

## Cookie Manufacturing



prediQ™

**Predict & Prevent losses in cookie  
manufacturing using AI driven predictive  
quality platform**

# Raw Materials used in Cookie Manufacturing



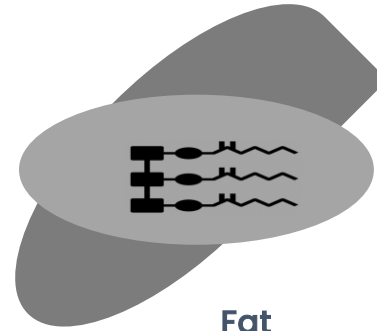
## Wheat Flour

It is a structure builder that provides the basic framework for biscuit making. The wheat flour is composed of nutrients – carbohydrate (as starch), protein and fat, together with some fiber, ash and trace minerals and vitamins



## Sugar

Sugar gives sweetness and imparts colour to biscuits and help in developing the texture of the biscuit



## Fat

Fats are a vitally important ingredient in achieving the texture, mouthfeel, and the bite of the biscuit. Hard biscuits and crackers require low percentages of fats, while more amount of fat is needed for soft cookies



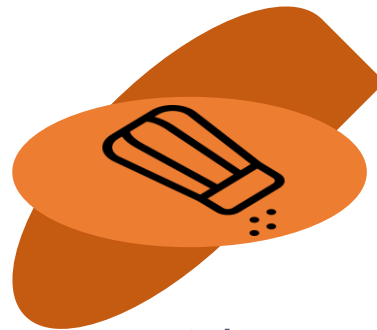
## Leavening Agent

Sodium Bicarbonate & Ammonium Bicarbonate are generally used. It produces products greater in volume than raw ingredients & have superior flavour & eating characteristics



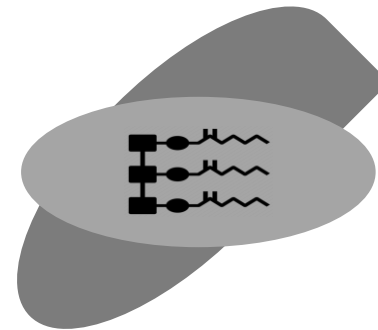
## Milk Solids

Provides nutrients to product, provide flavour and textural improvements to aid surface cooling



