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MAXIMUM PROFIT ANALYSIS USING LINEAR PROGRAMMING SIMPLEX METHOD AND POM-QM SOFTWARE AT UKM PIE BU SRI

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Abstract: *In current conditions, many people are competing to set up businesses to meet their daily living needs. One of the various ways to improve people's welfare is through small and medium enterprises (SMEs). As many businesses develop and are accompanied by intense competition, many problems will arise and will affect the profits of SMEs. The problem that occurs at UKM Pie Bu Sri is the problem of calculating the optimum profit obtained every day from the production of its activities. The aim of this research is to help calculate the optimum profit for UKM Pie Bu Sri so that it can be done accurately and quickly. In order to achieve this goal, the Simplex Linear Programming Method and QM for Windows Software were used to find the optimum profit estimate obtained in each production activity carried out by UKM Pie Bu Sri within a period of one day. The results of the maximization calculations show that in order to achieve maximum profits, Mrs. Sri must make 60 Brownie Pies and produce 25 Fruit Pies with a profit of IDR 99,500 per day.*

INTRODUCTION

The liberalization of markets in the business and service sectors during the past ten years has resulted in intense competition in the corporate world. In light of these circumstances, the company employs a variety of tactics to meet certain goals and target audiences. Numerous business players, ranging in size from small to large, are involved in the food industry and are actively seeking to expand their market share[1] . Especially when the pandemic situation causes the economy in Indonesia to decline. One of the businesses that was established in the pandemic era is UKM Pie Bu Sri. Pie Bu Sri's business is located at the Green De Jalen housing complex, North Tambun. The pie business is a business venture in the food sector, where the seller strives to make a profit from the pie trading business so that he can meet daily living needs. The problem that occurs at UKM Pie Bu Sri is the problem of calculating the optimum profit obtained every day from the production of its activities.

In order to maintain the sustainability and development of this pie business, appropriate procedures are needed to be able to allocate raw materials accompanied by increased profits. Therefore, a method or technique is needed to determine a suitable combination, starting with the product being created along with the combination or combination of the products being created. To solve the problem above, this research will use a simplex method which is a component of linear programming as suggested by [2] [3] [4].

In the context of Indonesian enterprises, these earlier studies employed the linear programming method to determine the most practical means of boosting profit, maximizing revenue, lowering expenses, and optimizing the available resources and production process. Other international researchers have also used linear programming to maximize profit, reduce expenses, assess worker performance, and decrease transportation costs at various organizational activities. These researchers include [5] [6] [7] [8] [9] . Based on the presentation of previous research, it is interesting to carry out research using a linear program to optimize the profits of Pie Bu Sri SMEs by carrying out updates, namely calculating optimum profits using QM software and the differences in the constraints used.

The aim of the research is to help calculate the optimum profits obtained from UKM Pie Bu Sri so that it can be done accurately and quickly. The aim of this research is to help calculate the optimum profit for UKM Pie Bu Sri so that it can be done accurately and quickly. In order to achieve this goal, the Simplex Linear Programming Method and QM for Windows Software were used to find the optimum profit estimate obtained in each production activity carried out by UKM Pie Bu Sri within a period of one day.

LITERATURE REVIEW

Linear Programming

Linear programming is an optimization technique to obtain the optimal value of a linear objective function in conditions of constraints. Constraints are dependencies related to resources, such as time, labor, raw materials, money, etc. Linear programming problems can be found in various sectors and can be used to help make the most accurate alternative decisions and optimal solutions [10] [11] . Linear programming is usually used to solve optimization problems in industry, transportation problems, investment decisions, scheduling, relocating resources, planning in production, mixed production, logistics problems, etc [12] [13].

Linear Programming has 3 important components, namely [14] :

1. Decision variables: X1, X2,…,Xn
   It is an element that will be selected as a decision based on its value.
2. Objective Function: $Z=f$(X1,X2, … ,Xn)
   It is a function that will later be optimized (minimized / maximized).

3. Constraints:gi(X1,X2, … ,Xn) gi
   This is a limitation that must be met.

There are two types of problems in linear programming [15] :

1. Maximization problem
   It is a problem in linear programming to seek maximum results from the resources at hand.
2. Minimization problem
   It is a problem in linear programming to minimize the resources available. Several things can be minimized, such as processing time, human resources, etc.

