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**Article information**

**Article title**

Optimization model for multi-product multi-period multi-supplier raw-material selection and composition, and order quantity problem with minimum one-year order quantity contract.

**Authors**

Mohammad Rizka Fadhli \*

Saladin Uttunggadewa

Rieske Hadianti

Sri Redjeki Pudjaprasetya

**Affiliations**

Magister of Computational Sciences Program, Institut Teknologi Bandung, Center for Advance Sciences 4th floor, Jalan Ganesha no. 10, Bandung 40132, Indonesia.

Faculty of Mathematics and Natural Sciences, Center for Advance Sciences 4th floor, Jalan Ganesha no. 10, Bandung 40132, Indonesia.

Center for Mathematical Modeling and Simulation, Gedung Labtek III 1st floor, Jalan Ganesha no. 10, Bandung 40132, Indonesia.

Faculty of Mathematics and Natural Sciences, Center for Advance Sciences 4th floor, Jalan Ganesha no. 10, Bandung 40132, Indonesia.

**Corresponding author’s email address and Twitter handle**

20921004@mahasiswa.itb.ac.id

**Keywords**

inventory control, multi-period multi-product multi criteria raw-material selection, mix-integer

linear programming

**Abstract**

This paper concerns the optimization model for a multi-product multi-period raw-material selection and

composition, and order quantity problem faced by a beverage company. There are some criteria in raw

material selection, which we accommodate all the criteria in the objective function. There are a number of

suppliers, and one of the decision criteria is minimum one-year order quantity contract between the company and the suppliers. The actual one-year demand of raw materials may deviate significantly from the minimum one-year order quantities. In this paper, we derive a function that can be regarded as a penalty function in order to maintain the total order quantities in one year fulfil the minimum one-year order quantity contracts. This penalty function is a part of the objective function and can be relaxed once the minimum one-year order quantity contracts are fulfilled.

We performed a number of numerical experiments to check the optimal solutions for various demands

and for various objective functions. These experiments show our MILP gives the desired optimal solutions

and also show the influence of decision criteria on the optimal solution.

**Graphical abstract**

**Specifications table**

|  |  |
| --- | --- |
| **Subject area** | Mathematics and Statistics |
| **More specific subject area** | Operation Research and Optimization |
| **Name of your method** | Mixed-Integer Linear Programming |
| **Name and reference of original method** |  |
| **Resource availability** | Data can be found in: https://github.com/ikanx101/MILP\_Methodx |

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**Ethics statements**

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**Mohammad Rizka Fadhli**: Conceptualization, Resources, Data curation, Software **Saladin Uttunggadewa**: Conceptualization, Methodology, Writing - Review & Editing **Rieske Hadianti**: Methodology, Writing - Original Draft, Validation, Investigation **Sri Redjeki Pudjaprasetya**: Supervision

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**Declaration of interests**

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