

Product Control Management Information System Using Eoq Method at Toko Herbamart

Harun Al Jafar^{1*}, Fauziah², Agus Iskandar³

¹ System Information, Faculty of Communication and Information Technology, Universitas Nasional
Jl. Sawo Manila No.61, RW.7, Pejaten Barat., Ps. Minggu, Kota Jakarta Selatan, 12520

Email: harunaljafar2019@student.unas.ac.id

² Master of Information Technology, Faculty of Communication and Information Technology

Email: fauziah@civitas.unas.ac.id

³ Master of Information Technology, Faculty of Communication and Information Technology

Email: agus.iskandar@civitas.unas.ac.id

ABSTRACT

This research focuses on product inventory management at Herbamart Store, a wholesale herbal medicine purchase center in South Jakarta. Currently, inventory control is done manually, which is not optimal and results in losses. The purpose of this research is to create a product inventory control management information system with the Economic Quantity Order (EOQ) method and a web-based application with an early warning system. The results showed that the optimal order quantity for various products can be determined by the EOQ method. The store also needs to provide safety stock and place a reorder when the remaining inventory reaches a certain amount. This research successfully designed a product control information system application using the web-based EOQ method tailored for Herbamart Store. This application is designed to assist Herbamart Stores in optimizing their business processes, improving efficiency, and increasing profitability. This application can also help minimize the total cost of ordering and storing goods, thus contributing to reducing operational costs and improving overall efficiency.

Keywords: *Inventory Management, Economic Order Quantity (EOQ), Management Information System, Early Warning System, Herbamart Store.*

Introduction

A trading company is a type of business whose main activity is the activity of buying and selling goods, with the main income coming from the sale of merchandise.[1]. One of the key functions of a trading company is to maintain sufficient stock of goods. In carrying out its activities, a trading company must manage inventory records to determine the availability of merchandise that is ready for sale and to monitor sales of certain products. Therefore, it is necessary to have an effective recording and valuation system to manage stock efficiently.

Inventory refers to merchandise acquired by a company and stored for the purpose of selling in its normal operations. Therefore, companies pay great attention to the management of this inventory. Inventory has great significance in the context of a trading company as it involves the storage of goods that will be used or resold. Inventory is a component that is always needed in business activities, and its contribution is very significant in maintaining the smooth running of the company's operational processes.[2].

At this time, many people are trying to enter the world of trade, and in managing this business, there are various factors that must be considered, including the control aspect. Control is applied with the intention of ensuring that business operations run with efficiency and effectiveness, so as to achieve the goals and objectives that have been set.[3].

Inventory of trade goods is one of the assets owned by the company, and therefore, its handling must be done carefully. Inventory in trading companies refers to products obtained from suppliers with the intention of reselling them for profit.[4]. The role of inventory is vital in the operations of a trading company because without it, the company cannot make sales. The existence of merchandise stock is crucial to meeting consumer needs and running a successful business.

Inventory has benefits and can also bring losses to the company. The benefits of inventory include its ability to anticipate the company's immediate needs and fulfill demand from customers or users. However, an inefficient inventory system can cause losses, especially in terms of increasing the company's operating costs due to excessive inventory storage and maintenance. Therefore, it is important to determine the economical amount of inventory items so that the company can optimize its benefits while avoiding unnecessary losses.

If the company has a large amount of inventory, this can result in significant costs for the company.[5]. Therefore, inventory control is key in business management. Inventory control involves the collection and storage of goods to meet consumer demand and needs. The purpose of inventory control is to anticipate the company's urgent needs so that it can meet customer needs properly. By controlling inventory efficiently,

companies can minimize storage costs and optimize the use of resources, thereby increasing operational efficiency and profits.

Inventory management is essential to ensure customer satisfaction and optimal demand fulfillment. The recording system in inventory management continuously monitors the availability of merchandise stock in the warehouse for each type of inventory. In a continuous recording system, the cost of each product sold is determined each time a transaction occurs related to the receipt, storage, and placement of the item for sale.[6]. In measuring inventory, careful planning and accuracy are needed to avoid risks such as accumulation of merchandise that can harm the company. With effective inventory control, companies can manage stock items more efficiently and reduce the risks associated with excess inventory or merchandise buildup.[7].