Simplex Method

The simplex method is a technique or method for solving linear programming as a method for solving linear programming problems in the context of optimal resource allocation decisions [16] [17]. In utilizing the simplex method to work on Linear Programming problems, this Linear Programming form will be replaced by a basic form called the "main form". The main form of Linear Program has the characteristic that all constraints contain equations with non-negative right-hand positions and with an objective function that can be minimized/maximized.

The terms used in the simplex method are [18]:

1. Iteration is a stage in calculations where the results are based on values from the previous value table
2. Non-basic variables are variables that have a value in any iteration set to zero (0).
3. Basic variables are elements that have a value in any iteration that is not zero (0).
4. The Right Value (NK) or solution is the value that is still available on the limiting resource.
5. Slack Variable is a component that will be put into a mathematical form of restriction to change inequality (<) into an equation (=).
6. Variable Surplus is the component that will be subtracted from the mathematical form of restriction to change the inequality (>) into an equation (=).
7. Artificial variables are components that will be included in the mathematical form of restrictions with inequality (>) or equality (=) used for variables on the first basis.
8. The Work Column is the column containing the incoming variables. The coefficient in the column will be used to determine the working column or row by becoming the NK divider (right value).
9. Work Rows are rows between basic variables that contain outgoing variables.
10. Work Elements are elements that are at the intersection between columns and work rows.
11. The Entry Variable is the component that in the next iteration is selected as the basic variable. For the next iteration, this variable will have a positive value.
12. Out variables are components in the next iteration that leave the basic variables and are replaced with incoming variables. In each iteration the outgoing variable will be selected from one of the basic variables and will be zero (0).

The procedures for completing the simplex method are [19] :

1. Changing the objective function to a constraint function, if all the objective functions have been replaced then the objective function is replaced with an implicit function, namely Cb Xab is moved to the left position. For example: Z = 10X1+ 20X2 changes to Z – 10X1- 20X2. Then the equations are arranged into a simplex table.
2. Define key columns. Choose the column with the negative (-) value on the objective function line with the largest number
3. Specifies the key row. Choose the row that has the smallest index number. Formula: Index value = Number in the NK column ÷ number in the key column
4. Change the numbers in the key row. The number in the key row is replaced by dividing the key number and replacing the base variable in the key row with the variable at the top of the key column.
5. Replaces all numbers except those in the key row. Formula: New value = old series – (coefficient in key column*number in key row).
6. Then repeat all the procedures from numbers 3-6, until all the values in the objective function are positive (+).

Quantitative Method (QM) For Windows

Quantitative Method (QM) means a device that is accompanied by several text books related to operations management. This software is a combination or mixture of POM & QM. The difference between POM Windows and QM is that the modules in QM For Windows are more complete and varied [20].

METHOD

The type of research carried out uses quantitative methods and uses primary data sources.. The research will utilize the QM For Windows application to measure the optimum profit obtained in each production activity carried out by Mrs. Sri so that she can have an accurate estimate. Data was obtained through literature review, research, and conducting direct interviews with Mrs. Sri as the Pie seller. The information needed for research needs is raw materials for production, production results and totals, as well as daily manufacturing profits.

RESULT AND DISCUSSION

In the process of making pies, Mrs. Sri can make 2 types of pies, namely Brownies Pie and Fruit Pie. To offer her merchandise, Mrs. Sri sells them with promotions via social media, places her merchandise in a shop that sells various foods such as breakfast, cakes and side dishes, and places it in the school canteen.

Every day Mrs. Sri produces 55 Brownie Pies and 25 Fruit Pies with an estimated daily profit of around Rp. 90,000. You can see the ingredients/recipe data in Table 1.1 and in Table 1.2 in the form of detailed data on making the raw ingredients for the pie.

