



Powdea

5 STEPS TO BETTER BAKERIES

and future-proof food plants



The 5 steps

1. Automate
2. Eliminate dust
3. Minimize loss
4. Optimize workflow
5. Contact us





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**1st STEP:
AUTOMATE**



How to automate dough production in industrial bakeries and food plants

In recent years, many large and medium-sized industrial bakeries have automated the processing of raw materials and become global leaders.

The automation of raw material dosing started with larger bakeries, but has now spread to medium sized, says **Tuomo Kousa**, CEO of [Powdea Technologies](#), Finland's leading dosing system supplier. Many industrial bakeries and food plants have successfully automated their raw material dosing systems and also upgraded the control systems by building new, modern control systems for existing equipment. "Rationalizing dough production can cut labor costs in half by freeing the baker or other employees from dough production for other phases of the process" Tuomo sums up the power of automation.

"Rationalizing dough production can cut labor costs in half by freeing the baker from dough production for other phases of the process."

Ingredients dozed with a touch of a button

In the modern ingredient dosing system, information of how many units of products need to be made are automatically transferred to the dosing system's operator panels. There the ordered amount of products is automatically converted into needed amount of dough.

With a touch of a button, the system doses the requirement amounts of each ingredient to the mixer bowl. You receive feedback on the dough batches and consumed raw materials as well as the recipes prepared in real time to your office computer.

Integration to virtually any ERP/ MES system is possible, allowing all events to be logged into the information system in real time.



Typical dosing system

A typical automated ingredient dosing system for a medium-sized industrial bakery consists, for example, of two silos (rye and wheat silos), 3 to 8 big bags, 8-16 small ingredients and a few liquids. Manually added ingredients are typically weighed with a recipe-connected table scale. Depending on the size of the system, it automatically and very accurately doses up to 20 medium-sized batches of dough per hour, serving up to 5 production lines. Thanks to automation, one production worker can do all the dough making.

Dough uniformity improves product throughput on the production line. As batching automation results in less and less obsolete production, there is no need to bake so-called extra doughs. Also raw material stocks can be significantly reduced thanks to better inventory management.

“Thanks to automation, one production worker can do all the dough making.”

Automate batching of small ingredients as well!

Although industrial bakeries are highly automated when it comes to ingredient dosing, this typically only applies to the major ingredients. Although proper dosing of minor ingredients is critical to achieving the desired rise, texture and flavor in baked goods, many bakeries and plants still manually measure minor ingredients such as salt or dough improvers. This introduces inconsistencies and opportunities for human error that can lead to costly mistakes.

Consider the case of yeast: If the wrong amount of yeast is used in a batch, it can significantly affect the final product. For example, if too much yeast is added, the dough may rise excessively, resulting in a product that is too large for its packaging. This can lead to packaging problems, warping, and even product waste. Conversely, if too little yeast is used, the dough won't rise enough, resulting in a product that is too dense, flat, and lacking in volume. In both cases, the result is an inferior product that is not only unsaleable, but also wastes valuable ingredients and production time.

To solve problems like these, we strongly recommend implementing automation for even the dosing of small ingredients. We know that a small variation in the amount of small ingredients may seem like a minor issue, but over the course of a year it can add up to significant losses when dealing with large volumes.



Dosing of manually added ingredients can be automated

Even in the most modern bakeries, some small ingredients are still dispensed by hand into transfer boxes. Typically the reason for this is that these ingredients have a strong flavor, thereby making it impossible to dose automatically using shared pipelines. Other reason may be that they are allergens and need to be kept separately from other ingredients. This work phase requires a careful dispensing from the baker and takes a lot of unproductive time. Human mistake either by dosing incorrectly or forgetting to dose altogether is possible.

Thanks to advancements in the weighing technology it's possible to automate the filling of the transfer boxes. The dosing machine, such as Powdea's Powdermatic Lite, doses required amount of each ingredients even within 5 g accuracy directly to the transfer box. This eliminates the risk of contamination and human mistakes in the dosing





Automation of dosing enables traceability of production

The EU General Food Law came into force in 2002. It makes traceability mandatory for all food and feed businesses.

Actions taken when a risk is identified:

- Immediately withdraw the affected products from the market and, if necessary, recall them from consumers.
- Destroy any batch, lot or shipment that does not meet food safety requirements.

