

# Implementation of Activity based Costing System in Real Price Calculation of Cost of Goods Manufactured for the Determination of the Selling Pricing for Start-up Business: Fruit Combining

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**Abstract:** This study discusses the relationship between the activity based costing system as the dependent variable in the actual cost calculation of fruit combining product and the determination of the selling price as the independent variable. The research method used is descriptive analytic research method, that is research done by collecting data of cost incurred at a start-up business, so as to give description about the assumption of situation of the start-up business, whether the start-up business correctly classify cost. It also carries the cost of data analysis so as to produce a more precise cost and selling price calculation of fruit combining product. Then, from analysing the conclusions and suggestions drawn. The results show that the start-up business has classified the cost incurred by the right party. In addition, the start-up business has calculated the product cost correctly because it charges the cost of each product. This product cost calculation resulted in the start-up business having a correct selling price base. The start-up business sets the selling price by marking up enough to cover production costs. Calculations using an activity-based costing system can result in more precise production costs that can be a good basis for determining product selling prices.

## 1 INTRODUCTION

Price competition, quality, and so make some companies must fix various aspects in the company to be able to face the competition. Companies are always required to be able to take the right decisions for the company to survive in the business world. Companies need excellence in the face of intense competition in the industry. Increased competition in similar industries causes the market for the industry to be price sensitive, where a relatively small increase or decrease in price can result in a significant impact on sales. Therefore, the selling price is one of the most important factors to survive in the industry. To be able to achieve excellence, the company must be able to calculate the selling price correctly. The selling price should not be too low to cover all costs incurred by the company and provide the desired profit, nor should it be too high for the company to compete with its competitors.

The company can set the selling price correctly if the company can calculate the cost of the product properly so that the product is not overcosted and not undercosted (charged less than it should). PT

Redceri Indonesia as one of the startup companies will implement Activity-based costing system. Activity-Based Costing (ABC) has a more comprehensive cost-tracking implementation than traditional cost accounting (Martusa et al., 2010). PT Redceri Indonesi determines the cost of the product using Activity-based costing system to help set the selling price correctly.

Research conducted on PT Redceri Indonesia which produces and sells Redceri Pure Fruit Jelly. The company produces goods on a regular basis with the capacity of PT Redceri Indonesia amounting to 61,440 Redceri Pure Fruit Jelly / day products with 5 working days per week for non-shift working time. The number of workers in PT Redceri Indonesia is 40 people. PT Redceri Indonesia products are Redceri Orange and Redceri Carica.

Selling price is an important thing to be consideration of buyers of the company's products considering the situation of competition in Indonesia is quite tight. Even small price changes will have a huge impact on sales in large quantities. If there is an error in determining the selling price then the company can lose in large amount. Increased

competition in this industry, requires the company to have the advantage to be able to keep his life and enlarge his business. For that, the company must be able to set a reasonable selling price by stipulating the cost of the product properly. The cost of the products discussed in this research is full costing so as to cover production and non-production costs.

The main purpose in establishing a company is to get the optimal profit to maintain the company's survival. The main source of company revenue is usually derived from the sale of products, both goods and services that the amount can be measured by loading to the buyer. The company must set a reasonable price to earn a substantial income. In determining the reasonable selling price, the company needs to get information about the cost of the product accurately because the information can have an effect in the decision making process.

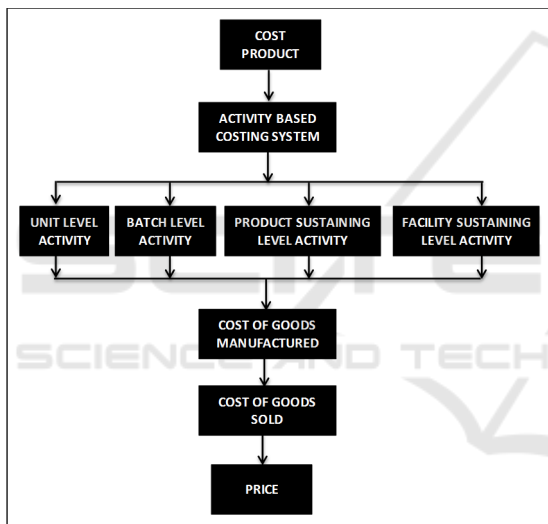


Figure 1. Chart of Framework

## 2 COST OF GOODS

According to Hilton (2005) defines the cost of the product as follows:

*"The total cost of direct material, direct labor, and manufacturing overhead transferred from work-in-process inventory to finished-goods inventory."*

Hariadi (2002) put forward the concept of different cost for different purposes. This concept underlies the meaning of cost of goods, that is, depends on what interests the management uses the information. On the basis of the traditional concept intended for the purposes of the preparation of financial statements states that the so-called cost of a

product only includes the cost of raw materials, direct labour costs, and factory overhead costs. Meanwhile, on the basis of contemporary concepts, for the interests of tactical operational management, the meaning of the cost of a product is in addition to covering traditional production costs also includes marketing costs and service costs to consumers.