Table 1.1 Pie Production Raw Material Data

Material	Capacity
Flour	750 gr
Dark Cooking Chocolate	300 gr
Fine granulated sugar	420 gr
Butter	550 gr
Egg	9 items
Oil	80 ml
Cocoa powder	70 gr
Toppings (Almonds, Chocochips,	60 gr
Cheese)	6 gr
Vanilla Powder	250 ml
Full cream milk	20 gr
Cornstarch	75 gr
Fruit (Strawberry, Grapes)	¼ pack
Jelly	

Table 1.2 Detailed Data on Making Pie Raw Materials

Raw material	Pie Variations		Capacity
	Brownie Pie	Fruit Pie	
Pie Dough	15gr	15gr	1500gr
Brownie Filling	15gr	0gr	1000gr
Brownie Pie Topping	1gr	0gr	60gr
Filling Vla	0gr	15gr	500gr
Fruit Pie Topping	0gr	3gr	75gr
Jelly	0gr	1gr	25gr

In the data table, the raw materials for pie production can be classified as a decision variable, namely, Brownies Pie requires 15 grams of pie crust, 15 grams of brownie filling, and 1 gram of brownie pie topping, while Fruit Pie requires 15 grams of pie dough, 15 grams of vla filling, and fruit topping 3 gr. The profit obtained from the brownie pie is IDR. 1,200/pcs and fruit pie Rp. 1,100/pcs. Meanwhile, the raw material supplies are 1,500 gr of Pie Crust, 1,000 gr of Brownie Filling, 60 gr of Brownie Pie Topping, 500 gr of Vla Filling, 75 gr of Fruit Pie Topping, and 25 gr of jelly..

Data Analysis

Determine the formulation of the data that has been obtained using the signs X1, X2, and Z.

Information :

X1 : Total Pie Brownies to be produced per day.

X2 : Total Fruit Pies to be produced per day.

Z :Total Profit from Brownies & Fruit Pies per day.

This research aims to determine the total production output in order to obtain maximum profit with the limitations or constraints of existing raw materials. The mathematical formulation model obtained is:

Maximizing Z : $1,200X_1 + 1,100\ X_2$

Limitations or constraints on resources can be formulated into boundary formulations, namely:

1. The amount of pie crust used to produce 1 brownie pie (X1) is 15 gr & to produce 1 fruit pie (X2) is 15 gr with a pie crust capacity of 1500 gr.
2. The amount of brownie filling used to produce 1 brownie pie (X1) is 15 gr & to produce 1 fruit pie (X2) is 0 gr with a brownie filling capacity of 1000 gr.
3. The amount of brownie pie topping used to produce 1 brownie pie (X1) is 1 gr & to produce 1 fruit pie (X2) is 0 gr with a brownie filling capacity of 60 gr.
4. The amount of vla filling used to produce 1 brownie pie (X1) is 0 gr & to produce 1 fruit pie (X2) is 15 gr with a vla filling capacity of 500 gr.
5. The amount of fruit pie topping used to produce 1 brownie pie (X1) is 0 grams & to produce 1 fruit pie (X2) is 3 grams with a fruit pie topping capacity of 75 grams.
6. The amount of gelatin used to produce 1 brownie pie (X1) is 0 grams & to produce 1 fruit pie (X2) is 1 gram with a gelatin capacity of 25 grams.

The function of the constraints (constraints) is as follows:

1. $15X1 + 15X2 \leq 1500$ gr
2. $15X1 \leq 1000$ gr
3. $X1 \leq 60$ gr
4. $15X2 \leq 500$ gr
5. $3X2 \leq 75$ gr
6. $X2 \leq 25$ gr

Table 1.3 Pie Variety, Capacity, & Profit

Raw material	Pie Variations		Capacity
	Brownie Pie	Fruit Pie	
Pie Dough	15gr	15gr	1500gr
Brownie Filling	15gr	0gr	1000gr
Brownie Pie Topping	1gr	0gr	60gr
Filling Vla	0gr	15gr	500gr
Fruit Pie Topping	0gr	3gr	75gr
Jelly	0gr	1gr	25gr
Profit	1200	1100	

Maximum Solution of Linear Programming with Simplex Method

From the data in Table 1.3, the calculation can be calculated as below:

a. The objective function is replaced with an implicit function, meaning it changes the element from the right position to the left position. So, the objective function changes form to: $Z - 1200X1 - 1100X2 = 0$

b. The limitation function is added to the slack variable, which functions to find out the existing limits in the capacity by adding the slack variable to form:
   1. 15X1 + 15X2 ≤ 1500 changed to $15X_1$+ 15X2 + S1 = 1500
   2. 15X1 ≤ 1000 changed to $15X_1$+ S2 =1000
   3. X1 ≤ 60 changed intoX1 + S3 = 60
   4. 15X2 ≤ 500 changed into $15X_2$+ S4 = 500
   5. 3X2 ≤ 75 changed into $3X_2$+ S5 = 75
   6. X2 ≤ 25 changed into X_2+ S6 = 25

