee Performance to advance a company, so it is very important for the company to provide job satisfaction for employees whether it is office facilities and so on so that their performance increases (Davidescu, Apostu, Paul, & Casuneanu, 2020).

**2. The Effect of Motivation (X2) on Employee Performance (Y)**

Based on the results of hypothesis testing that has been carried out using the t test (partial test) results were obtained that Motivation has a significant influence on employee performance, this is known from the value t count of the Motivation variable of 2.067 which is greater than the value of the t table (2.028) and the significance which shows a value of 0.046 which is smaller than $\alpha = 0.05$. Based on this, it can be said that the first hypothesis in the research is proven to be true and acceptable. Based on the results of multiple linear regression testing, there is a partial and significant influence between the Motivation variable on employee performance during the pandemic, this is known from the regression coefficient on the Motivation variable (X2) of 0.357 and positive. This positive influence direction shows that there is a unidirectional relationship between Motivation and Employee Performance.

In addition to job satisfaction and employee performance, it can also be influenced by another variable, namely motivation (Jalagat, 2016). To improve employee performance, motivation is needed. Because employees such as this pasasi service are unlikely to do their work online, but they will directly interact with customers who during this pandemic are very vulnerable to disease if we interact with people we don't know where employees must have families who can be infected at any time.

The results of this study are in accordance with previous research (Putu et al., 2020) where motivation affects the performance of employees themselves, including to increase the confidence of employees so that they can better appear in their work organization with this confidence can increase the effectiveness of the work they carry out (Davidescu et al., 2020).

**3. Effect of Job Satisfaction (X1) and Motivation (X2) on Employee Performance (Y)**

Based on the results of hypothesis testing that has been carried out using the f test (simultaneous test) it can be seen that job satisfaction (X1) and motivation (X2) have a simultaneous significant influence on employee performance (Y). This can be seen from the calculated F value in the F test of 97.780 where the value is greater than the F value of table 3.251 and the significance is

0.000 which is less than $\alpha = 0.05$. Based on this, the higher job satisfaction and motivation towards employees, the more the performance of employees at work will also increase, thus making better results for the company.

In the multiple correlation analysis test, an R value of 0.919 was obtained, which means that there is a very strong relationship between job satisfaction and work motivation to employee performance, while in the analysis of the coefficient of determination, it can be concluded that the variables of job satisfaction and motivation affect the performance of employees of the pasasi division during the pandemic by 83.6% and while the remaining 16.4% is influenced by other factors.

The results of this study are in line with the research (Andayani, 2020) which states that job satisfaction and work motivation have a positive effect on employee performance. If employees in a company feel satisfied at work and feel motivated at work, it will also be better the performance that employees produce.

## CONCLUSION

Based on the results of this study, it was concluded that there was a positive and significant influence between job satisfaction variables on the performance of employees of the pasasi division of PT Sriwijaya Air, Cengkareng district during the pandemic in 2022. So it can be concluded that Ha was accepted and Ho was rejected. Based on the recapitulation of the questionnaire, the highest weight is in the statement "I receive my salary every month on time during the pandemic". And based on the recapitulation of the questionnaire the lowest weight is in the statement "The promotion of positions that the company carries out motivates employees to further develop"

There is a positive and significant influence between motivational variables on the performance of employees of the pasasi division of PT Sriwijaya Air Cengkareng district during the pandemic in 2022. So it can be concluded that Ha was accepted and Ho was rejected. Based on the recapitulation of the questionnaire, the highest weight is in the statement "I am responsible for the position I have lived in the pandemic". And based on the recapitulation of the questionnaire the lowest weight is in the statement "I was awarded by the company for my work achievements during the pandemic".

There is a positive and significant influence between the variables of job satisfaction and motivation on the performance of employees of the pasasi division of PT Sriwijaya Air Cengkareng district during the pandemic in 2022. So it can be concluded that Ha was accepted and Ho was rejected. Based on the recapitulation of the questionnaire, the highest weight is in the statement "I always come to the office on time during the pandemic" and in the statement "In doing my job I do not wait for orders from superiors during the pandemic". And based on the recapitulation of the questionnaire the lowest weight is in the statement "I am trying earnestly in doing the work in order to get maximum results during the pandemic".

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