Herbamart shop is a wholesale herbal medicine shopping center that provides various types of herbal medicine products in the Mampang Prapatan sub-district area, South Jakarta. Herbamart stores provide various herbal medicine products such as honey, sarikurma, mangosteen skin, laziz goat milk, and so on. Herbamart shop is a complete herbal medicine shopping place to meet the needs of the community.

The business process at Herbamart Store starts when a customer makes a purchase. At that time, the cashier will give the price according to the predetermined price for the product. If a product has run out, the cashier will record it and inform the store owner. The goal is for the shop owner to immediately order the exhausted product to the supplier. Interestingly, in this case, the shopkeeper does not have exact information about the quantity to be ordered to the supplier. They usually order products based on experience and habit, without a fixed amount. This shows that stock management at Herbamart Store is based more on intuition and experience than on precise calculations.

The problem faced by Herbamart Store is the lack of an effective stock management system. Currently, store owners only make purchases based on habit without having a clear understanding of the fluctuations in demand and sales of their products. As a result, there is a risk of under-stocking or overstocking of goods.

This problem results in store owners incurring losses due to inefficient purchasing of goods, without considering the cost of orders, storage, and shipping. In addition, there is also a risk of overstocking or under-stocking which can damage goods if stored for too long. All of this can damage consumer confidence in the quality of products sold at Herbamart Stores. Therefore, an effective inventory management strategy is needed to overcome this problem.

The Basic Concept of Economic Quantity Order (EOQ) is an important foundation in managing various aspects of inventory, including analyzing the costs and prices required by the company to purchase goods. EOQ involves various elements calculated using the EOQ formula, which ultimately results in information about the optimal amount of goods to be purchased by the company.[8]. This aims to reduce the risk of company losses that may arise if not using the EOQ approach. In addition to EOQ, there are also other calculations such as Reorder Point (ROP) and Lead Time (LT).[9]. ROP helps determine when it is best to reorder raw materials before inventory runs out, resulting in an estimate of the time required for each order. Meanwhile, LT measures the period of time from when the order is placed until the goods arrive and are received by the company.[10].

The selection of Economic Quantity Order (EOQ) as the most suitable inventory control method to overcome the challenges faced by Herbamart Store is the right step. EOQ is an approach commonly used by companies to calculate the optimal amount of inventory in accordance with demand, thereby helping to reduce losses due to inefficient stock management. By using EOQ, Herbamart Stores can identify the right amount of inventory to efficiently meet demand, avoid over-purchasing or under-stocking, and ultimately improve their inventory performance.

Research Methods

The purpose of data collection techniques is to ensure that the data obtained is truly valid and in line with expectations; in every research, you must first determine what methods will be used to obtain and collect data because this is an important factor in the success of the research. In this study, researchers used several data collection techniques, including Observation, Document, and Interview methods. The data used in this research are primary and secondary data. Descriptive data analysis is used in this research, which involves collecting, analyzing, and processing data. The research data that has been processed will then be compared with the previous data. Furthermore, suggestions will be given to improve product inventory at herbamart stores to be more optimal. The implementation of the research was carried out in several stages, starting from the beginning to the end of the research.

The research steps are illustrated in the following research flow chart:

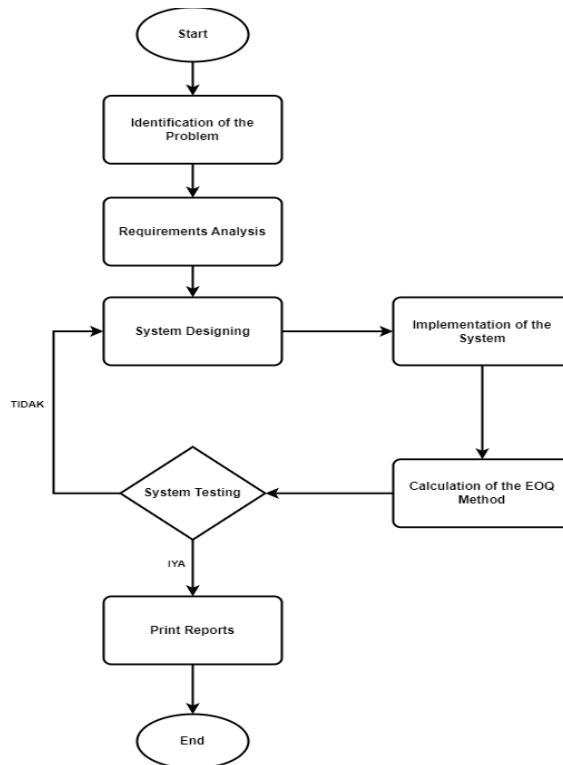


Figure 1 Research Flowchart

Results and Discussion

Here is the required data information for calculating the Economic Order Quantity at Herbamart Store, obtained through field research:

Table 1. Product Demand Data for Herbamart Store in the Year 2023.

Month	Worm fit Isi 60	Madu Ghazbee 460gr	Alshifa 500gr	Etawali n 200gr	Gamat Gold-g 500ml	Borges Extra Virgin 1ltr	Madu Faresha Multiflor a 1kg	Habbat ifit 200kpsl	Radix Wahida Plastik Isi 30pcs	Ace- max's 350 ml
Nov	82	103	192	177	164	210	153	228	196	212
Dec	124	145	240	212	176	242	147	251	221	228
Jan	166	161	264	189	152	212	132	233	184	196
Feb	207	185	216	234	140	263	105	196	152	182
Mar	249	201	180	188	188	204	162	272	219	236
Apr	291	226	192	140	156	161	141	164	194	242
May	312	242	120	167	124	141	104	142	128	158
Junne	285	215	144	155	132	187	114	188	144	164
Jully	249	207	168	200	144	264	120	274	172	192
August	207	142	288	256	188	281	156	292	224	241
Sep	166	194	254	201	200	243	174	278	240	252
Oct	124	173	224	225	168	202	135	264	188	216
Total	2,462	2,194	2,482	2,344	1,932	2,610	1,643	2,782	2,262	2,519
Average	205.16	182.83	206.83	195.33	161	217.5	136.91	231.83	188.5	209.91

Table 2. Ordering Cost Data for Herbamart Store in the Year 2023.

No.	Product Name	Telephone Costs	Administrative Costs	Transportation Costs	Total Ordering Costs
1	Wormfit Isi 60	55,000	32,000	85,000	172,000
2	Madu Ghazbee 460gr	45,000	22,000	65,000	132,000
3	Alshifa 500gr	33,000	41,000	72,000	146,000
4	Etawalin 200gr	62,000	55,000	92,000	209,000
5	Gamat Gold-g 500ml	42,000	35,000	55,000	132,000
6	Borges Extra Virgin 1ltr	48,000	28,000	78,000	154,000
7	Madu Faresha Multiflora 1kg	50,000	25,000	70,000	145,000
8	Habbatifit 200kpsl	38,000	30,000	80,000	148,000
9	Radix Wahida Plastik Isi 30pcs	60,000	45,000	88,000	193,000
10	Ace-max's 350 ml	47,000	38,000	60,000	145,000
Overall Total Ordering Costs		480,000	351,000	745,000	1,576,000

Table 3. Storage Cost Data for Herbamart Store in the Year 2023.

No	Product Name	Demand Quantity (Pcs)	Price (Rp) Per Unit	Holding Cost (%)	Storage Cost (Rp)	Total Purchase Cost (Rp)
1	Wormfit Isi 60	2,462	34,000	12%	4,080	83,708,000
2	Madu Ghazbee 460gr	2,194	58,000	8%	4,640	127,252,000
3	Alshifa 500gr	2,482	75,000	5%	3,750	186,150,000
4	Etawalin 200gr	2,344	86,000	5%	4,300	201,584,000
5	Gamat Gold-g 500ml	1,932	115,000	4%	4,600	222,180,000
6	Borges Extra Virgin 1ltr	2,610	85,000	4%	3,400	221,850,000
7	Madu Faresha Multiflora 1kg	1,643	135,000	4%	5,400	221,805,000
8	Habbatifit 200kpsl	2,782	55,000	6%	3,300	153,010,000
9	Radix Wahida Plastik Isi 30pcs	2,262	98,000	4%	3,920	221,676,000
10	Ace-max's 350 ml	2,519	125,000	3%	3,750	314,875,000
Total Purchase Cost						1,954,090,000

The steps in calculating the Economic Order Quantity (EOQ) method are:

$$EOQ = \sqrt{\frac{2 \times D \times S}{H}}$$

D = quantity of product demand in one period.