   The equations above are arranged in a simplex table. If all the formulas have been replaced then arrange them into variables for the first iteration, namely:

Table 1.4 Formulation

Base Variables	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK
Z	1	-1200	-1100	0	0	0	0	0	0	0
Slack1	0	15	15	1	0	0	0	0	0	1500
Slack2	0	15	0	0	1	0	0	0	0	1000
Slack3	0	1	0	0	0	1	0	0	0	60
Slack4	0	0	15	0	0	0	1	0	0	500
Slack5	0	0	3	0	0	0	0	1	0	75
Slack6	0	0	1	0	0	0	0	0	1	25

c. Define columns, rows and key numbers and index values. The key column is the largest negative number in the objective function row. The key row is a value with a limit ratio limit that is the same as the smallest positive (+) number value. The index is obtained from the number in the NK column ÷ the number in the key column. The key number is defined as the point where the row and key column intersect.

Table 1.5 Iteration I

VariableBase	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK	Index
Z	1	-1200	-1100	0	0	0	0	0	0	0	0
Slack1	0	15	15	1	0	0	0	0	0	1500	100
Slack2	0	15	0	0	1	0	0	0	0	1000	66.6
Slack3	0	1	0	0	0	1	0	0	0	60	60
Slack4	0	0	15	0	0	0	1	0	0	500	0
Slack5	0	0	3	0	0	0	0	1	0	75	0
Slack6	0	0	1	0	0	0	0	0	1	25	0

Information :
Column X1 = Key Column
Line S3 = Key Row
Number 1 = Key Numbers

d. Change the numbers in the key row. All numbers in row S3 will be divided by the number one (1), which is the key number

1. 0/1 = 0
2. 1/1 = 1
3. 0/1 = 0
4. 0/1 = 0
5. 0/1 = 0
6. 1/1 = 1
7. 0/1 = 0
8. 0/1 = 0
9. 0/1 = 0
10. 60/1 = 60

The results of the division above are entered into a new row, namely row S3 which has been changed to X1 because X1 is the key column

Table 1.6 Key Line Modification

Base	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK
Z	1	-1200	-1100	0	0	0	0	0	0	0
Slack1	0	15	15	1	0	0	0	0	0	1500
Slack2	0	15	0	0	1	0	0	0	0	1000
X1	0	1	0	0	0	1	0	0	0	60
Slack4	0	0	15	0	0	0	1	0	0	500
Slack5	0	0	3	0	0	0	0	1	0	75
Slack6	0	0	1	0	0	0	0	0	1	25

e. Changes numbers except in key rows. Formula: new value = old sequence – (coefficient in key column*number in key row).

LineZ											
Old Line		[-1200	-1100	0	0	0	0	0	0	0	]
NBBK	-1200	[1	0	0	0	1	0	0	0	60	] -
New Value		0	-1100	0	0	1200	0	0	0	72,000	
Slackline1											
Old Line		[15	15	1	0	0	0	0	0	1500	]
NBBK	15	[1	0	0	0	1	0	0	0	60	] -
New Value		0	15	1	0	-15	0	0	0	600	
Slack line2											
Old Line		[15	0	0	1	0	0	0	0	1000	]
NBBK	15	[1	0	0	0	1	0	0	0	60	] -
New Value		0	0	0	0	-15	0	0	0	100	
Slack line4											
Old Line		[0	15	0	0	0	1	0	0	500	]
NBBK	0	[1	0	0	0	1	0	0	0	60	] -
New Value		0	15	0	0	0	1	0	0	500	
Slack line5											
Old Line		[0	3	0	0	0	0	1	0	75	]
NBBK	0	[1	0	0	0	1	0	0	0	60	] -
New Value		0	3	0	0	0	0	1	0	75	
Slack Line6											
Old Line		[0	1	0	0	0	0	0	1	25	]
NBBK	0	[1	0	0	0	1	0	0	0	60	] -
New Value		0	1	0	0	0	0	0	1	25	

