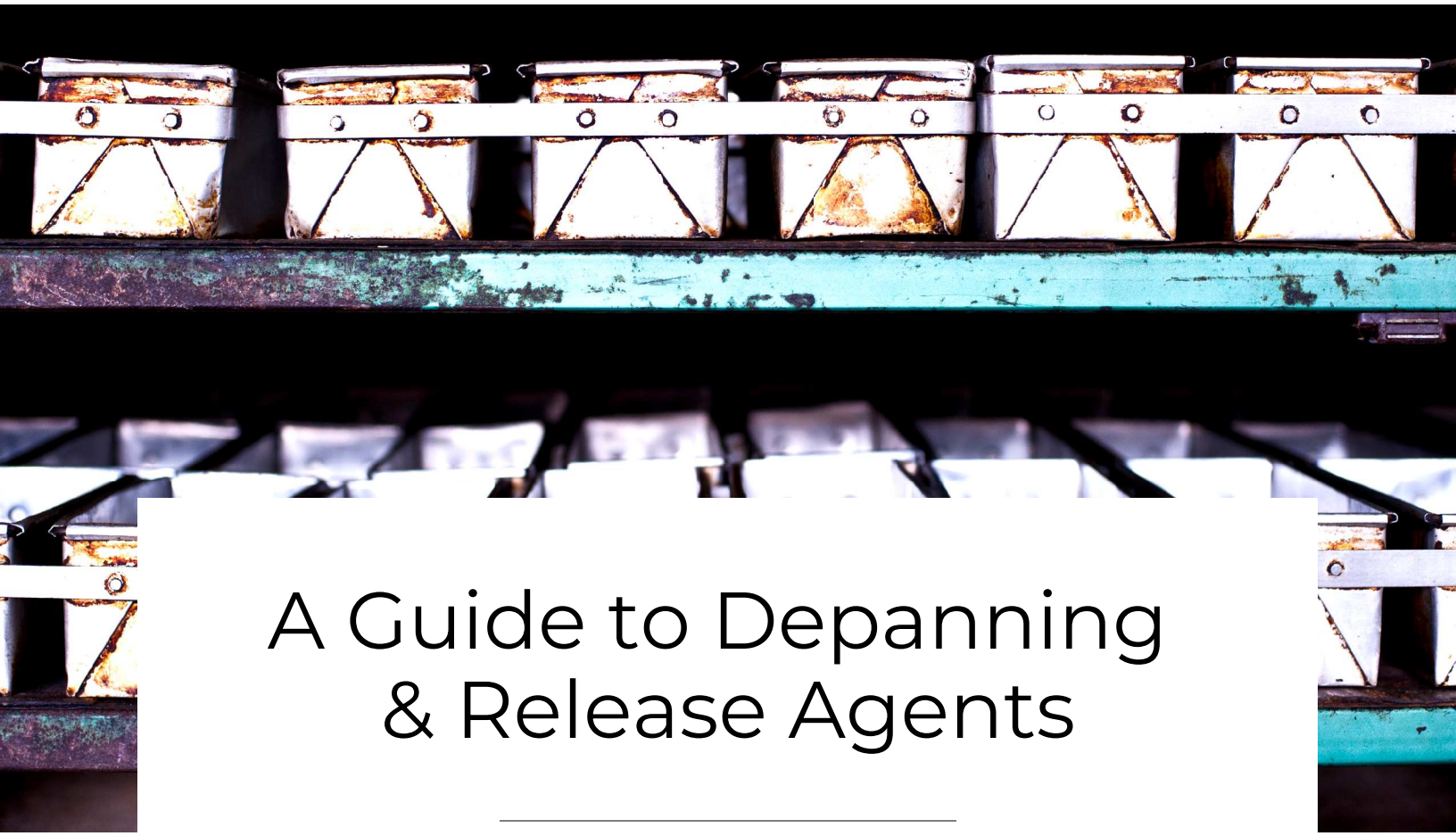


A Guide to Depanning & Release Agents

Depanning is a key step in the production of consistent, clean and high-quality bakery products. Whether bread, cake, or anything else baked in a pan, it's a crucial step in getting an intact final product. This is where release agents come in. The use of the appropriate release agent helps bakeries to:

- Reduce production costs
- Prevent sudden line stoppages at oven exit
- Prevent product waste due to poor depanning
- Keep conveyor belts as clean as possible

A wide range of release agents are commercially available to satisfy the need of industrial and small-scale bakers, with a variety of application methods which adapt to both manual and continuous, highly automated production lines.

