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VORMEK

Vormek an Innovation–based Machinery Company, an Knowledge & Progress Center with Superior Technology and High Reputation in its Field

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From Challenge to Competitive Advantage: The Role of Tray Sealer Packaging Machines in the Future of the Country's Cheese Industry

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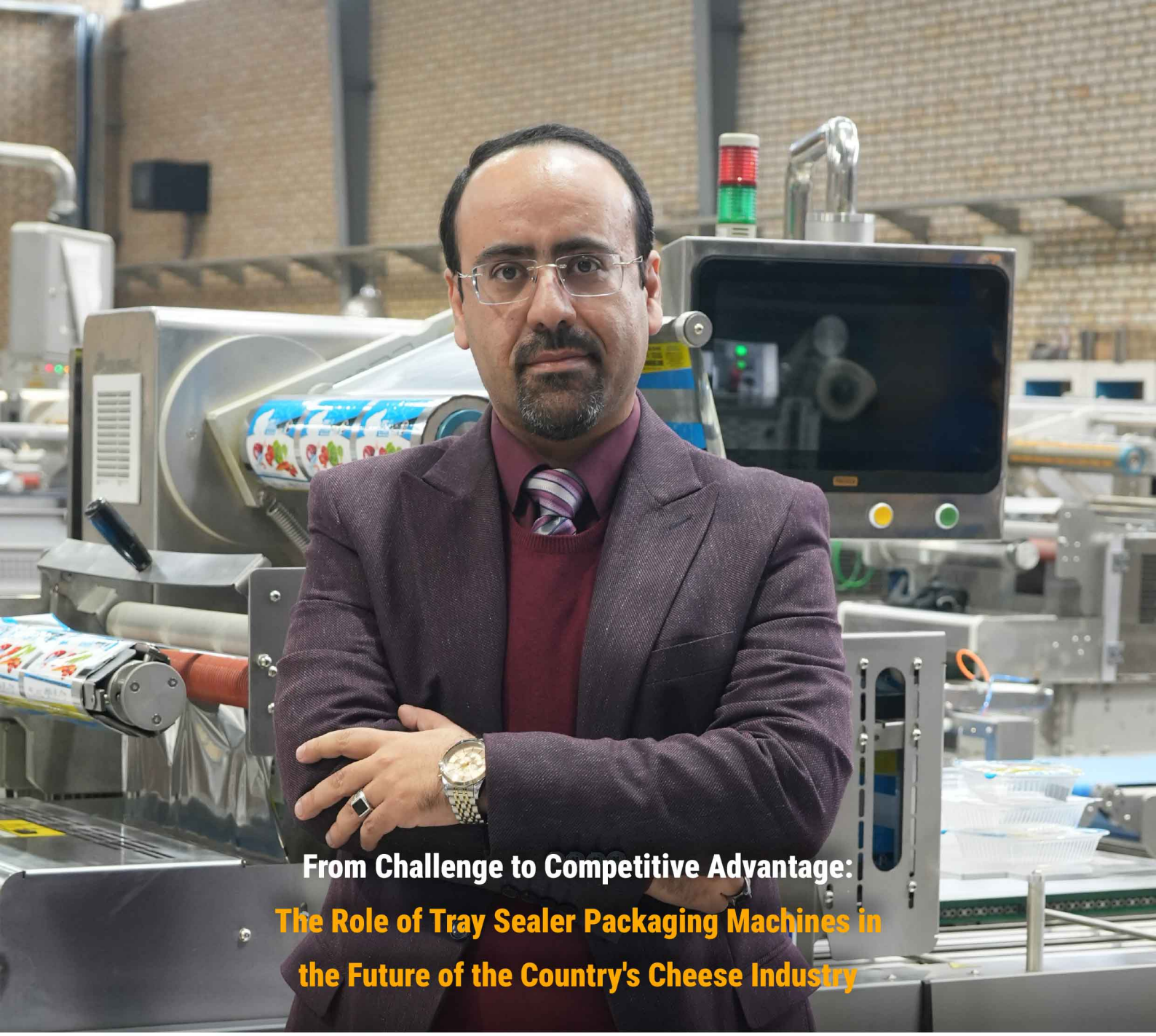
SEMI-AUTOMATIC TRAY SEALER MACHINE