According to Mulyadi (2001), the cost of products can be calculated by two approaches, namely by using full costing and variable costing.

Full Costing is a method of determining the cost of production which takes into account all the elements of production cost into the cost of production, which consists of raw material costs, direct labour costs, and factory overhead costs, both of which behave as well as variable. The cost of the products calculated by the full costing approach consists of the elements of cost of production (raw material costs, direct labour costs, variable factory overhead costs, and fixed factory overhead costs) plus non-production costs (marketing costs, administrative costs and general)

Variable Costing is method of determining the cost of production that only takes into account the cost of production that behaves variable into the cost of production, which consists of raw material costs, direct labour costs, and variable factory overhead costs. The cost of the product calculated by the variable costing approach consists of elements of the cost of production of variables (raw material costs, direct labour costs, and variable factory overhead costs) plus variable non-production costs (variable marketing costs, administrative costs and general variables) And fixed costs (fixed factory overhead costs, fixed marketing costs, general administrative and fixed costs).

The cost of the product is set when, according to Hansen and Mowen (2006) actual costing: *An actual cost system use actual costs for direct materials, direct (manufacturing) labour, and (manufacturing) overhead. These actual costs are then used to determined the unit cost.* According to Horngren et al. (2006) actual costing: *A costing system that traces direct costs to a cost object by using the actual direct-cost rates times the actual quantities of the direct- cost inputs.* In actual costing, the cost of the product is calculated at the end after the finished product is made because the actual cost is incurred to make the new product known after the finished product is made. The goal is to calculate the actual resources used / consumed to produce a particular product.

According to Horngren et al. (2006) normal costing: *Normal costing is a costing method that*

*traces direct costs to a cost object by using the actual direct-cost inputs, and allocates indirect costs based on the budgeted indirect-cost rates times the actual quantity of the cost-allocation bases.* The difficulty of calculating actual (actual) cost of fees per week or even per month makes the new company able to calculate the cost at the end of the year. This may result in the information being delayed. To overcome the delay, the normal costing of product cost is determined when the finished product is made, not waiting until the end of the year due to the indirect cost of the magnitude can not be known then for the calculation of the cost of goods used indirect cost tariff budgeted by the company management. How to calculate it is by dividing the indirect cost budgeted per year by the basic quantity of budgeted allocations per year.

The process of indirect cost charging on the product can use 2 approaches, that is with traditional system and Activity-based Costing system. In traditional cost systems, the cost drivers used are based only on a unit basis or are called unit-level activity drivers. The trigger of the unit's basic activity is the factors that cause the cost changes when the number of units generated changes. The use of these cost drivers in charging the overhead costs of the product means that the overhead has a very close correlation with the number of units produced. So far, there are three gradual levels that have been practiced in the cost system to charge overhead costs on products: (1) Single rate applicable to entire factory; (2) Some different rates apply to each department; (3) Implementation of the ABC system by using different tariffs applicable to each activity

The limitation of traditional basic cost calculation, that is can cause distortion overhead loading. This is because the proportion of overhead costs unrelated to the number of units over total overhead is significant, and the type of product produced varies greatly (Hariadi, 2002).

### **3 ACTIVITY-BASED COSTING SYSTEM (ABC)**

Garrison and Noreen (2003: 96) define Activity-based costing system (ABC) as follows:

*"A costing method that is designed to provide managers with cost information for strategic and other decisions that potentially affect capacity and therefore "fixed" costs"*

The essence of Activity-based costing system (ABC) revealed by Mulyadi (2001), namely in generating cost object (product or service), resources issued by the company in the form of costs based on activities undertaken by the company.

PT Redceri Indonesia calculates the cost of production per unit with ABC (Activity Based Costing) system. In the traditional cost system charging costs on production costs (Raw Material Cost, Direct labour costs and Factory Overhead Cost). The production cost component of ABC system is almost the same as traditional system, but in ABC Factory Overhead Cost search is more accurate.

