

# Factors predictive of pH in ABC Beverage products

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This report presents the findings of an in-house analysis to determine the factors predictive of pH in ABC Beverage products. The analysis applied five predictive Machine Learning models to beverage manufacture process data for each of the four ABC Beverage products – Brand A, B, C and D – and selected one model for predictive testing based on model predictive performance. Twenty models were fitted in total. Root Mean Square Error (RMSE) was the metric used to measure model error. The results of the analysis are summarized below:

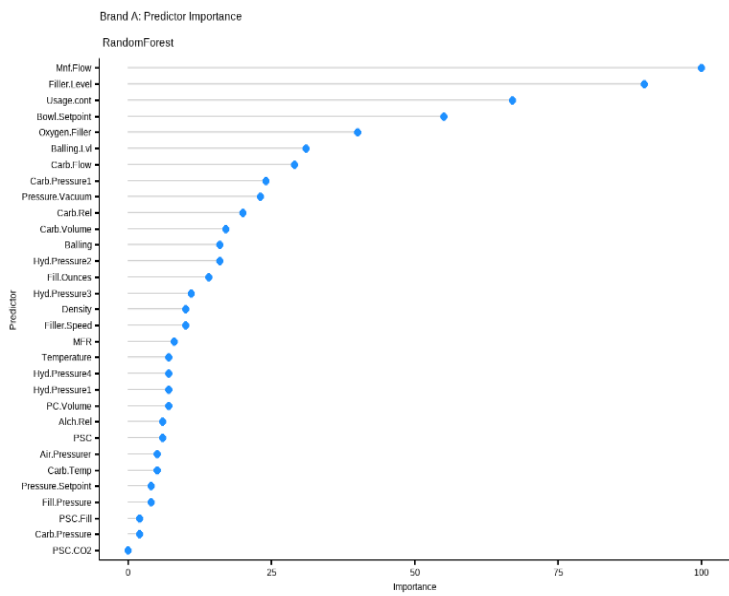
- The data has a substantial number of missing entries, pointing to possible gaps in data collection and management, and/or sensor malfunction and need for maintenance.
- **Random Forest** best predicts pH for all four ABC Beverage products. Model predictive error is as follows:
  - **brand A**, 0.11
  - **brand B**, 0.09
  - **brand C**, 0.14
  - **brand D**, 0.08
- Manufacturing process factors most predictive of pH in the model are, in descending order of importance, as follows:
  - **brand A** *Mnf.Flow, Filler.Level, Usage.cont, Bowl.Setpoint*
  - **brand B**, *Mnf.Flow*
  - **brand C**, *Oxygen.Filler, Carb.Rel*
  - **brand D**, *Usage.cont, Mnf.Flow, Pressure.Vacuum, Carb.Pressure1, Temperature*

Full factor importance for each brand manufacturing process is provided in the following page.

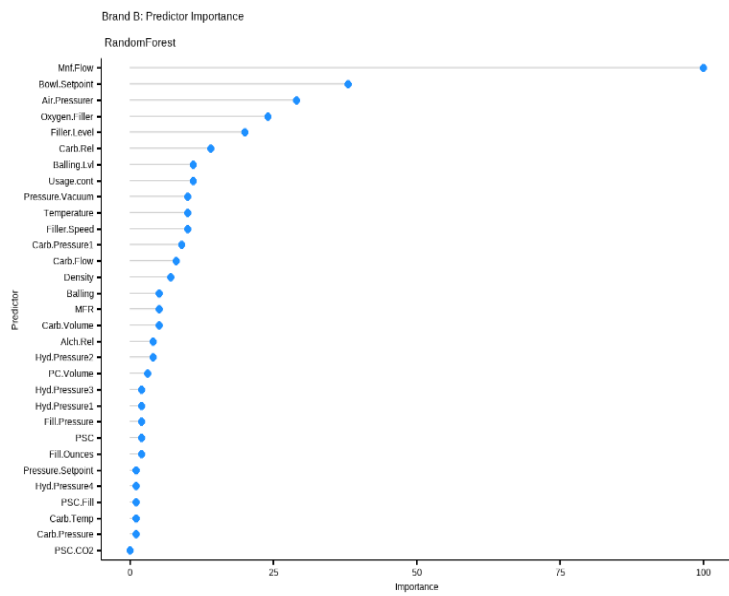
[Model predictions](#) for each product brand are available for inspection and download. Full details on the methodology of the analysis are found in the [Technical Report](#).

# Manufacturing process factor importance on product pH

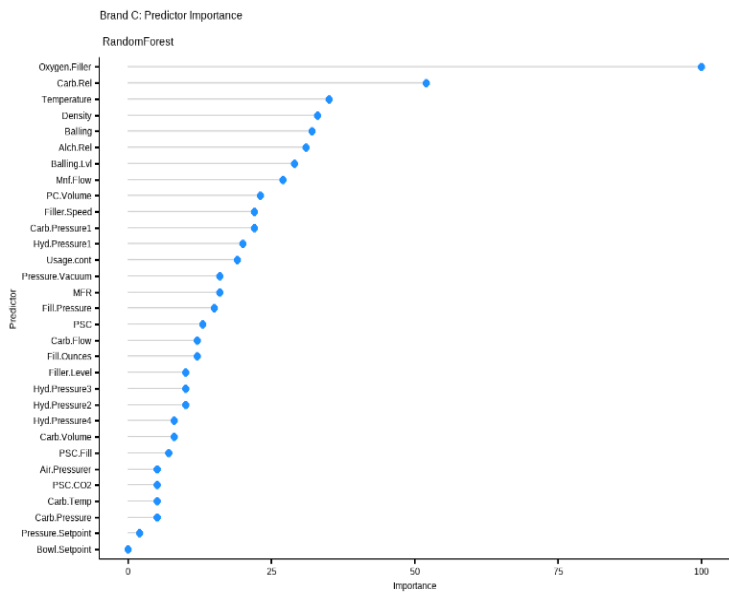
Brand A: predictor importance



Brand B: predictor importance



Brand C: predictor importance



Brand C: predictor importance

