Title : Forecasting the Usage of Substances in Pharmaceutical Production of Millimed BFS Co., Ltd.

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Type of presentation :

☐ **Oral Presentation**

☐ **Poster**

☑ **Cooperative Education**

ABSTRACT

This study aimed to develop and compare forecasting models for the usage of Glucosamine Sulfate, the principal raw material utilized in pharmaceutical manufacturing at Millimed BFS Co., Ltd., with the objective of identifying the model that yields the highest predictive accuracy. The analysis was conducted using monthly usage data spanning from January 2020 to June 2025, comprising a total of 66 observations. The dataset was partitioned into a training dataset of 60 observations and a test dataset of 6 observations.Three forecasting approaches were employed: Linear Regression, Double Exponential Smoothing, and the Box–Jenkins (ARIMA) methodology. The empirical results indicated that the data exhibited an increasing trend over time, with no evidence of seasonal effects, and demonstrated non-stationary characteristics. Model performance was evaluated using Root Mean Squared Error (RMSE) and Mean Absolute Percentage Error (MAPE).The findings revealed that the Linear Regression model achieved the lowest forecasting errors and demonstrated superior predictive accuracy. Consequently, this model was deemed the most appropriate for forecasting future Glucosamine Sulfate usage.