AUTOMATIC TRAY SEALER PACKAGING MACHINE

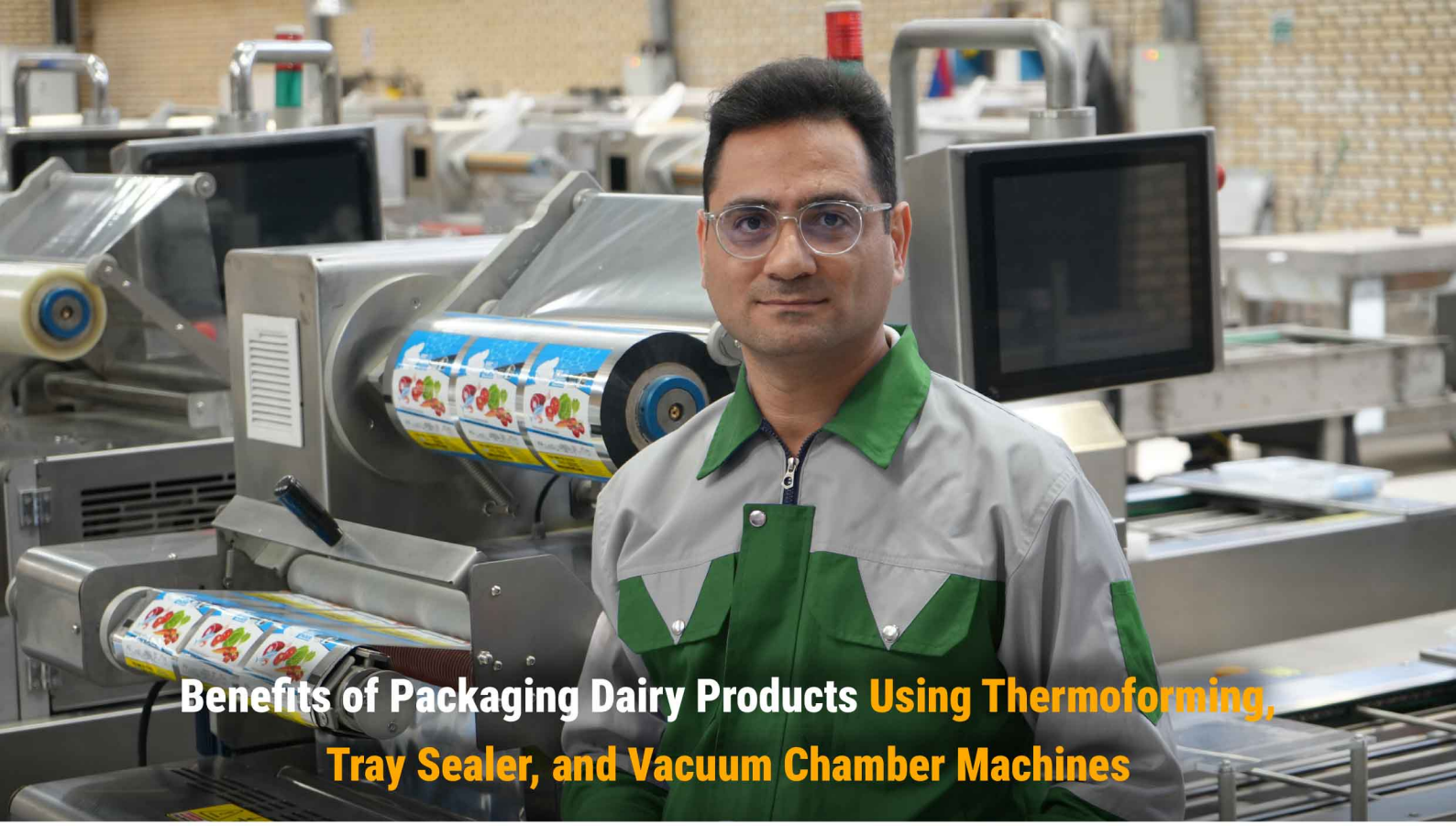
Content



From Challenge to Competitive Advantage: The Role of Tray Sealer Packaging Machines in the Future of the Country's Cheese Industry