What are release agents?

Release agents are food-grade oils or water-based formulations used to aid in the release of bread, buns or cakes from their baking containers such as baking pans, tins or trays. Some commonly used release agents are vegetable oils, shortening, butter and margarine.[1]

Other types of release agents used for depanning bakery products include the following:

- Waxes
- Emulsifiers (e.g lecithin and magnesium stearate)
- Silicones
- Flours and starches
- Antioxidants (improved oxidation stability)
- Combination of lipids and/or emulsifiers
- Water-based

Given the releasing capacity of lipids, high fat baked goods are more readily released from their containing pans than their lower fat counterparts. So, they require lower amounts of releasing agents to obtain similar results.[1]

What is depanning?

Depanning is the process of removing bakery products from their baking containers in order to be carried to the cooling and packaging stages. Pans are conveyed back to the depositing equipment, mold or pan indexer to keep production running smoothly.[2]

How are release agents used in baking?

Release agents are used in a variety of application methods. Spraying is the most common use in high speed baking. Or, they are brushed on the surface of the baking tray in smaller food production setups.

A wide variety of oiling equipment exists for the application of release agents to pans and trays. Some of them consist of automatic spraying systems for industrial applications. Both air-less spraying or air-mix spraying systems are commercially available. The former is commonly used with low viscosity oils while the latter is used for high viscosity oils.

The use of release agents significantly improves the quality of the end products, and also contributes to the maintenance of a cleaner working environment, reduction of food waste and reduction of build up in bakery wares, thus increasing their lifespan.

The absence of release agents or choosing the wrong depanning oil may cause significant problems such as:

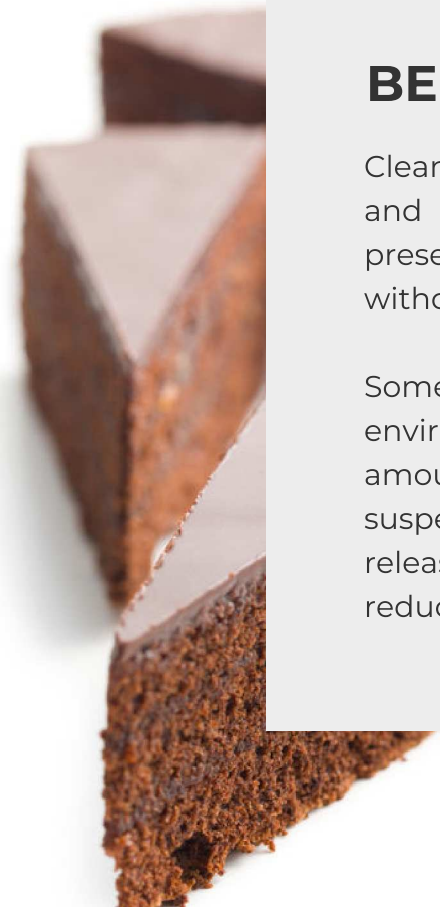
- Increased production times due to post-oven line stoppages
- Reduction of process efficiency with increased downtime needed for pan cleaning
- Potential allergen or safety issues
- Increased production cost due to food waste and excessive release agent consumption

How are release agents used in depanning?