Table 1.7 Optimization Results

Base	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK
Z	1	0	-1100	0	0	1200	0	0	0	72,000
Slack1	0	0	15	1	0	-15	0	0	0	600
Slack2	0	0	0	0	0	-15	0	0	0	100
X1	0	1	0	0	0	1	0	0	0	60
Slack4	0	0	15	0	0	0	1	0	0	500
Slack5	0	0	3	0	0	0	0	1	0	75
Slack6	0	0	1	0	0	0	0	0	1	25

In determining maximum profit, negative numbers cannot be found on the goal line. Based on table 1.7 above, negative values are still found on the goal line so a second iteration still needs to be carried out, namely in column X2.

f. Determine columns, rows and key values in the 2nd iteration

Table 1.8 Rows, Columns and Key Values in the Second Iteration

VariableBase	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK	Index
Z	1	0	-1100	0	0	1200	0	0	0	72,000	- 65.45
Slack1	0	0	15	1	0	-15	0	0	0	600	40
Slack2	0	0	0	0	0	-15	0	0	0	100	0
X1	0	1	0	0	0	1	0	0	0	60	0
Slack4	0	0	15	0	0	0	1	0	0	500	33.33
Slack5	0	0	3	0	0	0	0	1	0	75	25
Slack6	0	0	1	0	0	0	0	0	1	25	25

g. Changing the value in the key row, all values in row S5 will be divided by the number 3 which is the key number

1. 0/3 = 0
2. 0/3 = 0
3. 3/3 = 1
4. 0/3 = 0
5. 0/3 = 0
6. 0/3 = 0
7. 0/3 = 0
8. 1/3 = 0.33
9. 0/3 = 0
10. 75/3 = 25

The results of the division will be entered into a new row, namely row S5 which has been replaced with X2.

Table 1.9 Key Line Modification

Base	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK
Z	1	0	-1100	0	0	1200	0	0	0	72,000
Slack1	0	0	15	1	0	-15	0	0	0	600
Slack2	0	0	0	0	0	-15	0	0	0	100
X1	0	1	0	0	0	1	0	0	0	60
Slack4	0	0	15	0	0	0	1	0	0	500
X2	0	0	1	0	0	0	0	0.33	0	25
Slack6	0	0	1	0	0	0	0	0	1	25

Z row											
Old Line		[0	-1100	0	0	1200	0	0	0	72,000	]
NBBK	-1100	[0	1	0	0	0	0	0.33	0	25	] -
New Value		0	0	0	0	1200	0	363	0	99,500	
Slackline1											
Old Line		[0	15	1	0	-15	0	0	0	600	]
NBBK	15	[0	1	0	0	0	0	0.33	0	25	] -
New Value		0	0	1	0	-15	0	(-4.95)	0	225	
Slack line2											
Old Line		[0	0	0	0	-15	0	0	0	100	]
NBBK	0	[0	1	0	0	0	0	0.33	0	25	] -
New Value		0	0	0	0	-15	0	0	0	100	
Slack line4											
Old Line		[0	15	0	0	0	1	0	0	500	]
NBBK	15	[0	1	0	0	0	0	0.33	0	25	] -
New Value		0	0	0	0	0	1	(-4.95)	0	125	
Slack Line6											
Old Line		[0	1	0	0	0	0	0	1	25	]
NBBK	1	[0	1	0	0	0	0	0.33	0	25	] -
New Value		0	0	0	0	0	0	(-0.33)	1	0	

Table 1.10 Optimization Results

Base Variables	Z	X1	X2	Slack1	Slack2	Slack3	Slack4	Slack5	Slack6	NK
Z	1	0	0	0	0	1200	0	363	0	99,500
Slack1	0	0	0	1	0	-15	0	-4.95	0	225
Slack2	0	0	0	0	0	-15	0	0	0	100
X1	0	1	0	0	0	0	0	0	0	60
Slack4	0	0	0	0	0	0	1	-4.95	0	125
X2	0	0	1	0	0	0	0	0.33	0	25
Slack6	0	0	0	0	0	0	0	-0.33	1	0

Based on table 1.10 in row Z there are no negative numbers (-), therefore the optimal solution has been obtained. So, the optimum profit obtained by UKM Pie Bu Sri within a day using the simplex method calculation is IDR. 99,500 by making 60 pcs of Brownie Pies (X1) and 25 pcs of Fruit Pies (X2).