Editorial: Dr. David Sterling

Today's cheese industry needs modern packaging technologies more than ever; technologies that can ensure the freshness, safety and shelf life of the product. In the meantime, tray sealer packaging machines have found a special place in cheese production lines as one of the most efficient packaging solutions. Capabilities such as modified atmosphere packaging (MAP), precise sealing, and flexible design make the tray sealer a suitable solution for preserving the texture, flavor, and quality of cheese. Also, the packaging produced with this technology meets the needs of the modern market in terms of beauty, hygiene, and the ability to be offered in chain stores and online. Despite the advantages, challenges such as the initial cost of equipment, the need for specialized personnel, and compliance with modern standards still remain. Our mission at Vormek Company is to provide analysis, advice, and specialized experiences from years of value-added production activities to help respected cheese producers make informed choices and improve packaging quality. In the 13th edition of Vormek, we have examined the application of tray sealers in cheese packaging, the required standards and global trends to provide a clear overview of the opportunities and development path of this industry. We hope that reading this edition will provide you with new practical insights.



Benefits of Packaging Dairy Products Using Thermoforming, Tray Sealer, and Vacuum Chamber Machines

Mr. Simon Füllenbach

Packaging dairy products, such as cheese, is one of the critical and key steps in maintaining the quality and shelf life of these products. Since these products are often affected by environmental factors such as air, humidity, and temperature, choosing the right equipment for packaging them plays a very important role in maintaining the taste, quality, and hygiene of the product. In this regard, the use of advanced packaging machines such as thermoforming, tray sealers, and vacuum chambers has become one of the most effective and practical methods.

Thermoforming Packaging Machine (Soft and Rigid Film); Attractive and Practical Packaging

One of the popular methods in packaging dairy products, especially in cases where preserving the product's appearance and packaging attractiveness is very important, is the use of thermoforming machines. These machines use soft films to produce transparent and attractive packages that completely cover the product. This type of packaging, in addition to beauty, has important features such as high speed and high precision in forming.

Thermoforming makes it possible to create precise packaging that leaves no space for air to enter. In this way, the packages will be not only attractive but also protected and safe. This method is very effective for packaging products with special shapes and those that require optimal form retention.

Vacuum Chamber Packaging Machine; an Economical Method for Longer Shelf Life

Alongside thermoforming machines, vacuum chamber packaging machines are also considered among the suitable machines for packaging dairy products.

These machines effectively remove the air inside the package and create a vacuum environment for the product.

This process ensures that there is no contact with air and prevents the growth of microorganisms. As a result, the product's shelf life increases significantly. In this method, the package is manually placed inside the machine and then the air inside the package is sent out. The machine then seals the pouch edge. Due to its simplicity and low cost, this method is a cost-effective option for large-scale producers.

Packaging Machine: A New and Suitable Method for Qualified and High-Capacity Packaging

If we want to place dairy products in packaging trays, tray sealer packaging machines are the best choice. These machines, with their various types, are capable of packaging products in different shapes quickly and with high quality. Tray sealer packaging machines can perform packaging in semi-automatic or automatic modes and give producers the ability to easily adapt to any production capacity.

Tray sealer packaging machines can package various types of products. These machines are suitable for products with features such as being liquid or sliced. These machines have high speed in the packaging process and can perform well in mass production conditions.

Among the most important packaging machines suitable for packaging products such as cheese are high-speed tray sealer packaging machines and automatic tray sealer packaging machines, considering their high precision and speed.

MAP Method; Preserving Freshness and Product Features along with Longer Shelf Life and Helping Product Safety

One of the modern techniques that has been improved with the help of thermoforming and tray sealer packaging machines is the MAP method or Modified Atmosphere Packaging. This method controls microorganisms and prevents their growth by changing the composition of gases inside the packaging. Using this method, even without the need to add chemicals and preservatives, the shelf life of products can be significantly increased.