Release agents are considered to be processing aids. They assist in the depanning process by providing a coat or layer that eases the removal of the product. In simple words, release oils or water-based formulations prevent product sticking to baking pan or trays.[1,3]

Release agents should have certain qualities to be able to aid in the depanning process. Some of the quality considerations include: [2]

- Hydrophobic properties (i.e. low water solubility)
- Formation of thin layers with good adhesion properties at high temperature
- High smoke points and high temperature stability
- Low reaction with the dough or batter
- Protection of the pan or tray from corrosion or build up
- Use of food-grade additives
- Allergen composition



BENEFIT OF CLEAN LABEL RELEASE AGENTS

Clean label release agents are commonly made with traditional oils or waxes and vegetable lecithin for improved performance. They don't contain preservatives or chemicals like magnesium stearate (an emulsifier) that may withdraw their clean label status.[4,5]

Some manufacturers may also be concerned about the potential environmental effects of their production. The baking industry produces high amounts of wastewater charged with high amounts of organic pollutants like suspended solids (SS) and Fat, Oil and Grease (FOG). The use of water-based release agents may improve the reduction of wastewater pollutants and thus reduce wastewater treatment costs.[6]

BEST PRACTICES

The application of release agents is fundamental in high-speed baking. An insufficient amount of release agent may cause the product to stick to the pan. However, over-application may cause undesirable puddles that will not allow proper baking of the product and produce undesirable gumming on pans, conveyor belt surfaces and belt side guides. All of this will extend the downtime required for proper line cleaning and sanitizing. Gumming will increase cleaning processes, slowing the overall baking process.[1]

Most release agent spraying machinery suppliers provide guidelines for the proper use of their equipment, providing the accurate application of the required release agents.[1]

IMPORTANT CONSIDERATIONS

Temperature: increasing temperature may change the viscosity of the release agent, and change the hanging properties of the coating. Enhancing the spraying application onto pan surfaces helps maintain an optimum operation temperature to keep just the right viscosity.

Air Pressure: correct atomization of the release agent is vital for the overall covering of the pan, and the protection of the integrity of the final product. Highly viscous depanning agents require higher pneumatic pressures in order to atomize or spray the same amount of oil.

Nozzle Adjustment: efficient coverage of the pan ensures the even coating of the release agent on the pan. Nozzles are sized based on spraying angle, surface of pan to be coated, oil viscosity and volumetric flow rate required for inline application. The higher the rate of the production line, the higher the flow of oil the equipment needs to deal with.

Stability: a wide variety of formulations exist for release agents. Non-hydrogenated, allergen-free oils are commonly used as the first choice of release agents.

APPLICATION
6 TOP TIPS [1,3]

1 **PRODUCT FORMULATION:** For high-sugar products, consider using a release agent with an oil and wax base and added lecithin. In high-sugar products, an increasing concentration of wax improves releasing capacity. A reduction of the sugar or syrup content will significantly reduce the thickness of the release agent film.

2 **BAKING TEMPERATURE:** Lower baking temperatures improve the performance of release agents by decreasing the potential breakdown of the components of the agent. Choosing release agents with higher thermal stability is vital in high temperature baking.

3 **PAN OR TRAY TEMPERATURE:** Higher release agent dosing is required for colder bakery pans. Once the pans have reached higher temperatures (e.g after one pass through the oven) there should be a reduction of the dosing of the release agent.

4 **PAN MATERIAL:** For silicone baking pans or trays, the use of a release agent with good hanging properties and low iodine number is recommended to provide lower dosing and avoid the burning of the silicone mold. Chromium-plated baking pans require lower levels of release agents.

5 **PAN OR TRAY PHYSICAL STATE:** New or freshly clean bakery ware provides a better surface for release agent coating, thus decreasing the required dosing and improving the performance of the release agent.

6 **OVERALL PLANT MAINTENANCE:** Some release agents may increase cleaning periods or processes due to their based matrix. The selection of the most cost-effective release agent requires extensive analysis of the overall process diagram considering potential hazards and even post-treatment of plant effluents. Water-based release agents may reduce operational cost of effluents post treatment by reducing organic pollutants compared to their oil-based counterparts.

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