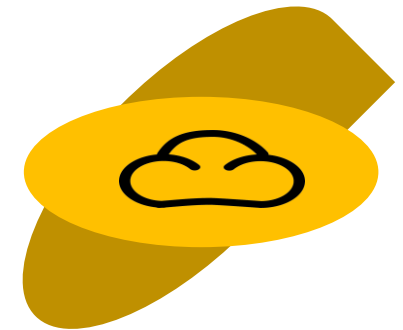
## Salt

Used for flavour & flavour enhancing properties



## Emulsifiers

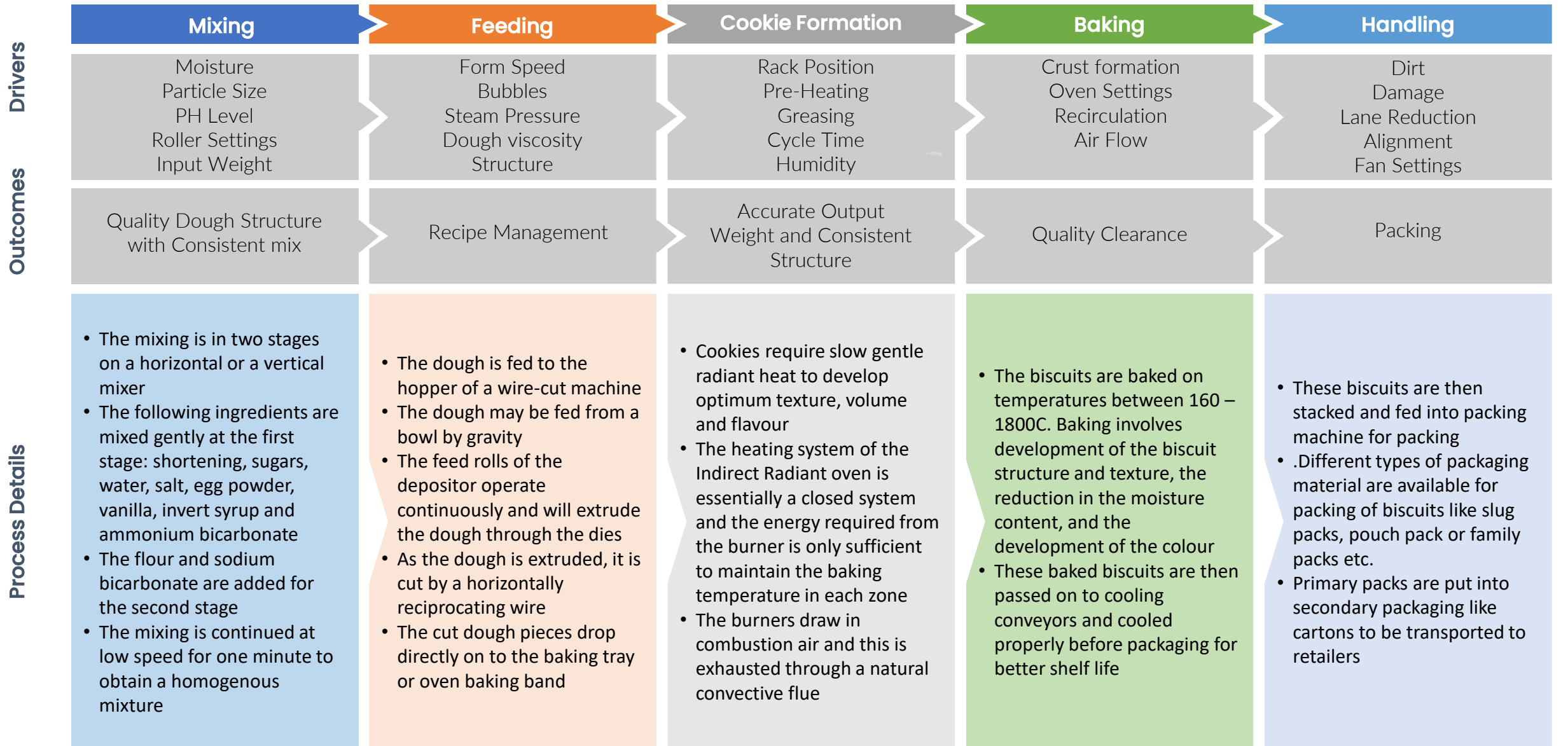
To stabilize mixtures of two immiscible liquids (normally oil & water). Lecithins, SSL, DMG are used