In this method, the composition of gases inside the packaging changes, and in this way, the conditions for the growth of microorganisms are controlled. This process, in addition to preserving the freshness and taste of the product, prevents spoilage and unwanted changes.

Conclusion

Considering technological advances in the field of packaging, the use of newer methods can greatly help increase work efficiency; thermoforming, tray sealer, and vacuum chamber machines can greatly help improve the quality and shelf life of dairy products. Each of these machines, with their own features and advantages, covers the different needs of producers and enables them to provide their products to the market under optimal conditions and at a cost-effective price. Also, using techniques such as the MAP method can increase product shelf life without the need for chemical additives and prevent their spoilage.

Increasing Cheese Shelf Life
Using Modified Atmosphere Packaging (MAP)

Increasing Cheese Shelf Life Using Modified Atmosphere Packaging (MAP)

Tulum cheese is a traditional semi-hard cheese that, due to its high moisture content and specific characteristics, quickly undergoes texture changes, flavor alterations, and microbial spoilage. Therefore, using modern packaging methods to extend its shelf life is essential. One of the most effective methods is Modified Atmosphere Packaging (MAP), which creates a controlled environment by altering the composition of gases inside the packaging to preserve product quality and longevity.

In MAP packaging, the gas composition is precisely adjusted to limit microbial growth and preserve the sensory and chemical properties of the cheese. The main gases used include:

• Carbon dioxide (CO_2): Plays a key role in inhibiting the growth of harmful bacteria such as Listeria and Staphylococcus aureus and preventing microbial spoilage. Increasing CO_2 concentration extends the shelf life of cheese.

• Nitrogen (N_2): An inert gas used to replace oxygen and maintain the packaging environment, preventing discoloration and dryness of the cheese.

• Oxygen (O_2): A small amount of oxygen (less than 1%) is necessary to maintain color and appearance, but reducing it prevents the growth of aerobic bacteria and fat oxidation.

Effect of MAP on the Chemical Properties of Cheese:

• Moisture retention: Prevents drying and texture changes in the cheese.

• pH and acidity control: Prevents undesirable changes in flavor and texture.

• Prevention of fat oxidation: By reducing oxygen, the taste and quality of cheese are preserved for a longer time.

Effect of MAP on Microbial Properties:

MAP delays microbial growth and mold-related spoilage and reduces the number of harmful bacteria. CO_2 and N_2 play roles in inhibiting microbial growth and maintaining an inert environment, respectively.

Effect of MAP on Sensory Properties:

Key cheese characteristics including taste, texture, color, and aroma are preserved with MAP. Cheese flavor and texture remain stable due to oxygen control and prevention of oxidation, and the natural color of the product is maintained.

Conclusion:

Using Modified Atmosphere Packaging (MAP) is an effective solution for extending cheese shelf life and preserving its quality. This technology prevents microbial spoilage, fat oxidation, and texture and flavor changes by controlling gases, and reduces food waste. In the cheese packaging industry, offering machines with the MAP option is a key competitive advantage and can significantly increase product shelf life.

The Advantages of Vormek Machines for Proper Implementation of Modified Atmosphere Packaging (MAP)

Mr. Alexander Hoffmann (Deputy CEO of Vormek)

Accuracy In Gas Control

• Precise Gas Injection System: The packaging machine must be able to accurately inject specific gas ratios (such as nitrogen and carbon dioxide) according to the product type. This system must have precise control over gas composition and injection volume.

• Gas Pressure Control: Gas pressure must be precisely adjusted to prevent damage to the product and to avoid gas leakage.

Effective Filters and Air Ventilation System

• To remove the existing air (which mainly contains oxygen) from the tray and replace it with the desired gases, the machine must have a suitable ventilation system that enables rapid and effective oxygen reduction.

Powerful Vacuum System

• One of the key stages in MAP packaging is creating a vacuum, which is essential for removing oxygen and other unwanted gases from the tray. The machine must be capable of creating a complete vacuum to prevent rapid product spoilage.

Accuracy in Time and Temperature

• Time and Temperature Settings: The machine must be able to precisely adjust the time and temperature of the packaging process. Depending on the type of product, the appropriate temperature and time for creating the correct gaseous environment inside the tray must be set to avoid damage to the product.

