CryoGas International

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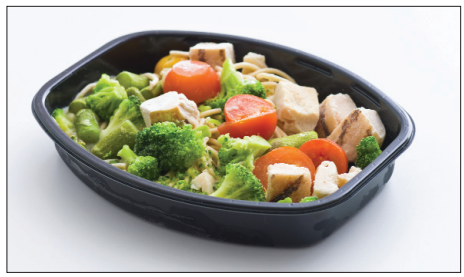
New Trends in Frozen Prepared Foods

A Special Report by Air Products



Some recent research suggests that consumers feel that supermarket prepared meals have evolved to the point where they are of restaurant-quality at better prices.

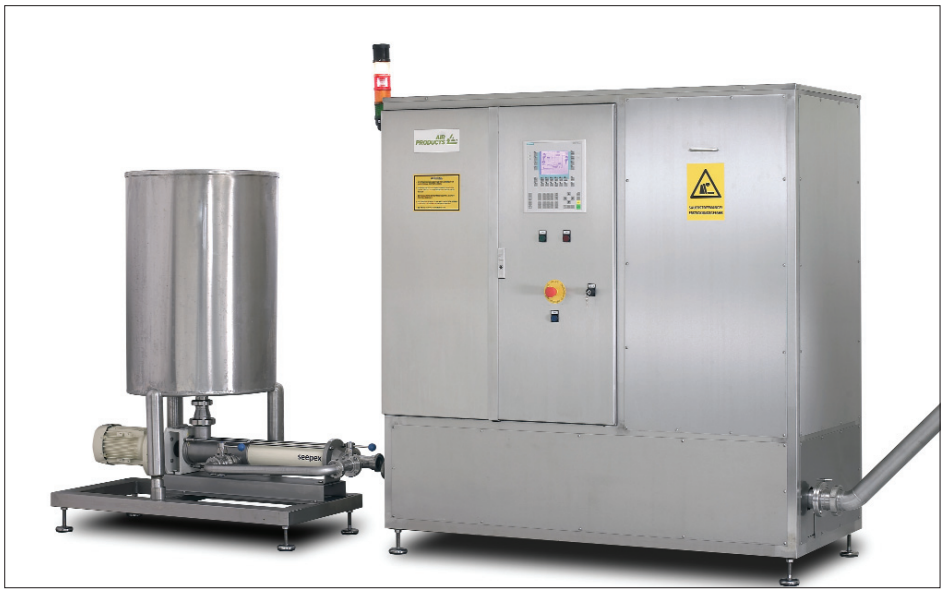
In today's economic climate, many consumers who want the convenience of takeout food or the quality of dining out are turning to their local supermarkets. One way that grocery stores across the nation have begun to compete directly with restaurants is by creating ready-to-heat or ready-to-eat portion-controlled meals for consumers. Some recent research suggests that consumers feel that supermarket prepared meals have evolved to the point where they are of restaurant-quality at better prices. The supermarket prepared meals category grew approximately seven percent in 2011, and continued growth is expected in 2012.

In order to compete with the restaurants, these ready meals must be attractively prepared and of high quality. More and more, consumers are also seeking innovative food choices and flavors. In order to keep up with popular food trends, producers must employ their unique talents coupled with the latest developments in food processing equipment and technology. Beyond unique flavors and high quality, food producers need the capabilities for variety and flexibility.

Like any quality restaurant meal, a big component of the style and flavor of a meal stems from a sauce. With the increased popularity of ready meals, a large variety of new sauces and ready meals are heading to market. To help producers meet this growing demand, Air Products offers the Freshline® continuous sauce chiller.

The continuous sauce chiller is a unique solution that uses the power of liquid nitrogen (LIN) for fast and economic cooling of many types of liquids and semi-liquids. Products such as sauces, gravies, marinades, custards, purees, and mixed meal combinations can be chilled in-process right after a hot cooking station instead of cooling in cooking kettles in a time-consuming batch process. The sauce then moves to the next step, such as mixing or packaging. This can provide significant temperature reduction, cut cycle times, and free the cooking station for the next batch.

For ready meals and other entrée items that are further frozen, precooling of sauces can help debottleneck downstream freezing systems by reducing the heat load to the mechanical freezer, reducing ice buildup, and increasing production throughput.



Air Products' Freshline® continuous sauce chiller

The rising consumer demand for more convenient, healthy, and sophisticated food products has also created a revolution in packaging technologies. Producers continually looking for new ways to add value to their products are turning to modified atmosphere packaging (MAP). MAP has become one of the most effective methods of increasing shelf-life, preserving quality, and improving packaging presentation. In addition, MAP products are protected from outside contamination or tampering due to hermetic sealing, which would reveal any interference.

MAP was historically used to prolong the shelf life of food items such as processed meats. Today, however, MAP is used to package anything from fresh salads and fruits to sandwiches and snacks.