Overhead budget is a budget that plans costs in the factory issued by the company in the course of the production process except for direct raw material costs and direct labour. This budget is useful as a basis for preparing the cost of goods manufactured budget, the cost of goods sold and the cash budget. The benefits of this budget are to know the cost of use more efficiently, to determine the cost of the product more precisely, to know the allocation of factory overhead cost in accordance with the place (department) where the cost is charged and as a control tool overhead factory cost.

PT Redceri Indonesia created a Factory Overhead Cost budget with Activity Based Costing System (ABC System). This is because the ABC system based on activities that use cost drivers more than the traditional system. Using the ABC system allows management to make cost savings by eliminating non value-added activities. An error in charging a product will result in over costing or under costing resulting in an error in decision making.

The stages of preparing the Factory Overhead Cost Budget of PT Redceri Indonesia with ABC System begins with the process of identifying activities. The identification of activities requires that there be a list of the types of jobs within the company related to the production process. Then charge the activities. Each time an activity is set, the cost of implementing the activity is determined.

The next step is to determine the activity driver for each activity that is the controlling factor of the activities and determine the tariff and charge the product. In determining this rate, the total cost of each activity is divided by the total activity of the driver used for the activity. The next step is to multiply the rate obtained for each activity with the driver activity consumed by each type of product produced and then divide by the number of units produced for each product.

Unit-level activities are activities that are done every time a unit of product is produced, the size of this activity is influenced by the number of units produced. For example, direct power, machine clock, and electrical clock (energy) are used every time a unit of product is produced.

Batch-level activities are activities performed each time a product batch is produced, the size of the activity is affected by the number of batches of manufactured products. Examples of activities included in this group are setup activities, production scheduling activities, material management activities (material movement and purchase orders), inspection activities.

Product-level activities are activities undertaken to support the various products produced by the company. This activity consumes input to develop the product or enable the product to be produced and sold. Examples of activities included in this group are product research and development activities, process engineering, product specifications, engineering changes, and product upgrades.

Table 1. Factory Overhead Cost & Calculation Assumption

No.	Cost Type	Amount
1	Indirect Labor Cost	659.600.000
2	Building Rent Cost	200.000.000
3	Depreciation Cost	232.068.500
4	Electricity Factory Cost	142.349.460
5	Fuel & Gas Cost	5.628.493
6	Maintenance & Spare part	7.415.000
7	Other Overhead Cost	60.000.000
	<b>TOTAL</b>	<b>1.307.061.453</b>
Assumption		
	Installed capacity (cup/hour)	9600
	Capacity used from installed	80%
	Weekdays per month (days)	22
	Working hours per day (hours)	8
	THR from monthly salary value	100%
	Maximum bonus from salary value per month	400%
	Cost of building rental per year	Rp 200.000.000
	Other Overhead Cost / month	Rp 5.000.000

Facility-level activities include activities to support general manufacturing processes that are required to provide facilities or plant capacity to produce products but many of these activities are not related to the volume or mix of manufactured products. Examples of these activities include for example: plant management, building maintenance, security, landscaping, factory lighting, hygiene, land and building tax, and factory depreciation.

Cost Pool is a group of costs caused by activity along with a cost driver basis. Cost pool is useful to determine the cost pool rate which is the factory overhead cost per unit cost driver calculated for each activity group. The group rate is calculated by the formula of total overhead for a given activity group divided by the basis of the group's activity measurement.

Cost drivers or cost drivers are used to charge activity costs to outputs that are structurally different from those used in conventional cost systems. Or causal factors that explain overhead consumption. Cost drivers are the basis used to charge the costs accumulated on the cost pool to the product.

Table 2. Identification of Factory Overhead Cost Into Activity Category

No.	Factory Overhead Cost	Cost Driver
1	Indirect Labor	Unit Level
2	Factory Electricity	Unit Level
3	Fuel & gas	Unit Level
4	Maintenance & Spare part	Batch Level
5	Other Factory Overhead	Batch Level
6	Building Rent Cost	Facility Level
7	Depreciation Cost of Machinery & Equipment	Facility Level

Table 3. Production Cost Activity

Cost Pool	Type of Factory Overhead Cost	Cost Driver
I	Indirect Labor	Total Production
	Maintenance & Spare part	Total Production
	Other Factory Overhead	Total Production
II	Factory Electricity	Machine Hours
	Fuel & gas	Machine Hours
	Depreciation Cost of Machinery & Equipment	Machine Hours
III	Building Rent Cost	Facility Level