Maximum Linear Program Solution Using QM For Windows

Figure I. Production Data Display Form

	Pie Browni...	Pie Buah ...		RHS	Equation form
Maximize	1200	1100			Max 1200Pie Brownies (...
Adonan Pie	15	15	<=	1500	15Pie Brownies (X1) + 1...
Isian Brownies	15	0	<=	1000	15Pie Brownies (X1) <= ...
Topping Pie Brownies	1	0	<=	60	Pie Brownies (X1) <= 60
Isian Vla	0	15	<=	500	15Pie Buah (X2) <= 500
Topping Pie Buah	0	3	<=	75	3Pie Buah (X2) <= 75
Agar-agar	0	1	<=	25	Pie Buah (X2) <= 25

From Figure I, there is a display of a linear simplex method program using Quantitative Methods (QM) software for Windows. If all the data has been entered then select the Solve button then select the Iteration menu then select the Solution List menu. After that, 3 iteration tables will appear as in Figure II below:

Figure II. Production Data Iteration Form

Cj	Basic Variables	Quantity	1200 Pie Brownies (X1)	1100 Pie Buah (X2)	0 slack 1	0 slack 2	0 slack 3	0 slack 4	0 slack 5	0 slack 6
Iteration 1										
0	slack 1	1.500	15	15	1	0	0	0	0	0
0	slack 2	1.000	15	0	0	1	0	0	0	0
0	slack 3	60	1	0	0	0	1	0	0	0
0	slack 4	500	0	15	0	0	0	1	0	0
0	slack 5	75	0	3	0	0	0	0	1	0
0	slack 6	25	0	1	0	0	0	0	0	1
	zj	0	0	0	0	0	0	0	0	0
	cj-zj		1.200	1.100	0	0	0	0	0	0
Iteration 2										
0	slack 1	600	0	15	1	0	-15	0	0	0
0	slack 2	100	0	0	0	1	-15	0	0	0
1200	Pie Browni...	60	1	0	0	0	1	0	0	0
0	slack 4	500	0	15	0	0	0	1	0	0
0	slack 5	75	0	3	0	0	0	0	1	0
0	slack 6	25	0	1	0	0	0	0	0	1
	zj	72.000	1200	0	0	0	1200	0	0	0
	cj-zj		0	1.100	0	0	-1.200	0	0	0
Iteration 3										
0	slack 1	225	0	0	1	0	-15	0	-5	0
0	slack 2	100	0	0	0	1	-15	0	0	0
1200	Pie Browni...	60	1	0	0	0	1	0	0	0
0	slack 4	125	0	0	0	0	0	1	-5	0
1100	Pie Buah ...	25	0	1	0	0	0	0	0,3333	0
0	slack 6	0	0	0	0	0	0	0	-0,3333	1
	zj	99.500	1200	1100	0	0	1200	0	366,67	0

Figure III. Form a Solution List

Variable	Status	Value
Pie Brownies (X1)	Basic	60
Pie Buah (X2)	Basic	25
slack 1	Basic	225
slack 2	Basic	100
slack 3	NONBasic	0
slack 4	Basic	125
slack 5	NONBasic	0
slack 6	Basic	0
Optimal Value (Z)		99500

The analysis results obtained show that applying a linear program using Quantitative Method (QM) for Windows software can help optimize SME Pie Bu Sri in determining the highest profit accurately and quickly from the limited raw materials it has.

The analysis results obtained prove that in calculating the optimum profit using the linear simplex method program and the Quantitative Method (QM) for Windows application, it shows the same solution, namely the optimum profit obtained by UKM Pie Bu Sri in a day is IDR. 99,500 by making 60 Brownie Pies (X1) and 25 Fruit Pies (X2).

CONCLUSION

From the results of the analysis and discussion above, it can be concluded that the simplex linear program method can be used in optimizing SME Pie Bu Sri in terms of maximizing profits from the dependencies of the raw materials it has. QM For Windows software can also help accurately and quickly in increasing maximum profit calculations.

The maximum profit obtained is IDR. 99,500 every day by making 60 Brownie Pies (X1) and 25 Fruit Pies (X2). However, SME Pie Bu Sri has not achieved maximum profits because it can only produce 55 pcs of Brownie Pies (X1) and 25 pcs of Fruit Pies (X2) and the profit will be IDR. 90,000 in one day.

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