When employing MAP, the gas composition in food packaging is changed by altering levels of oxygen, nitrogen, and carbon dioxide, which inhibits microbial growth, controls reactions of enzymes and bio-chemicals, and reduces moisture loss. The composition of the atmosphere surrounding the food is modified based upon the type of food, which not only extends the shelf life of the food, but results in a more appetizing appearance—appealing to both supplier and consumer.

A range of high purity gases, delivered in both liquid and gaseous form, are primarily used for MAP. Carbon dioxide is used widely in MAP to inhibit the growth of most bacteria and molds. It is used extensively in the packaging of bakery products.

Another important element in MAP is nitrogen, which is used as an inert gas to displace air—particularly oxygen. Aerobic bacteria thrive in an oxygenated environment. In addition, oxygen causes oxidative deterioration, and moisture needs to be

reduced or eliminated to prevent the growth of micro-organisms.

So how can restaurants compete with supermarket prepared meals? They can fight back by taking their brands to the frozen, ready-to-heat section of the supermarket! Developments in food processing equipment and technology can help today's restaurateurs produce ready-to-heat meals that taste as good at home as they do in the restaurant.

The global frozen prepared food industry is experiencing phenomenal growth and is expected to reach sales of $186 billion by 2015, according to a study by Global Industry Analysts, Inc. Some contributors to this rise in consumer demand are an increased interest in ethnic and international foods and a desire for healthier diets. The study points to three major drivers behind this growth: consumer need for convenience, creative product development (especially in microwavable formats), and continuous improvements in commercial refrigeration and freezing technology.

Air Products' Freshline® food grade gases help extend shelf life, improve quality, and minimize waste.

For example, Air Products has developed a range of cooling and freezing solutions that can help restaurateurs prepare their foods for the supermarket shelf, such as the Freshline® QS tunnel freezer. The QS is a continuous, in-process freezer that requires a minimal up-front capital investment and can be quickly and easily integrated into an existing or new production line.

Air Products' QS freezer was designed with simplicity in mind, enabling easy operation by processors who are new to cryogenic food freezing. Warm food enters the freezer at one end, travels via a conveyor through the exceptional cold of a LIN-powered atmosphere, and exits the other end in a perfectly frozen or cooled state. Foods are frozen or cooled in just seconds, ready for completion, packaging, storing, or shipment.

LIN cooling and freezing solutions take up very little space as compared to alternative solutions. More importantly, cryogenic freezing with LIN results in higher-quality food products due to LIN's rapid freezing ability. When a food item is frozen slowly, ice crystals grow, which cut through the food's cell walls. When the foods thaws, the broken cell walls result in mushy, poor-quality food. However, due to the extremely cold temperature of LIN (-320°F), food products are frozen in just minutes instead of hours. This quick freeze enables foods to retain their moisture, texture, and flavor.

Food processing technology like the QS tunnel freezer can help restaurateurs reclaim some of their business lost to supermarkets. The high-efficiency of in-process cooling eliminates the time and handling required to move products from a process area to a cooling area. In addition, food freezing with LIN can help restaurateurs increase the shelf life of their food products while expanding their distribution radius.

As consumer demand for convenient, high quality, easy-to-prepare dishes continues to grow, so does the trend towards coating, mixing, and forming of frozen and chilled products.

Today, an increasing number of high capacity meat grinding, blending, and mincing machines are being used to deliver the growing demand for burgers, nuggets, and other formed products. However, the heat generated by these machines during the mincing process often means that subsequent forming of the meat product can be difficult.

This problem can be addressed by mixing frozen meat with fresh meat, but the results are not always reliable. In addition, the quality of the minced product is considerably reduced because the frozen meat and fresh meat do not necessarily grind with the same consistency.

To address this challenge, Air Products has developed a tailor-made temperature control system for coating, mixing, blending, molding, and forming applications. Freshline® LIN-IS can be used to control the temperature of the meat itself through controlled injection of LIN into the product during mincing, grinding, or blending. The nitrogen injection is regulated, providing the cold that is required at all times and adjusting the gas consumption to the requirements of the process.

LIN-IS improves the quality of the meat product as the fat is not melted and the cuts are regular and even, ensuring repeatable and consistent product for forming. In addition, by displacing the atmospheric oxygen with nitrogen, bacteria are inhibited and the appearance of the meat is improved by avoiding the formation of metamyoglobin. This solution is also suitable for soups, sauces, mixed vegetables, fish, chicken, and many other products.

Regardless of economic conditions, consumers still need to eat. So when frequenting restaurants must be curtailed, consumers will turn to their local grocery stores. In addition to looking for restaurant-quality food at supermarket prices, consumers desire healthier choices and more variety, including ethnic and international foods. Air Products has the solutions to help food producers get their high-quality products to market as efficiently and economically as possible. ■

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