Table 4. Allocation of Calculation of Activity Based Costing System (ABC)

Description	Redceri Orange	Redceri Carica
Total Production (unit)	10,493,036.00	6,995,357.00
Machine Hours (Hours)	1,267.20	844.80
Square Area (M2)	303.60	202.40

## 4 BUDGET COST OF GOODS MANUFACTURED

The cost of production calculated for a certain period of time is useful for management to establish



the selling price of the product. Estimated production cost information per unit to be issued to produce the product within a certain period of time can be used as a basis for determining the selling price per unit of product to be charged to the buyer. In determining the selling price of the product, production cost per unit is one of the information considered in addition to other cost information as well as non-fee information.

Table 5. Factory Overhead Rates With Activity Based Costing System (ABC)

Cost Pool I	
Indirect Labor	659.600.000
Maintenance & Spare part	7.415.000
Other Factory Overhead	60.000.000
<b>Total Cost (Rp)</b>	<b>727.015.000</b>
<b>Total Production (Unit)</b>	<b>17.488.393</b>
<b>Factory Overhead Cost Rates - Cost Pool I (Rp)</b>	<b>41,57</b>
Cost Pool II	
Factory Electricity	142.349.460
Fuel & gas	5.628.493
Depreciation Cost of Machinery & Equipment	232.068.500
<b>Total Cost (Rp)</b>	<b>380.046.453</b>
<b>Machine Hours (Hours)</b>	<b>2.112</b>
<b>Factory Overhead Cost Rates - Cost Pool II (Rp)</b>	<b>179.946,24</b>
Cost Pool III	
Building Rent Cost	200.000.000
<b>Total Cost (Rp)</b>	<b>200.000.000</b>
<b>Square Area (M2)</b>	<b>506,00</b>
<b>Factory Overhead Cost Rates - Cost Pool III (Rp)</b>	<b>395.256,92</b>

In addition, Cost of Goods Manufactured is useful to monitor the realization of production costs. Management requires information on actual production costs incurred in the implementation of the production plan. This information is useful to monitor whether the production process consumes the total cost of production in accordance with the previous calculation.

Cost of Goods Manufactured is also useful for calculating the company's profit and loss. Management requires information on production costs that have been incurred to produce the product within a certain period. This information is useful to know whether the production and marketing activities within a certain period able to generate gross profit or even result in gross loss.

The cost of goods manufactured also determines the cost of the inventory of the finished product and the product in the process presented in the balance

sheet. When management makes periodic financial accountability, management must present financial statements in the form of a balance sheet and income statement. In the balance sheet, management should present the cost of the inventory of the finished product and the cost of the product at which the balance sheet is still in process.

PT Redceri Indonesia calculates the cost of production per unit with ABC (Activity Based Costing) system. In the traditional cost system charging costs on production costs (Raw Material, direct Labour, Factory Overhead). The production cost component of ABC system is almost the same as traditional system, but in ABC Factory Overhead Cost search is more accurate.

From the calculation of cost of goods manufacture for Redceri Orange then obtained the total production cost of Rp19,004,352,914.11. With the number of products produced for 10,493,036 units, the cost of production per unit is Rp1,811.14. As for the cost of production Redceri Carica obtained total production costs of Rp12,186,899,232.84. With the number of products produced amounted to 6.995,357 units, the cost of production per unit is Rp1,742.14.

## 5 PROJECTED COST OF GOODS SOLD

In determining the cost of goods sold, the conventional cost accounting system is no longer appropriate to be applied in today's modern technological era. Because this system has several weaknesses. Among them is providing distorted cost information. Distortions arise because of inaccuracies in charging costs, resulting in costing, decision-making, planning, and control errors. The distortion also results in under cost / over cost of the product (Hansen & Mowen, 2004). The existence of various weaknesses can be overcome by the use of Activity-Based Costing method.

Companies can use Activity Based Costing (ABC) system to analyse activities. The implementation of ABC is an innovation, one of which is to reduce non value-adding activities, add value to products / services to be produced, and eliminate activities that are not in accordance with the wishes of customers or who do not create added value. Activity Based Costing is a costing pricing method that tracks costs to activities, then to products. The main difference between the cost of product costing between conventional cost

accounting and ABC is the amount of cost drivers used in the ABC method more than in conventional cost accounting systems.