S = ordering cost per order.

H = holding cost per unit of the product.

Here is the Economic Order Quantity (EOQ) calculation for each product at Herbamart Store:

EOQ for Wormfit isi 60.

$$\begin{aligned} EOQ &= \sqrt{\frac{2 \times 2,462 \times 172,000}{4,080}} \\ &= \sqrt{207,580} \\ &= 455.60 \text{ pcs (Rounded to 456 pcs).} \end{aligned}$$

Therefore, the economical purchase quantity for Wormfit with a quantity of 60 is 456 pcs.

Calculation of Purchase Frequency and Optimal Time Interval Between Orders:

$$\text{Purchase Frequency} = \frac{D}{EOQ}$$

D = Quantity of product demand in one period.

EOQ = Economic Order Quantity, which is the optimal quantity to be ordered in each order to minimize inventory costs.

Here is the calculation of purchase frequency and optimal time interval between orders for each product at Herbamart Store:

Purchase frequency for Wormfit isi 60.

$$\text{Purchase Frequency} = \frac{D}{EOQ} = \frac{2,462}{456} = 5.39$$

$$\text{With a reorder cycle of } \frac{360}{5} = 72 \text{ hari}$$

Therefore, the purchase frequency for Wormfit with a quantity of 60 in one period is 5 times with a reorder interval occurring every 72 days in one year (assuming the year consists of 360 days).

The results of the EOQ calculations, as well as the calculations for purchase frequency and reorder intervals for each product at Herbamart Store, can be found in the following table:

Table 4. The results of the Economic Order Quantity (EOQ) calculation for Herbamart Store in the year 2023.

No	Product Name	Demand Quantity (Pcs)	EOQ	Purchase Frequency (/year)	Reorder Interval
1	Wormfit Isi 60	2,462	456 pcs	5 times	72 days
2	Madu Ghazbee 460gr	2,194	353 pcs	6 times	60 days
3	Alshifa 500gr	2,482	440 pcs	6 times	60 days
4	Etawalin 200gr	2,344	477 pcs	5 times	72 days
5	Gamat Gold-g 500ml	1,932	333 pcs	6 times	60 days
6	Borges Extra Virgin 1ltr	2,610	486 pcs	5 times	72 days
7	Madu Faresha Multiflora 1kg	1,643	297 pcs	6 times	60 days
8	Habbatifit 200kpsl	2,782	500 pcs	6 times	60 days
9	Radix Wahida Plastik Isi 30pcs	2,262	472 pcs	5 times	72 days
10	Ace-max's 350 ml	2,519	441 pcs	6 times	60 days

Calculation of safety stock at Herbamart Store.

Safety Stock, or buffer stock, is the allocated quantity of inventory intended to ensure the continuity of the production process and prevent shortages or excesses of products in stock.[11].

$$\text{Safety Stock (SS)} = \frac{UD \times R}{WD}$$

In this study, it is known that the difference between the usage date and the receipt of goods is 2 days, and the number of working days at Herbamart Store in one year is 360 days. Here is the calculation of safety stock for each product at Herbamart Store:

Safety Stock for Wormfit isi 60.

$$\begin{aligned} \text{Safety Stock} &= \frac{UD \times R}{WD} \\ &= \frac{2 \times 2,462}{360} \\ &= 13.67 \text{ pcs (Rounded to 14 pcs)}. \end{aligned}$$

Calculation of Reorder Point (ROP) at Herbamart Store.

