**Microwave Assisted Thermal Sterilization (MATS)**

***Clean label, Clean food***

Microwave Assisted Thermal Sterilization (MATS™) is a healthier way to produce safe, convenient and nutritious packaged food. MATS is the first and only microwave sterilization technique accepted by the U.S. Food and Drug Administration (FDA).

**How It Works**

In the MATS system, packaged foods are simultaneously heated to 120°C through a pressurized hot water bath and microwave energy at 915 MHz, held for sterilization and then rapidly cooled. The patented technology uses a single-mode 915 MHz microwave system, which produces precise and predictable heating patterns and deeper microwave penetration depth of the food product.

MATS-processed foods:

* More nutritious
* Additive-free
* Greater variety
* Freshly prepared texture and taste
* More natural

Applying microwave energy while packaged foods are in the pressurized hot water bath eliminates edge-heating issues and maximizes food quality. Because food reaches sterilization temperature very rapidly, the MATS process reduces the thermal exposure of the product by approximately 80 percent, eliminating the heat damage that occurs during the long process times of legacy sterilization methods.

MATS-processed foods are shelf stable from 12 months to three years.

**Preserve What Matters Most**

The MATS process preserves the natural flavor, texture and nutrients in food — and eliminates the need for unnatural additives and excess sodium. As a result, MATS technology produces what consumers and health experts are demanding today: high quality, inherently nutritious, clean label foods.

MATS-processed foods are inherently more nutritious. As a result of the significant reduction in processing time, a higher percentage of heat sensitive micronutrients remain intact during microwave sterilization as compared to foods sterilized with retort. A recent study demonstrated that a MATS salmon dish retains up to 5.3 mg of heart healthy Omega 3s, whereas today’s retort-processed product would retain a negligible 0.3 mg.

**Sensory Panel and Consumer Test Results**

* The quality of the MATS-processed products was statistically indistinguishable from the freshly prepared products.
* MATS products were substantially and significantly better than retort products and were on par with refrigerated and frozen products.

**Great Taste and Texture**

MATS-processed foods also retain their natural taste, texture and flavors, eliminating the need for enhancers. Spices, like micronutrients, do not thermally degrade during the MATS process, which allows spicy cuisines and other highly flavorful meals to be sterilized *and* maintain their freshly prepared flavor profiles and qualities.

**Less Salt**

MATS food recipes start with 50 percent less sodium and still taste much better than their traditional retort counterparts because they maintain many of their freshly prepared product characteristics. By eliminating the need for excess sodium, the MATS technology offers food companies a way to meet. Sodium intake in the United States is approximately 3,400 mg/day, nearly 50 percent more than what is recommended by experts. The new voluntary [sodium reduction guidelines](http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm503874.htm) issued by the U.S. Food and Drug Administration (USDA) in June 2016 offer voluntary targets for the food industry intended to help Americans gradually reduce sodium intake to 2,300 mg per day.

**Greater Variety**

As a result of the unique MATS process, a variety of foods that have never been successfully sterilized are now possibilities for packaged foods.

**“MATS processing results in product quality that is better than any other sterilization technology every developed. MATS-processed soups taste like home-cooked, or what you would get at a white linen tablecloth restaurant.”**

***–John Kowalchik, CEO, Wornick Foods***

Heat-sensitive foods, such as eggs and other dairy ingredients, seafood and pastas, can all be processed with MATS. Microwave sterilization opens the door to a whole new world of healthful, nutritious packaged foods, many of which are naturally rich in nutrients and high in protein, healthy fats and fiber. Culinary experts working with MATS systems are developing recipes for ancient grains, quinoa, pasta and rice dishes, healthy soups, baby and toddler foods, salsas and cheese sauces, omelets and frittatas and gourmet ready-to-eat meals.

By producing a superior quality product — as close as possible to fresh — the MATS technology offers food companies the opportunity to meet consumer demand for safe, great tasting, convenient, inherently nutritious and additive-free packaged foods.

**MATS Systems**

The 915 Labs product line includes the pilot-scale MATS-B for recipe and food product development and commercial-scale systems with a range of processing speeds from 15 to 250 packages for minute.

In addition to innovative MATS processing systems, 915 Labs offers a suite of wraparound services to help customers accelerate the application of MATS, including product development and testing, thermal process validation and the Packaging Solutions Program.

**MATS and MAPS-Friendly Foods**

**What’s the difference between MATS and MAPS?**

Microwave pasteurization is similar to microwave sterilization, but operates at the lower temperatures and shorter heating times required for pasteurization. MATS-processed foods are shelf-stable for 1-3 years, while microwave pasteurized products may be kept, refrigerated, for up to 12 weeks. Pasteurization can be performed on MATS systems, but only pasteurization can be performed on MAPS systems

Any food or beverage that will benefit from a lower cooking temperature and processing time is ideal for MATS and/or processing. This includes foods that have been traditionally sterilized through thermal processes such as retort, as well as foods that have never been successfully retorted — including heat-sensitive foods like eggs, meat, seafood, and dairy. When these types of ingredients are retorted, they develop unpleasant aromas, flavors and textures.

Pasta and sauces, especially dairy-based sauces, and complex pasta dishes such as lasagna and spicy Indian dishes also do well in MATS processing. In retort, Indian dishes lose their character and the spices become muted. With microwave sterilization, the spice flavors of traditional Indian dishes stay intact.

MAPS and MATS will allow professional chefs and restaurant brands to bring their food experience to retail without compromising taste and texture. Microwave sterilization and pasteurization will be terrific enablers for food service organizations that want to touch more consumers and grow their presence in retail and emerging supply chains like direct-to-consumer meals.

Foods ideal for microwave processing include:

* **Pasta and sauces**
* **Soups**
* **Rice and Grains**
* **Meats and seafood**
* **Vegetables**
* **Complex Meals.**