Table 6. Calculation of Cost of Goods Manufactured per Unit with Activity Based Costing System (ABC) For Redceri Orange

Raw Material Cost (Rp)			<b>18.029.163.394,99</b>
Direct Labor Cost (Rp)			<b>190.952.639,00</b>
Factory Overhead Cost:			
Cost Pool I			
Rp 41,57 x 10.493.036 unit		436.209.008,31	
Cost Pool II			
Rp 179.946,24 x 1.267 jam		228.027.871,80	
Cost Pool III			
Rp 395.256,92 x 304 M2		120.000.000,00	
Total of Factory Overhead Cost (Rp)			<b>784.236.880,11</b>
<b>Total of Production Cost (Rp)</b>			<b>19.004.352.914,11</b>
<b>Total of Products Manufactured (Units)</b>			<b>10.493.036,00</b>
<b>Cost of Goods Manufactured Per Unit (Rp)</b>			<b>1.811,14</b>

Table 7. Calculation of Cost of Goods Manufactured per Unit with Activity Based Costing System (ABC) for Redceri Carica

Raw Material Cost (Rp)			<b>11.549.503.079,95</b>
Direct Labor Cost (Rp)			<b>114.571.580,00</b>
Factory Overhead Cost:			
Cost Pool I			
Rp 41,57 x 6.995.357 unit		290.805.991,69	
Cost Pool II			
Rp 179.946,24 x 845 jam		152.018.581,20	
Cost Pool III			
Rp 395.256,92 x 202 M2		80.000.000,00	
Total of Factory Overhead Cost (Rp)			<b>522.824.572,89</b>
<b>Total of Production Cost (Rp)</b>			<b>12.186.899.232,84</b>
<b>Total of Products Manufactured (Units)</b>			<b>6.995.357,00</b>
<b>Cost of Goods Manufactured Per Unit (Rp)</b>			<b>1.742,14</b>

Table 8. Projected Cost of Goods Sold Y0-Y5

NO	KETERANGAN	Y0	Y1	Y2	Y3	Y4	Y5
I	RAW MATERIAL						
	Initial Supplies of Raw Materials						
	Purchase of Raw Materials	24.744.032.817	27.583.688.314	33.762.434.496	43.047.103.983	57.080.459.881	75.688.689.490
	Total Raw Material	24.744.032.817	27.583.688.314	33.762.434.496	43.047.103.983	57.080.459.881	75.688.689.490
	Final Inventory of Raw Materials						
	Used Raw Materials	24.744.032.817	27.583.688.314	33.762.434.496	43.047.103.983	57.080.459.881	75.688.689.490
II	AUXILIARY						
	Initial Supplies of Auxiliary						
	Purchase of Auxiliary	4.834.633.658	5.389.462.138	6.467.354.565	8.084.193.207	10.509.451.169	13.662.286.463
	Total Auxiliary	4.834.633.658	5.389.462.138	6.467.354.565	8.084.193.207	10.509.451.169	13.662.286.463
	Final Inventory of Auxiliary						
	Used Auxiliary	4.834.633.658	5.389.462.138	6.467.354.565	8.084.193.207	10.509.451.169	13.662.286.463
III	DIRECT LABOR	305.524.219	360.621.055	432.745.266	540.931.583	703.211.058	914.174.371
IV	FACTORY OVERHEAD COST	1.307.061.453	1.471.346.342	1.765.615.611	2.207.019.513	2.869.125.367	3.729.862.962
	<b>TOTAL PRODUCTION COST (I + II + III + IV)</b>	<b>31.191.252.147</b>	<b>34.805.117.849</b>	<b>42.428.149.939</b>	<b>53.879.248.286</b>	<b>71.162.247.475</b>	<b>93.995.013.286</b>
V	WORK IN PROCESS						
	Initial Inventory of Work In Process						
	Final Inventory of Work In Process						
	Inventory of Work In Process						
VI	FINISHED GOODS						
	Initial Inventory of Finished Goods		112.828	530.920	637.104	796.380	1.035.294
	Final Inventory of Finished Goods	112.828	530.920	637.104	796.380	1.035.294	1.345.882
	Inventory of Finished Goods	112.828	643.748	1.168.024	1.433.484	1.831.674	2.381.176
	<b>COST OF GOODS SOLD</b>	<b>31.191.364.975</b>	<b>34.805.761.597</b>	<b>42.428.317.963</b>	<b>53.880.681.770</b>	<b>71.164.079.149</b>	<b>93.997.394.462</b>

Companies can use Activity Based Costing (ABC) system to analyse activities. The implementation of ABC is an innovation, one of which is to reduce non value-adding activities, add value to products / services to be produced, and eliminate activities that are not in accordance with the wishes of customers or who do not create added value.