Tracking batch numbers manually can be a time-consuming task. Fortunately, modern dispensing systems include traceability capabilities as standard. The batch number is typically set on the system's control panel when the ingredient batch changes. Dispensing reports show which ingredient batch was used in each batch of dough.



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**2nd STEP:
ELIMINATE DUST**



Starting point: The serious harm caused by flour dust is known, but there is no solution.

Flour dust in bakeries and food processing plants is not only a hazard for workers, but also for machinery and equipment. Although the dangers have been known for centuries, and recent studies show that dust can be significantly reduced, not much had been done to improve working conditions. **That's why Powdea's product development started to design solutions towards safer, dust-free conditions.**

We found out that bakeries and food mills have several dusty operations, and the eight-hour OELV (Occupational Exposure Limit Value) for flour dust of 5 mg/m³ is exceeded in many of them. The dustiest jobs are usually the manual do-it-yourself tasks, as well as combination of manual tasks and working with wire or perforated bread machines. For dough preparation, the average total dust content was about 2 times the limit value for organic dust, and the results varied widely. The highest concentrations were several times higher than the OELV. In addition, enzymes and other additives were measured at levels close to the OELV. In response to these problems, Powdea has developed a dust-tight Anti-Dust hood mechanism for its flour receiving hoppers.



High Asthma Risk Among Bakers: The Respiratory Impact of Flour Dust Exposure

It has been known for several hundred years that respiratory symptoms are a serious hazard for workers in bakeries and food factories that handle powders. We have come to know these symptoms as asthma or a runny nose. The diseases are due to a particular sensitization to flour dust and its various components, such as enzymes. In different studies, respiratory and ocular occupational symptoms have been reported to vary by 10-30%. Asthma affects at least 5-10%. In Finland, bakers still have the highest risk of developing occupational asthma of all occupational groups.

In the following section, we introduce solutions designed to reduce the risks posed by flour dust in bakeries and the food industry.



The solution: the fully dust-proof Anti-Dust™ hood mechanism for hoppers.

Powdea's automatic hood is integrated in the **Powdermatic A100, I200** and **IB200** models. It descends on the dough trolley under the control of pneumatic cylinders, closing it during emptying of the receiver hopper. After emptying the hopper, the hood rises to its upper position, so that the dough trolley can be removed from under the scale.

Even the partial enclosure of a dust source affects dust exposure and safety. The effect of dough bowl shields on dust levels is clear. The more closed the flour hopper and the protective lid, the lower the dust concentration in the worker's breathing zone. With a closed system, the total dust content is less than 5 mg/m^3 . The most dust-free system is the completely enclosed dough bowl, with target extraction activated throughout the operation.

Case: Powdea helped Saarioinen to eliminate dust hazards

Powdea modernized the transfer and dosing of flour to Saarioinen, one of the biggest food manufacturers in Finland. The goal of which was to remove the dust nuisances of the previous equipment.

Thanks to the new Anti-Dust™ flour scale* supplied by Powdea, flour dust no longer exists. The previous filter with a filter bag was replaced with a new Powdea hose filter. Also a new Anti-Dust™ lid was installed on top of the dough trolley. The Anti-Dust™ bowl lid, which moves to the cylinders, lowers tightly over the bowl when the balance is emptied, closing it completely. In this case, the dust generated during emptying remains in the bowl and cannot escape.

*The scale is integrated in the **Powdermatic A100, I200** and **IB200** models.



“It doesn’t let anything through. The gap between the bowl and the scale is also completely closed, so there is no dust inside.”

Ilkka Kihlakaski, Saarioinen

6 advantages of Powdea's Anti-Dust™ receiver hoppers

1. Meet the occupational safety regulations
2. The k-value of the dust content in dough making is less than 5 mg / m³
3. The amount of dust in the bakery premises is clearly reduced
4. The need for cleaning is reduced, saving money
5. More satisfied employees, better productivity, easier recruitment
6. Lower staff turnover



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**3rd STEP:
MINIMIZE LOSS**



Powdea's promise

100 % recipe precision

Powdea's why

**Enabling sustainable growth with
the right dose of key ingredients.**

Checklist: How to cut waste and boost profits in industrial bakery or food plant

1. Optimize recipe accuracy from the start through recipe standardization
2. Automate batching of small ingredients
3. Reduce product variation through consistent monitoring
4. Improve batch consistency with calibration and analysis
5. Verify the machines on your production line



Optimize recipe accuracy from the start through recipe standardization

As you know, bakers often have their own unique style. The personal touch can shine through even in industrial bakeries. However, Powdea's experts recommend that you start with recipe standardization as the foundation for increasing both efficiency and profitability. When your recipes are accurate, everything else is more likely to fall into place.