Gas Monitoring and Feedback System

• Gas Sensors: Using precise sensors to measure gas composition and monitor oxygen, carbon dioxide, and nitrogen levels inside the tray helps ensure that gases are injected in the correct ratios.

• The machine must be able to provide immediate feedback to the operator so that corrective action can be taken quickly in case of any issues.

Proper Packaging Design and Protective Layers

• The machine must be able to use specific packaging materials that can maintain gas composition for a long period. These materials must typically be resistant to gas permeability, moisture, and light.

• The packaging must be designed to create proper gas insulation and prevent any gas leakage.

Fast and Uniform Coating

• The machine's coating system must be able to uniformly expose the product to the modified gases so that no part of the product is subjected to improper conditions (such as excessive or insufficient oxygen). This protects product quality and shelf life.

Resistance to Contamination and Ease of Cleaning

• The packaging machine must have antimicrobial surfaces and be easy to clean, as food product packaging may be prone to contamination. The use of stainless materials and anti-contamination design is of great importance.

Flexible Settings and Capabilities

• The machine must be able to offer different settings for various types of products with different characteristics (food products with different textures and chemical properties).

• Flexibility in tray sizes and the ability to package different products with varying characteristics (fruits, meat, seafood, etc.) is another requirement of the machine.

Automation and Process Control

• The packaging machine must have an automatic control system to regulate the packaging process, minimizing human intervention and ensuring optimal performance under all conditions.

• The management software must handle various processes such as gas settings, timing, temperature, and also provide accurate reporting for production quality tracking.

Protection of the Product Against External Pressure

• The machine must have sufficient structural strength to ensure that packages are not damaged under external pressure, especially during transportation or when exposed to different temperatures.

Cheese Production Method

Milk is heated, and rennet or acid is added. The curd is cut, whey is separated, the curd is placed into a tray, pressed, then salted, and allowed to mature.

3

Introduction to Cheese

Cheese is a solid or semi-solid dairy product obtained by coagulating milk proteins (casein) using rennet or acid.

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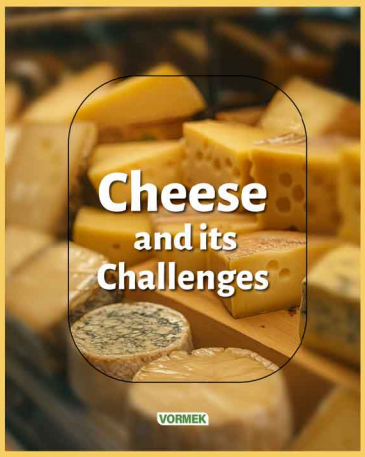


Challenge of Drying and Moisture Loss

Vacuum creates a barrier, and MAP maintains high relative humidity, keeping the cheese surface moist and fresh.

6

Main Preservation Challenge

The growth of molds and aerobic bacteria is delayed in vacuum packaging by removing air and in Modified Atmosphere Packaging (MAP) by replacing oxygen with nitrogen and CO_2.

5

Properties and Characteristics of Cheese

It is a rich source of calcium, complete protein, and fat; its texture ranges from soft and creamy to hard and crumbly, and its flavor varies from mild to very strong.

4

Challenge of Weight Loss During Storage

Vacuum and MAP prevent moisture evaporation, minimizing weight loss over several months.

9

Challenge of Absorbing Refrigerator and Environmental Odors

Multilayer vacuum and MAP films prevent the penetration of external odors and preserve the natural aroma of the cheese until the end.

8

Challenge of Fat Oxidation and Rancid Flavor

Both vacuum and MAP, by removing or drastically reducing oxygen, prevent fat oxidation and preserve the original flavor.

7

VORMEK

Vormek is the knowledge-based company and manufacturer of Tray Sealer packaging machines with a true **MAP** system in the country, which has been specializing in this field for about **15** years.

Impact of Extended Shelf Life on Profitability and Export

Long shelf life reduces waste, increases profitability, and enables export opportunities.