Reorder Point, or the reorder threshold, indicates the remaining quantity of inventory at which a company needs to place a replenishment order. The first step involves determining the average daily product requirement, obtained by dividing the total annual product demand by the number of working days in a year (360 days).[12]. Subsequently, the average daily requirement is multiplied by the lead time and added to the safety stock. The formula used for Reorder Point (ROP) is as follows:

$$ROP = (Lead\ Time \times DailyRequirement) + SafetyStock$$

In this study, it is known that the lead time is 5 days, while the number of working days in a year at Herbamart Store is 360 days. Here is the Reorder Point (ROP) calculation for each product at Herbamart Store:

Reorder Point (ROP) for Wormfit isi 60.

$$\begin{aligned} ROP &= \left(5 \times \frac{2,462}{360}\right) + 14 \\ &= 34.19 + 14 \\ &= 48.19\text{ pcs (Rounded to 48 pcs).} \end{aligned}$$

Therefore, the Reorder Point (ROP) for Wormfit with a quantity of 60, which the company needs to initiate a reorder when the product remains at 48 pcs.

The results of the Safety Stock and Reorder Point (ROP) calculations for each product at Herbamart Store can be found in the following table:

Table 5. The results of the Safety Stock and Reorder Point calculation for Herbamart Store in the year 2023.

No .	Product Name	Demand Quantity (Pcs)	Working Days	Usage Date	Lead Time	Safety Stock	ROP
1	Wormfit Isi 60	2,462	360 days	2 days	5 days	14 pcs	48 pcs
2	Madu Ghazbee 460gr	2,194	360 days	2 days	5 days	12 pcs	42 pcs
3	Alshifa 500gr	2,482	360 days	2 days	5 days	14 pcs	48 pcs
4	Etawalin 200gr	2,344	360 days	2 days	5 days	13 pcs	46 pcs
5	Gamat Gold-g 500ml	1,932	360 days	2 days	5 days	11 pcs	38 pcs
6	Borges Extra Virgin 1ltr	2,610	360 days	2 days	5 days	15 pcs	51 pcs
7	Madu Faresha Multiflora 1kg	1,643	360 days	2 days	5 days	9 pcs	32 pcs
8	Habbatfit 200kpsl	2,782	360 days	2 days	5 days	15 pcs	54 pcs
9	Radix Wahida Plastik Isi 30pcs	2,262	360 days	2 days	5 days	13 pcs	44 pcs
10	Ace-max's 350 ml	2,519	360 days	2 days	5 days	14 pcs	49 pcs

Calculation of total Inventory Costs using the Economic Order Quantity (EOQ) method is as follows:

The purpose of determining the total inventory cost is to calculate the amount of inventory-related expenses that a company needs to incur. In calculating the total inventory cost, several associated costs need to be considered, including purchasing costs, ordering costs, and holding costs.[13].

$$TIC = \frac{D}{Q} \times S + \frac{Q}{2} \times H$$

TIC = Total Inventory Cost.

Q = Average purchase quantity.

D = Quantity of product demand during one period.

S = Cost per order.

H = Holding cost per year.

Here is the calculation of the total inventory cost using the Economic Order Quantity (EOQ) method for each product at Herbamart Store:

Total inventory cost for Wormfit isi 60

$$\begin{aligned} \text{TIC} &= \left(\frac{2,462}{456} \times \text{Rp } 172,000\right) + \left(\frac{456}{2} \times \text{Rp } 4,080\right) \\ &= \text{Rp } 928,649 + \text{Rp } 930,240 \\ &= \text{Rp } 1,858,889 \end{aligned}$$

Therefore, the total inventory cost for Wormfit with a quantity of 60 using the EOQ method is Rp 1,858,889.

The results of the inventory cost calculation using the Economic Order Quantity (EOQ) method can be found in the following table:

Table 6. Total Inventory Cost Using the EOQ Method for Herbamart Store in the Year 2023.