Why recipe standardization is the key to success in industrial bakeries? It ensures that every batch delivers the same great taste, texture and quality that your customers expect. By adhering to standardized recipes, you not only ensure consistency, but also streamline production, reducing costly errors and waste. Accurate ingredient control helps keep costs in check, prevents over-utilization, and ensures that every resource is fully optimized.



Reduce product variation through consistent monitoring

Small amounts can have a big impact. Even a small variation in ingredient usage can result in significant waste over time. For example, overusing ingredients by 1% over the course of a year can result in significant losses. And when it comes to profitability, it's better to avoid unnecessary losses.

So what do you do? Monitoring your process is critical, but occasional checks aren't enough when you're talking about continuous production. **The answer is automated monitors that monitor the entire process – all the time.** If a deviation occurs, the system immediately alerts the operator, allowing adjustments to be made before waste escalates.

“The answer is automated monitors that monitor the entire process – all the time.”



Verify the machines on your production line

If your equipment was purchased decades ago, it's definitely time to consider an upgrade. Older equipment often lacks the precision and efficiency that today's technology offers. In recent years, technology has advanced rapidly, becoming both faster and more precise, especially when it comes to ingredient dosing, monitoring, and process automation.

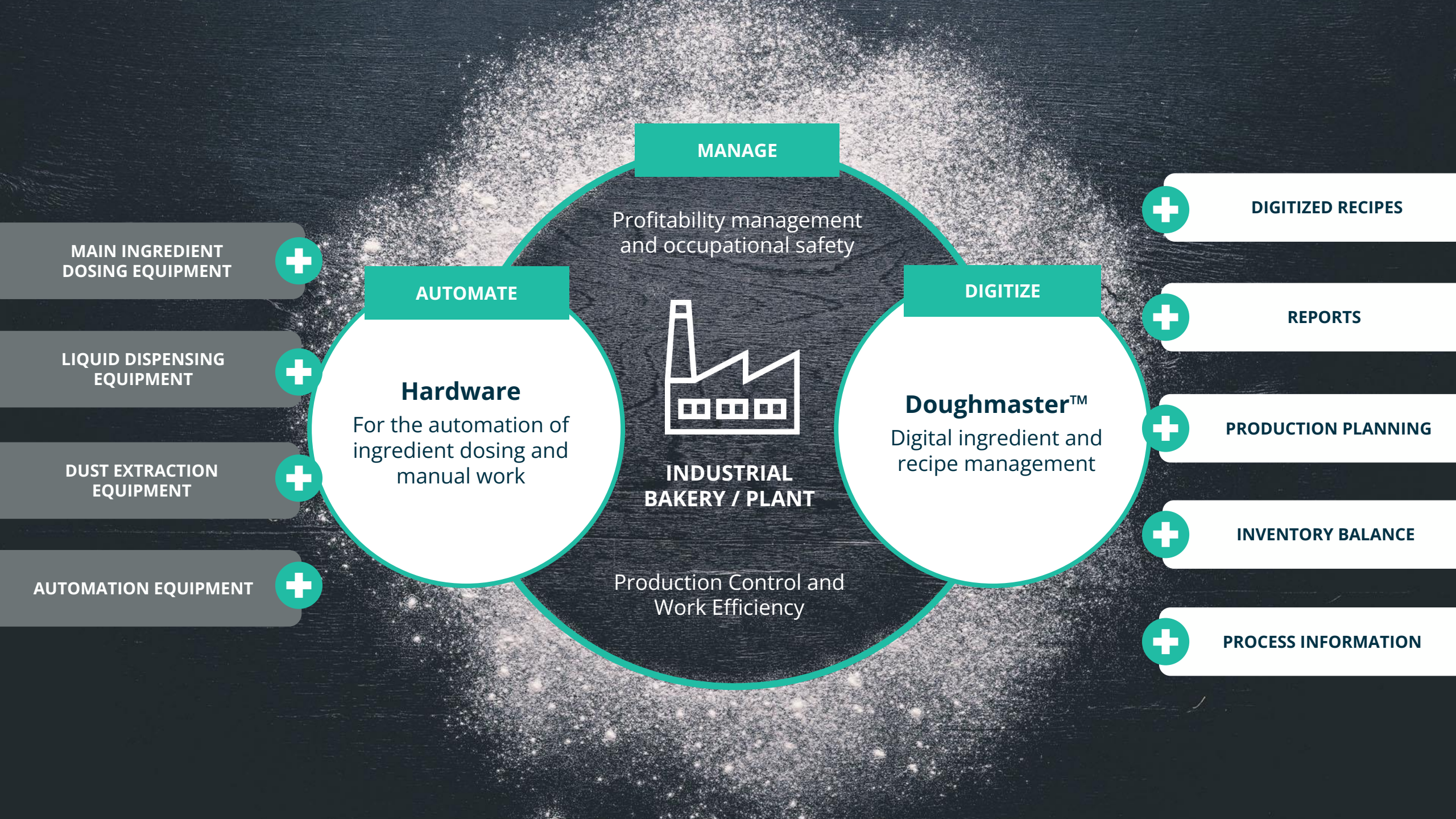
As we learned earlier, in an industrial bakery or food plant environment where high-volume production is key, even small inefficiencies in outdated machines can lead to significant waste. For example, **older machines may not offer the same level of accuracy when dosing ingredients**, which can lead to product inconsistencies and affect overall quality.