11

Advantage of Increasing Commercial Shelf Life with MAP

The shelf life of soft cheeses under MAP conditions will increase several times.

10

Comparison of Consumer Purchase Behavior Toward Products Packaged with Tray Sealer Packaging Machines and Traditional Packaging

Dr. David Sterling

Food packaging has long moved beyond a purely protective role and has become a communication and marketing tool (Rundh, 2005). Today, consumers consider information, appearance, sense of security, and even user experience of the packaging in their decision-making (Wells, Farley & Armstrong, 200).
Among these, packaging with tray sealer packaging machines, with features such as heat sealing, high transparency, reduced leakage, extended shelf life, and the ability to use Modified Atmosphere Packaging (MAP), has gained a special position in the food industry and significantly influences customer purchase behavior.

Role of Packaging in Perceived Quality and Safety
Research shows that packaging is one of the most important drivers of perceived quality. For fresh products, the appearance and transparency of the tray directly affect consumer trust (Ampuero & Vila, 2006).

Advantages of Tray Sealer Packaging Machines over Traditional Packaging include:
- Reduced hand contact with the product
- Clear, uncontaminated display
- Prevention of liquid leakage
- Increased perception of health and hygiene

Consumer behavior studies show that products with high-quality packaging are more likely to be chosen, even if there is a price difference (Grunert, 2002).

Impact of Extended Shelf Life on Purchase Behavior
One of the key factors in purchase behavior is the perceived risk of product spoilage. Tray sealer packaging machines, especially when combined with MAP technology, significantly extend shelf life. Credible research in packaging has shown that increased shelf life and quality stability boost purchase intention and consumer trust (Singh, Wani & Saengerlaub, 2012).

In contrast, traditional packaging (without sealing) creates higher perceived risk due to leakage, reduced visual quality, and high permeability.

User Experience of Packaging and Its Effect on Purchase Decisions
Consumer behavior is not limited to the purchase stage; post-purchase experience also affects satisfaction and repeat purchases (Kotler & Keller, 2016).
Positive experiences associated with tray sealer packaging machines include:
- Ease of carrying
- Better storage in the refrigerator
- Reheating capability (in some containers)
- Easy opening

These factors increase consumer satisfaction and loyalty.

Effect of Packaging Design on Visual Stimuli and Purchase Decision
Research shows that about 70% of purchase decisions are made on the spot and influenced by visual packaging factors (Wells et al., 2007). Tray sealer packaging creates greater shelf appeal due to its orderly form, higher transparency, professional labeling, and attractive arrangement, aligning with sensory marketing principles.

Conclusion:
For food manufacturers and companies in the packaging machinery sector, investing in tray sealer packaging machine technology is not just a technical measure but a consumer-behavior-based competitive advantage.

The Impact of Modern Packaging on Extending Cheese Shelf Life

Dr. Stefanie Kaiser

With advances in technology, food industry experts, especially in dairy, have focused on extending the expiration date and shelf life of perishable dairy products, particularly natural cheeses. Natural cheeses, due to their high fat content and moisture, spoil faster than other products. Experts in this field have applied Modified Atmosphere Packaging (MAP).

MAP is a method that uses one or two types of inert gases and poses no risk to the product, meaning it does not affect the taste, aroma, or moisture of the product. The type of product determines the specific gases used. For example, different types of cheese include: hard cheese, semi-hard cheese, fresh and breakfast cheese, and shredded cheese (e.g., pizza cheese). Depending on the dry matter and moisture content of these products, gas injection is applied. The lower the moisture in the cheese, the higher the percentage of gas needed; the higher the moisture, the lower the gas percentage required.

For a product like Parmesan cheese, which has higher dry matter and fat content compared to other dairy products, gases such as carbon dioxide (CO_2) and nitrogen (N_2) are used. The current standard consists of 30% carbon dioxide and 70% nitrogen.

Why is this amount of CO_2 used in this type of cheese? Because this cheese contains fat, and the higher the fat content and CO_2 injection, the more the cheese releases water, as some fat is broken down.

Among the machines that perform MAP on products are tray sealer packaging machines, thermoforming, and vacuum chamber machines.