No	Product Name	Demand Quantity (D)	Average (Q)	Ordering Cost (S)	Holding Cost (H)	Total Inventory Cost (TIC)
1	Wormfit Isi 60	2,462	456	Rp 172,000	Rp 4,080	Rp 1,858,889
2	Madu Ghazbee 460gr	2,194	353	Rp 132,000	Rp 4,640	Rp 1,639,379
3	Alshifa 500gr	2,482	440	Rp 146,000	Rp 3,750	Rp 1,648,573
4	Etawalin 200gr	2,344	477	Rp 209,000	Rp 4,300	Rp 2,052,586
5	Gamat Gold-g 500ml	1,932	333	Rp 132,000	Rp 4,600	Rp 1,531,738
6	Borges Extra Virgin 1ltr	2,610	486	Rp 154,000	Rp 3,400	Rp 1,653,237
7	Madu Faresha Multiflora 1kg	1,643	297	Rp 145,000	Rp 5,400	Rp 1,604,038
8	Habbatifit 200kpsl	2,782	500	Rp 148,000	Rp 3,300	Rp 1,648,472
9	Radix Wahida Plastik Isi 30pcs	2,262	472	Rp 193,000	Rp 3,920	Rp 1,850,048
10	Ace-max's 350 ml	2,519	441	Rp 145,000	Rp 3,750	Rp 1,655,118

Implementation of the product control application system using the EOQ method.

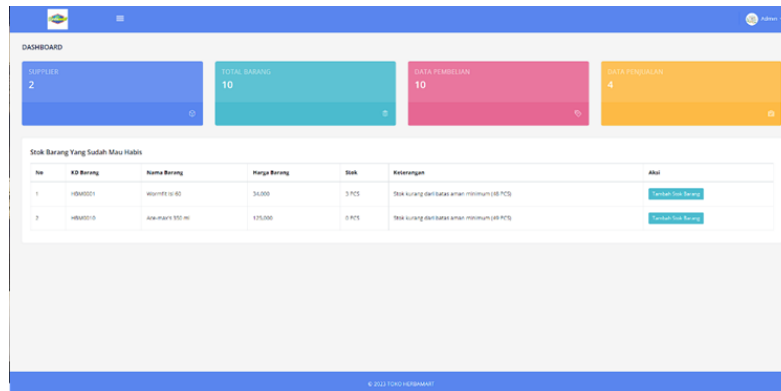


Figure 2 Dashboard Display

The image above represents the dashboard view referring to the interface that appears after the administrator successfully logs into the system. On this page, the administrator can check the quantity of Supplier Data, Product Data, Sales Data, and other information presented in the form of data counts. Additionally, the Dashboard also provides alerts related to low stock items, allowing the administrator to manage dwindling inventory by directly adding stock.

No. Item	Nama Barang	Stok Awal	Demand (Per Hari)	Lead Time (Hari)	Safety Stock	Reorder Point	Order Qty	Total Biaya Pembelian (Rp)	Total Biaya Simpan (Rp)	Total Biaya Kehilangan (Rp)	Total Biaya (Rp)	Reorder Point (Rp)	Reorder Point (Hari)				
1	Wormfit 456	143,000	2402 Pcs	300	2	5	170,000	4,080	400 Pcs	48 Pcs	14,870	678,040	180,240	1,858,880	5	2,32	70
2	Madu Ghazbee 353	38,000	2704 Pcs	300	2	5	100,000	4,040	300 Pcs	42 Pcs	12,810	828,410	81,800	1,680,070	6	1,99	60
3	Alshifa 440	70,000	2462 Pcs	200	2	3	140,000	2,700	440 Pcs	40 Pcs	14,810	828,010	80,000	1,648,010	9	2,10	60
4	Etawalin 477	80,000	2248 Pcs	300	2	5	200,000	4,300	477 Pcs	40 Pcs	13,810	1,027,000	1,020,000	2,047,000	5	2,44	70
5	Gamat Gold-g 333	110,000	1802 Pcs	300	2	5	100,000	4,000	333 Pcs	30 Pcs	11,810	760,000	760,000	1,520,000	6	2,00	60
6	Borges Extra Virgin 486	80,000	2010 Pcs	300	2	5	150,000	3,400	486 Pcs	51 Pcs	15,810	870,000	880,000	1,750,000	5	2,20	70
7	Madu Faresha Multiflora 297	100,000	1940 Pcs	300	2	5	140,000	3,400	297 Pcs	30 Pcs	11,810	800,000	800,000	1,600,000	6	2,10	60
8	Habbatifit 500	90,000	2760 Pcs	300	2	5	140,000	3,500	500 Pcs	54 Pcs	15,810	870,000	880,000	1,750,000	4	2,16	60
9	Radix Wahida 472	80,000	2202 Pcs	200	2	3	100,000	2,800	472 Pcs	44 Pcs	13,810	820,000	820,000	1,640,000	5	2,30	70
10	Ace-max's 441	120,000	2010 Pcs	200	2	3	140,000	2,700	441 Pcs	40 Pcs	14,810	820,000	880,000	1,700,000	6	2,10	60