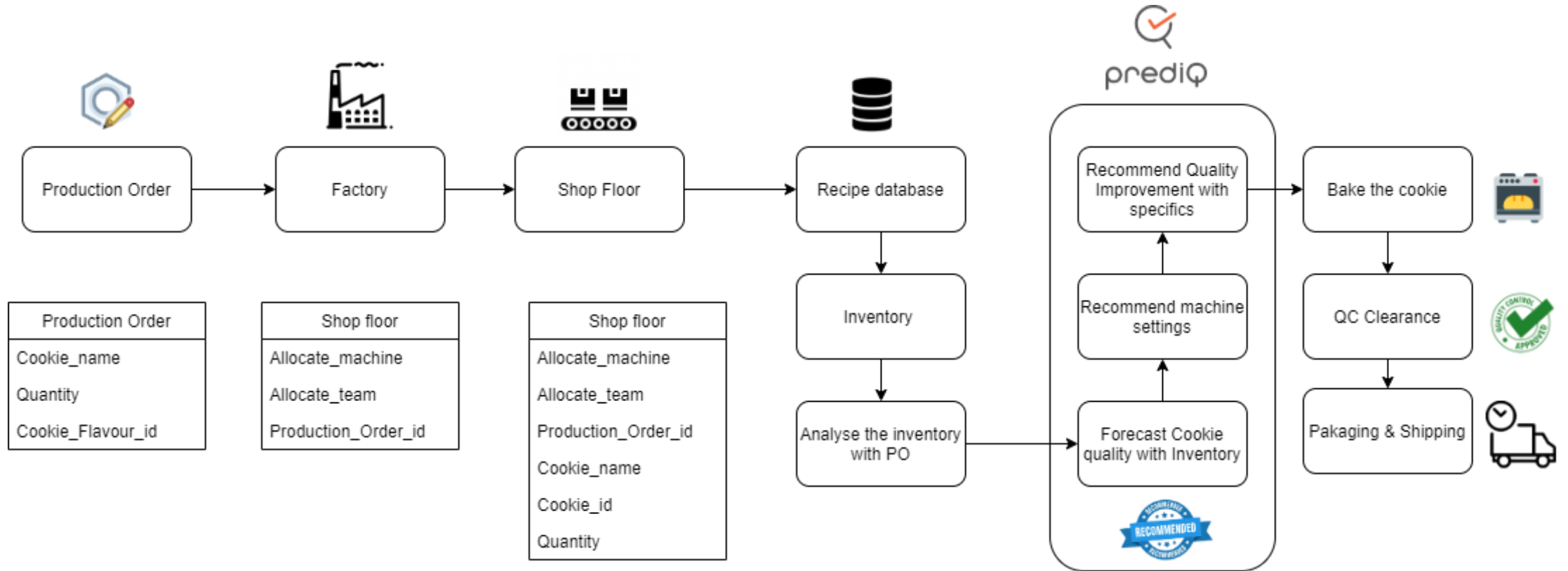
## Dough Conditioner

Dough conditioners can improve dough handling, gas formation and retention, loaf volume, crumb structure and texture

# Standard Cookie Manufacturing Process



# Cookie Production Flow



- Plant team gets the production order which consists of cookie name, quantity to be produced with flavour details and any other specific requirement provided
- The operations team will allocate the machine and other required resources for the manufacturing of the required order
- The shop floor team will receive the planned activity list at the beginning / before shift commences
- The shop floor team will also check the recipe database and check the inventory against the production order
- The inventory consists of all the details of raw materials stored in the warehouse

# How PrediQ helps the Cookie Manufacturing Industry

## What is PrediQ?

- **prediQ**, is an AI/ML enabled predictive quality platform developed by Thoucentric Labs. It can be used by quality teams & shop floor teams to predict & prevent quality issues using industrial IoT & advanced machine learning.  
**PrediQ** provides simulation and recommends environments to test out the deviations in production parameters (pressure, temperature etc.) and the likely impact on product quality.
- This is enabled through advanced machine learning models, Industrial IoT and optimization techniques.

Below 5 modules of PrediQ assist the shop floor & quality teams at different stages of Cookie manufacturing process

### Data Lake

- Correlate & Analyze data sources to build predictive models
- Live & Historical data feed from Machines, sensors, ERP, MES & other quality systems is analyzed to detect patterns & establish relationships

### Predictor

- Predict failures through real time monitoring of process conditions
- PrediQ will continuously monitor the drivers like temperature, moisture, dough patterns, raw material content and predict at what time the process can fail

### Proactive Alerts

- Alert teams of potential quality issues, before they can happen
- Proactively send detailed, relevant & prioritized alerts to the operators & supervisors, with sufficient lead times

### Recommender

- Provide automated insights & recommended settings
- Automated Insights & prescriptive analytics to optimize performance & quality

### Simulator

- Simulator engine to analyze the impact of different demand drivers
- Play out scenarios by entering different values of defect drivers & analyze its impact on the output

# PrediQ Interventions

Common Issues	Probable Causes	Recommended sensors & systems	Alerts & Recommendations from PrediQ
<b>Burnt Cookies</b>	Oven door was opened too frequently Oven was over crowded Inadequate air flow around the pans Oven temperature was too low	Temperature Connected machine Machine settings(PLC) Blower fan speed sensor	Alert users about temperature loss Recommend oven settings Monitor preheat variations and recommend temperatures Monitor air flow with blower usage Recommend backing time with input raw material
<b>Cookie formation</b>	The speed of the cutter Startup adjustments Weight measurement on every startup Pressure adjustment in cutting Dough consistency	Check weigher Manufacturing control tower	Alert users for structural issues Inline continuous weight monitoring system Alert operators with weight adjustments
<b>Flat &amp; Hard Cookie</b>	Issue with ingredients High sugar level Over Crunchiness	Connected machine Machine settings(PLC) Control tower	AI based Recipe management system Suggest input material ratio's Forecast cookie quality
<b>Pale &amp; Soft Cookie</b>	Baked from an inconsistent dough Raw portion inside the cookie	Temperature Connected machine Machine settings(PLC)	AI based Oven monitoring and adjustment system Recommend Oven cycle input / Output speed Forecast cookie quality
<b>Baking Issue</b>	Issue with ingredients Excess Butter	Connected machine Machine settings(PLC) Control tower	AI based Recipe management system Suggest input material ratios Forecast cookie quality





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Thank You for Reading !

To know more about PrediQ and our other products, please visit [www.thouc-labs.ai](http://www.thouc-labs.ai)

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