Barrier Films

Another important aspect is the use of barrier films, which significantly reduce the passage of gases, water vapor, aroma, light, and moisture. Barrier films can be multilayered; for example, a five-layer polyamide film with a polyethylene layer for sealing purposes. Another commonly used film is made of ethylene vinyl alcohol (EVOH), which provides high impermeability. With such films, shelf life of up to 9 months has been achieved.

Regarding equipment used in MAP to monitor and analyze injected gases and packaging, gas analyzers and leak detectors are employed.

In general, the shelf life of cheeses depends on protein content, dry matter, and moisture. For example:

- Hard cheese: 14–21 days in vacuum, 38–70 days under MAP
- Grated cheese: up to 21 days in vacuum, 35 days under MAP
- Soft cheeses like mozzarella and pasta cheese: 8 days in vacuum, up to 21 days under MAP

It is important to note that the storage temperature of packaged cheese should be maintained at 4–6°C.

Pegah Gilan:

Where Packaging Technology Redefines Quality

Following field investigations by the After-Sales Service unit, we visited Pegah Gilan and interviewed Dr. Rashid, the technical manager of the facility—a company that has achieved a remarkable leap in packaging quality and product shelf life using an automatic machine equipped with a UV system.

Pegah Gilan performs packaging of this type of cheese only three days a week, yet in this short period, it prepares an average of 12,000 cheese trays per week using our machine. This production volume is managed by a single operator, demonstrating the ease of operation and high efficiency of the packaging line.

Dr. Rashid explained that with 80% vacuum and nitrogen gas injection, they were able to extend cheese shelf life up to 3 months, whereas without these technologies, the product's shelf life was only a few days. This not only prevented spoilage but also significantly improved the flavor, texture, and color stability of the cheese.

According to him, the new packaging not only increases shelf life but also gives the product a professional and attractive appearance, enhancing consumer satisfaction. He also noted that this packaging model has created a high profit margin for the company, and market reception has been very positive.

"With the machine we purchased from you, both the shelf life of the cheese has increased several times, and the product appearance has become completely different and attractive. Technically, we are fully satisfied with the stitching quality, UV performance, and energy consumption. Even though we produce only three days a week, the machine delivers exactly the efficiency we were expecting."