More accurate per-unit pricing is important for management as a basis for decision-making. Management can be made easier in making decisions, among others in determining the selling price, considering refusing or accepting an order, monitoring the realization of costs, calculating the profit / loss of each order and determining the cost of the finished product and product inventory in the process to be presented on the balance sheet.

Determination of cost of goods sold in industrial companies, generally on the initial inventory of finished products coupled with the amount of production price (cost of goods manufactured) and reduced by the end product inventory. So the notion of cost of goods sold, based on Accounting Principles Indonesia explains that the beginning balance of inventory plus the cost of goods purchased for sale, minus the final inventory amount. For industrial enterprises in cost of goods sold including all direct wages and materials costs plus all factory costs (production) is not directly corrected by the number of beginning and ending inventory balances.

The calculation of cost of goods sold can not be separated from the total cost of raw materials, direct labour, and overhead. However, excludes counting of operational costs such as marketing, administration and general costs. Cost of goods sold also involves all costs used for employee wages and the cost of direct production materials and indirect factory production costs.

Cost of goods sold has three basic structural elements: (1) Inventory; (2) direct labour costs; (3) Overhead (overhead cost). The inventory element includes raw materials inventory, work in process inventory or WIP and stock of finished goods (inventory).

The company uses Activity Based Costing (ABC) system to analyse the activity. From the pre-made budget planning covering the sales budget, production budget, raw material budget, indirect labour budget, factory overhead budget and cost of product cost for each product type, it can be projected cost of goods sold (cost of goods sold) As in Table 8.

## 6 PRICE DETERMINATION

Companies generally specify the goods and services they offer based on the cost of goods sold. Companies can be specific to know how much the right price to be charged to the buyer.

Based on calculations performed with Activity Based Costing (ABC) system, PT Redceri Indonesia can determine the Factory SellPrice to Distributor of Redceri Orange is Rp4,055.91 with profit 17% from total cost and Factory SellPrice to Distributor of Redceri Carica is Rp 4,057.31 with profit 19.35% from total cost.

The Factory Sell Price to Retailer of Redceri Orange is Rp4,583.17 with profit 32.21% from total cost and Factory Sell Price to Retailer of Redceri Carica is Rp 4,584.76 with profit 34.86% from total cost. Selling price of PT Redceri Indonesia’s product can be seen in table 9.

Table 9. Price Determination

DESCRIPTION	REDCERI ORANGE	REDCERI CARICA
<b>Cost:</b>		
Raw Material	1.442,30	1.373,76
Auxiliaries	275,90	277,26
Direct labor	18,20	16,38
Factory Overhead Cost	74,74	74,74
Marketing Expenses	1.306,58	1.306,58
Admin & General Expenses	74,71	74,71
Depreciation of Office Supplies	94,20	94,20
Interest	82,73	84,63
Income Tax	97,22	97,22
<b>Total Cost:</b>	<b>3.466,59</b>	<b>3.399,49</b>
<b>Profit 17% and 19.35%</b>	<b>589,32</b>	<b>657,82</b>
Factory Sale Price to Distributor	4.055,91	4.057,31
<b>Profit 32.21% and 34.86%</b>	<b>1.116,59</b>	<b>1.185,28</b>
Factory Sale Price to Retailer	4.583,17	4.584,76
<b>Profit 32.21% and 34.86%</b>	<b>1.116,59</b>	<b>1.185,28</b>
Factory Sale Price to School & Hospital	4.583,17	4.584,77

## 7 CONCLUSION

Product cost calculation resulted in the start-up business having a correct selling price base. The start-up business sets the selling price by marking up enough to cover production costs. Calculations using an activity-based costing system can result in more precise production costs that can be a good basis for

determining product selling prices. To set an appropriate selling price, mark the right to consider the competitive situation and the purchasing power of the customer.

Conventional cost systems are less able to meet management needs in an accurate product cost calculation, especially when it involves substantial indirect production costs and product diversity. This results in improper decision making by the management in relation to pricing.

Implementation of Activity Based Costing System in real price calculation of Cost of Goods Manufactured also helps the company to know which products are more profitable, so it becomes a consideration to determine which products will be maintained and which are not. Redceri Carica is more profitable than Redceri Orange.

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