

ABSTRAK

Pengelolaan persediaan bahan baku merupakan faktor penting dalam menjaga efisiensi biaya dan kelancaran proses produksi perusahaan. UMKM Go Green sebagai produsen sabun cuci di Yogyakarta masih menghadapi permasalahan ketidakteraturan dalam pengadaan bahan baku yang menyebabkan terjadinya *overstock* dan *stockout* pada beberapa periode produksi. Kondisi tersebut berdampak pada meningkatnya biaya persediaan serta terganggunya kelancaran operasional perusahaan. Penelitian ini bertujuan untuk menentukan metode peramalan permintaan yang paling akurat, merencanakan kebutuhan bahan baku sabun cuci piring dan sabun cuci pakaian secara terstruktur, serta menentukan teknik *lot sizing* yang paling efisien guna meminimalkan total biaya persediaan bahan baku menggunakan metode *Material Requirement Planning* (MRP).

Penelitian diawali dengan melakukan agregasi permintaan dua jenis produk ke dalam satu *product family*. Selanjutnya dilakukan peramalan permintaan menggunakan *software* WinQSB dengan membandingkan beberapa metode peramalan. Berdasarkan hasil evaluasi, metode *Naive* dipilih sebagai metode terbaik karena memiliki tingkat kesalahan terkecil dengan nilai MAPE sebesar 4,10%, MAD sebesar 23,96, dan MSE sebesar 806,44. Hasil peramalan kemudian didisagregasi menjadi kebutuhan masing-masing produk untuk menyusun *Master Production Schedule* (MPS). Perhitungan MRP dilakukan menggunakan tiga teknik *lot sizing*, yaitu *Lot for Lot* (LFL), *Economic Order Quantity* (EOQ), dan *Periodic Order Quantity* (POQ).

Hasil penelitian menunjukkan bahwa metode *Lot for Lot* (LFL) menghasilkan total biaya persediaan paling rendah sebesar Rp10.400.000 dibandingkan metode EOQ sebesar Rp22.911.200 dan POQ sebesar Rp16.718.000. Selain itu, penerapan MRP dengan teknik LFL mampu menghemat biaya persediaan sebesar Rp1.334.200 atau 11,37% dibandingkan metode aktual perusahaan yang mencapai Rp11.734.200. Dengan demikian, metode MRP menggunakan teknik *Lot for Lot* (LFL) direkomendasikan untuk diterapkan pada UMKM Go Green karena mampu meminimalkan biaya persediaan, mengurangi penumpukan bahan baku, serta meningkatkan ketepatan perencanaan kebutuhan material.

Kata kunci: Persediaan, Bahan Baku, *Material Requirement Planning*, *Lot Sizing*, Biaya Persediaan.

ABSTRACT

Raw material inventory management is an important factor in maintaining cost efficiency and ensuring smooth production processes within a company. UMKM Go Green, a washing soap manufacturer located in Yogyakarta, still experiences irregularities in raw material procurement, resulting in overstock and stockout conditions during several production periods. These conditions increase inventory costs and disrupt operational activities. This study aims to determine the most accurate demand forecasting method, plan the raw material requirements for dishwashing soap and laundry soap systematically, and identify the most efficient lot sizing technique to minimize total inventory costs using the Material Requirement Planning (MRP) method.

The research began by aggregating the demand for two products into a single product family. Demand forecasting was then conducted using WinQSB software by comparing several forecasting methods. Based on the evaluation results, the Naive method was selected as the best forecasting method because it produced the smallest forecasting errors with a MAPE value of 4.10%, MAD of 23.96, and MSE of 806.44. The forecasting results were then disaggregated into individual product requirements to develop the Master Production Schedule (MPS). MRP calculations were carried out using three lot sizing techniques, namely Lot for Lot (LFL), Economic Order Quantity (EOQ), and Periodic Order Quantity (POQ).

The results of the study indicate that the Lot for Lot (LFL) method generated the lowest total inventory cost of Rp10,400,000 compared to EOQ at Rp22,911,200 and POQ at Rp16,718,000. In addition, the implementation of MRP using the LFL technique reduced inventory costs by Rp1,334,200 or 11.37% compared to the company's current method, which amounted to Rp11,734,200. Therefore, the MRP method with the Lot for Lot (LFL) technique is recommended for UMKM Go Green because it is able to minimize inventory costs, reduce excessive raw material accumulation, and improve the accuracy of material requirement planning.

Keywords: *Inventory, Raw Materials, Material Requirement Planning, Lot Sizing, Inventory Cost.*