By upgrading outdated machines, bakeries and plants can not only improve dosing accuracy, but also **integrate digital monitoring systems** that alert operators to any discrepancies in real time. This ensures that problems can be corrected immediately, preventing them from escalating into larger issues.



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**4th STEP:
OPTIMIZE WORKFLOW**



MANAGE

Profitability management and occupational safety

AUTOMATE

Hardware

For the automation of ingredient dosing and manual work

DIGITIZE

Doughmaster™

Digital ingredient and recipe management

INDUSTRIAL BAKERY / PLANT

Production Control and Work Efficiency

MAIN INGREDIENT DOSING EQUIPMENT

LIQUID DISPENSING EQUIPMENT

DUST EXTRACTION EQUIPMENT

AUTOMATION EQUIPMENT

DIGITIZED RECIPES

REPORTS

PRODUCTION PLANNING

INVENTORY BALANCE

PROCESS INFORMATION

Safe and simple management of recipes and raw materials anytime, anywhere.

A bakery's competitive advantage is not only in good recipes, but also in their consistent application. Profitability depends on how ingredients and labor costs are managed. Accurately calculating the cost value of products requires the ability to track raw materials in real time and plan production accordingly. This can be very difficult without advanced software tools that work seamlessly with the batching system.

Modern software tools, such as Powdea's Doughmaster, make life easier for bakers. They digitize the recipe, eliminating possible human errors that can be made when memorizing and calculating proportions. The software allows you to store all the necessary information about the ingredients and how they are combined, so it can be easily accessed and understood. It also allows the dough-making process to be digitally controlled, so that the cost price of products can be calculated and ingredients can be accurately monitored.



3 levels of leading by knowledge

Level 1: Digitize your recipes

When you digitize your recipes they are always safe and up to date. Any recipe changes you make are conveyed to the dough maker in real time so batch sizes can be easily updated and edited

Level 2: Monitor and manage the profitability of your dough production

It's easier to run a business with up-to-date information. Reports provide real-time information on both the consumption of ingredients and product batches. Reporting and screening recipes also speed up everyday decision-making.

Level 3: Plan the optimal production process

By controlling all the production information necessary makes it easier to plan production on both a daily and weekly level. Advanced software applications, like Powdea Doughmaster Pro, provides capacity planning tools for production lines and ingredient adequacy forecasts.





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**5th STEP:
CONTACT US**

MASTERS OF INGREDIENTS AT YOUR SERVICE

We at Powdea help you **modernize and automate** your ingredient dispensing process with simple, innovative and sustainable solutions. With our help, you **ensure** the recipe compliance of your products, you **know the circulation** of raw materials and you always **know** what and how much you are manufacturing.

We are your **support team** that makes your work easier. We listen to your needs and make production changes profitable and clear to manage. As **waste is reduced**, production becomes **more efficient** and **product quality becomes more standardized**, you will have time for the work where you are invaluable.

Powdea's Masters of ingredients are at your service.



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