Figure 3 Display of the Results of EOQ Method Calculation Analysis.

The image above shows the design of the Economic Order Quantity (EOQ) report page within the system. This page is designed as a central hub for viewing and printing reports on the results of EOQ calculation analysis. Here, the admin can see a summary of the EOQ calculation results, including information such as EOQ, Safety Stock, Reorder Point, Order Frequency per year, Optimal Reorder Time per day, as well as total storage costs, total ordering costs, and total inventory costs overall. This report can assist the admin in understanding the EOQ calculation results and making informed decisions regarding inventory management.

Conclusion

Based on the research conducted at Herbamart Store, several conclusions were drawn as follows:

1. Based on the Economic Order Quantity (EOQ) calculations, the optimal order quantities for the products at Herbamart Store are as follows: Wormfit 456 pcs, Madu Ghazbee 353 pcs, Alshifa 440 pcs, Etawalin 477 pcs, Gamat Gold-g 333 pcs, Borges Extra Virgin 486 pcs, Madu Faresha Multiflora 297 pcs, Habbatifit 500 pcs, Radix Wahida 472 pcs, and Ace-max's 441 pcs. With the implementation of the EOQ method, the total inventory cost can be minimized to Rp 17,142,078.
2. Herbamart Store needs to maintain safety stock for various products. For Wormfit, 14 pcs are required, Madu Ghazbee needs 12 pcs, Alshifa 14 pcs, Etawalin 13 pcs, Gamat Gold-g 11 pcs, Borges Extra Virgin 15 pcs, Madu Faresha Multiflora 9 pcs, Habbatifit 15 pcs, Radix Wahida 13 pcs, and Ace-max's 14 pcs.
3. Herbamart Store needs to initiate reorder points for various products when the remaining inventory reaches a specific quantity. For Wormfit, the reorder point should be triggered when the remaining inventory reaches 48 pcs. For Madu Ghazbee, the reorder point should be at 42 pcs. Alshifa requires a reorder point at 48 pcs, Etawalin at 46 pcs, Gamat Gold-g at 38 pcs, Borges Extra Virgin at 51 pcs, Madu Faresha Multiflora at 32 pcs, Habbatifit at 54 pcs, Radix Wahida at 44 pcs, and Ace-max's at 49 pcs.
4. This research successfully designed a web-based product control information system using the EOQ method, specifically tailored to meet the needs of Herbamart Store. The design of this information system covers various crucial aspects of store operations, including the calculation of the EOQ method, determination of safety stock to maintain product inventory stability, and identification of the right time for reorder points (ROP) when the stock is nearing depletion. This application is designed with the aim of assisting Herbamart Store in optimizing their business processes, enhancing efficiency, and ultimately improving profitability. Additionally, this application can also aid the store in minimizing the total costs of ordering and storing goods.

Acknowledge

Based on the conclusions above, the researcher can provide recommendations to Herbamart Store, which can be considered with various considerations, including:

1. The company may consider implementing the EOQ method. This method helps determine the optimal order quantity, thus optimizing the company's inventory costs.
2. It is recommended for the company to set safety stock levels and reorder points. This step can reduce the risk of stockouts or overstocks, which may disrupt operations and result in increased inventory costs.
3. The designed information system application can assist Herbamart Store in optimizing their business processes. Therefore, Herbamart Store is advised to maximize the use of this application.

Additionally, this application can help minimize the total costs of ordering and storing goods. The contribution of this application has also been proven to reduce operational costs and improve overall efficiency.

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