DamaGostar Industrial Production Group

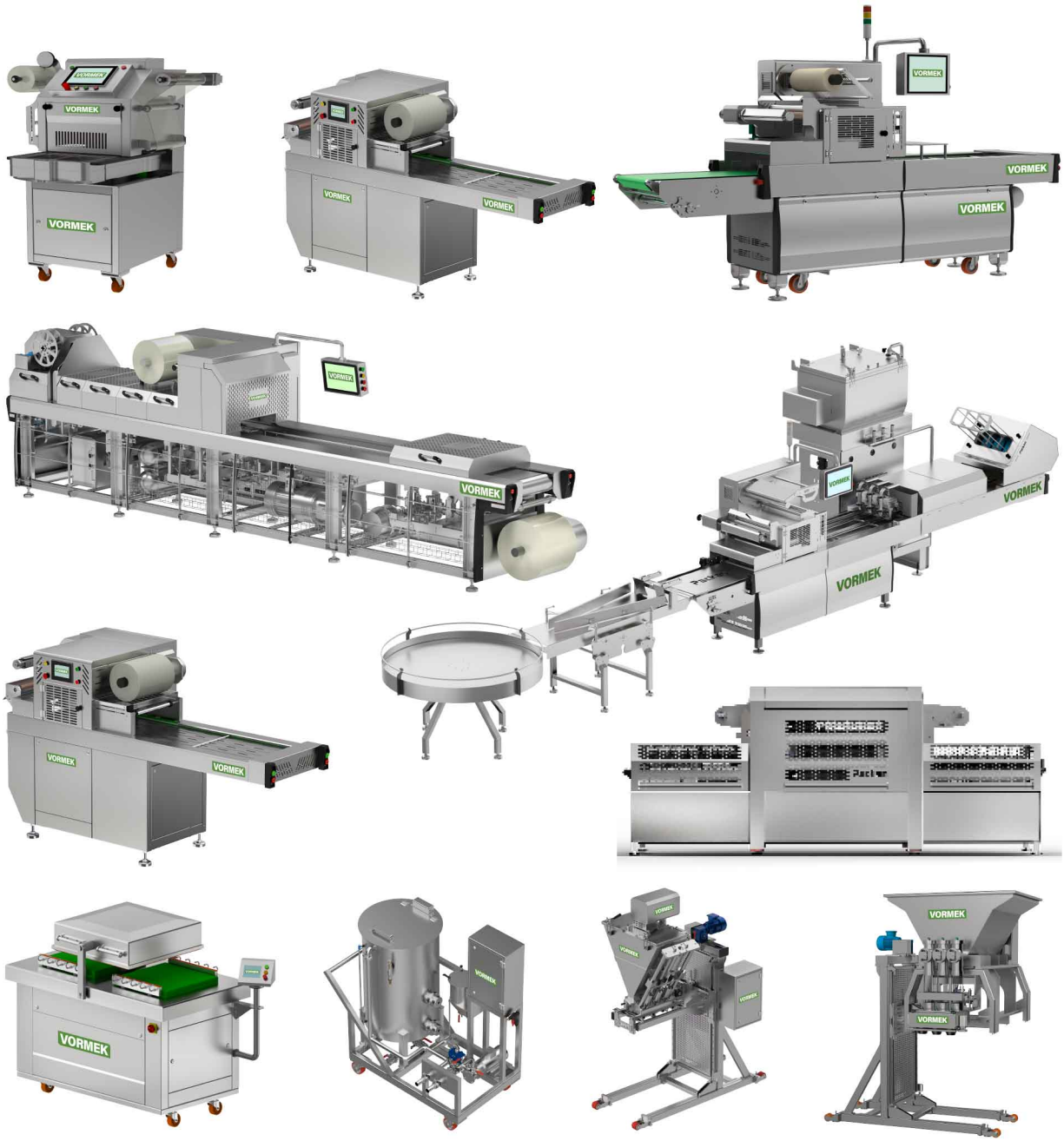
Hello, I am Alireza Mirbabayi, CEO of Damagostar Industrial Production Group. For over 35 years, our specialized team at Damagostar has been designing and manufacturing food industry machinery and continuous production lines. Our products include industrial pasteurizers, stainless steel tanks, reactors, and fermenters, which have wide applications in the beverage and confectionery industries.

At Damagostar, we take pride in our local technical expertise and constantly strive, through close collaboration with associations and food industry specialists, to provide the best solutions for improving and optimizing production processes. We are also pleased that, along this journey, we have been able to collaborate with reputable regional companies, including Vormek, and their positive feedback on our quality and expertise has been a great encouragement for our team.

Our goal is to enhance the quality of domestic machinery and assist producers in achieving the highest quality standards. We firmly believe that our customers' success reflects our own success, and every day we work alongside them with this perspective.

The Importance of Using Tray Sealer, Thermoforming, and Vacuum Chamber Machines in Today's Packaging Industries

- Tray Sealer packaging machines, with easy operation and simple maintenance, make it possible to package a wide variety of food products. In addition to extending shelf life, they give the product a stylish and professional appearance.
- Thermoforming packaging machines, in addition to producing trays, also carry out the filling and packaging process. These machines, in different types such as soft film, hard film, and skin pack, can package food products in a highly professional and attractive way with complete precision.
- Vacuum Chamber machines, by completely removing the air (vacuum) from inside the filled pouches, can ensure freshness, safety, and long-term preservation of food products. Furthermore, the installation of various fillers and dedicated options on these machines makes the packaging process more automated, hygienic, and faster.
- This technological combination elevates packaging standards and, while modernizing the production process, creates trust and a modern image of the producer's brand in the minds of customers.



We warmly invite you, our dear audience, to share your topics of interest with us. Your opinions and suggestions not only help enrich our content but also guide us in providing more practical material to meet your needs.**Would you like to read a report about a specific industry or a special technology in the field of packaging?**

Share your thoughts with us so we can cover them in upcoming editions.