

Safe steam decontamination

Spices & herbs, seeds and nuts



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1. Introduction

Spices, herbs, seeds and nuts and dehydrated vegetable substances bring a world of flavours, aromas and colours to food.

The potential for pathogens like salmonella, yeasts, moulds, enterobacteraceae and sporeformers to get into the food supply has resulted in the trend towards more stringent Good Agricultural Practices and regulations. Spices, herbs are sourced worldwide and they may be heavily contaminated from the soil where they were grown and harvested. These microbes often remain after local processing due to simple treatments and processing at low temperatures. If left untreated, these products may encounter continued microbial growth that can easily lead to spoilage and consumer health issues.

There are many commonly used methods to decontaminate natural products, such as ethylene oxide and irradiation but most have been or will soon be restricted due to their potential health risks and adverse consumer acceptance.



Ventilex steam sterilization benefits:

- a natural, renewable process that utilizes steam and is accepted worldwide as safe and wholesome.
- Continuous decontamination of bacteria and pathogens – 5 log kills are typical.
- high-temperature, short-time processing (htst) which protects the taste, texture, and color of the product and a minimal loss of volatile oil.
- Very gentle for leavy products.



2. Ventilex safe continuous steam sterilization: Natural elimination of bacteria

The use of steam is ideal as it is natural, inexpensive and can be produced in an unlimited supply. It is a natural 'organic' process that does not leave behind any chemical residue or create toxins. Steam pasteurization / sterilization systems are the most effective 'natural' method for reducing or eliminating bacteria, pathogens, and other food-borne causes of sickness.

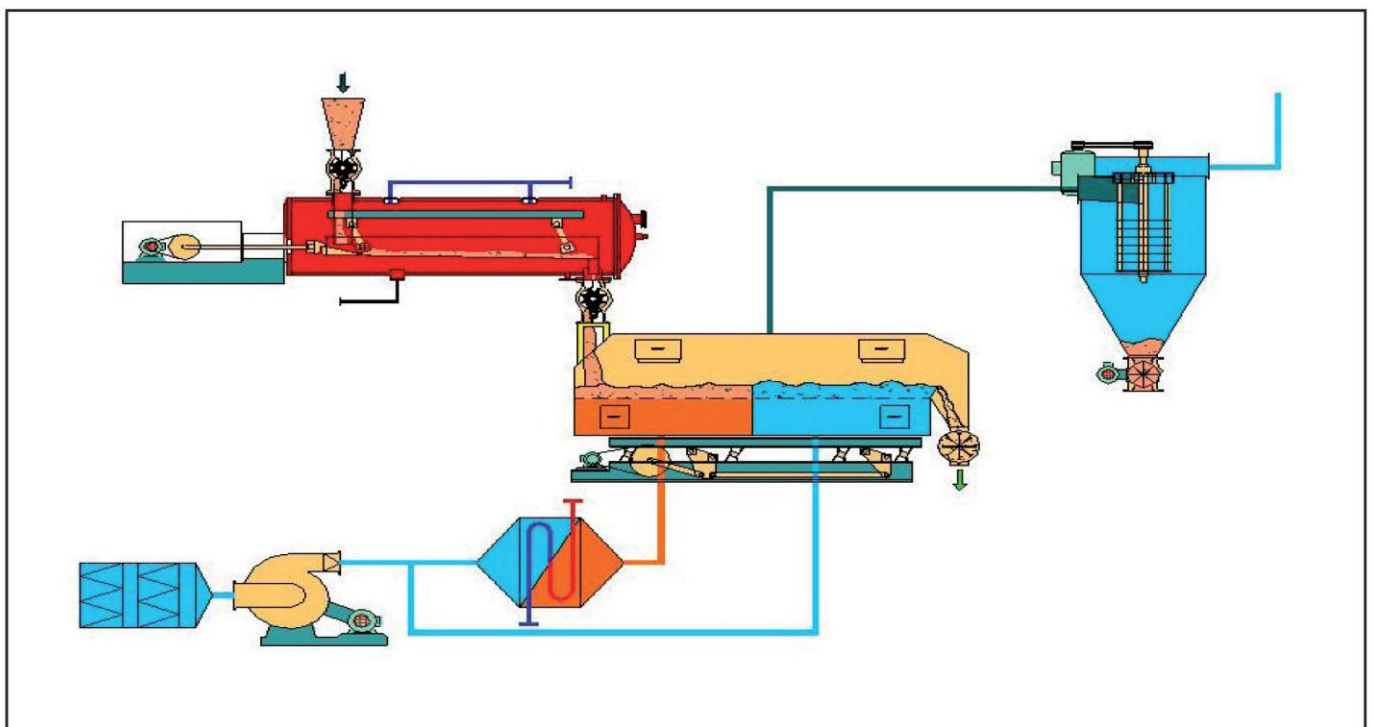
Effective steam treatment will eliminate listeria, salmonella, E. Coli, and a variety of other bacteria and pathogens. As a result, many of the world's largest spice, herb and nut processing companies have selected Ventilex continuous steam sterilizers/pasteurizers. More than 100 systems have been supplied worldwide

Modern, hygienic and chemical free steam treatment process

With the Ventilex system, you get a continuous 'inflow' of high pressure steam that results in the elimination of undesired microorganisms while causing the minimum harm to the organoleptic characteristics (flavor, color, texture or taste) of spices, herbs and

nuts. Our system can be used to process chili powders, whole and ground pepper, paprika, garlic, cloves etc., and a variety of herbs, seeds, and other spices. We can do leafy spices without harm to the leaf due to our gentle shaking action – there is no screw conveyor that can damage the product. The continuous system treats powders as well as whole spices, which is a unique feature of the Ventilex system. In addition, steam treatment is effective in the deactivation of enzymes, e.g. amylase and lipase. This cannot be done with irradiation or ethylene oxide treatment. These enzymes have been shown to cause a breakdown of fat and starch components in sauces, salads and many ready-made meals. The heart of the nut is left natural and alive - it will still germinate. This makes it possible for the 'organic' food label to be applied and for certain products to be labeled as 'pasteurized'.

FLOWSHEET VENTILEX STERILIZATION SYSTEM.



3. Steam sterilizer or steam pasteurizer



CONTINUOUS HIGH PRESSURE STERILIZER/AUTOClave.

We offer two different technologies of decontamination systems commonly referred to as 'steam sterilizers' and 'steam pasteurizers'.

Customized systems

The main difference is that 'sterilizers' do their work in closed pressure vessels (autoclave) at up to 3 bar (45 psi) and 'pasteurizers' work at atmospheric pressure with superheated steam. The selection of the appropriate technology depends on the size of the product itself and the type of pathogens to be eliminated. We offer some standard sizes of sterilizers and

pasteurizers to span the range of commonly specified capacities but each system is customized to meet the client's specific requirements.

Meeting the client's specifications

We typically work with a 'Process Authority' or the client's microbiologist who performs the microbiological testing and sets the process parameters to be validated for regulatory compliance. Our role is to supply equipment meeting these specifications. However, we offer a testing service to process samples inoculated with surrogate pathogens for process parameter development.

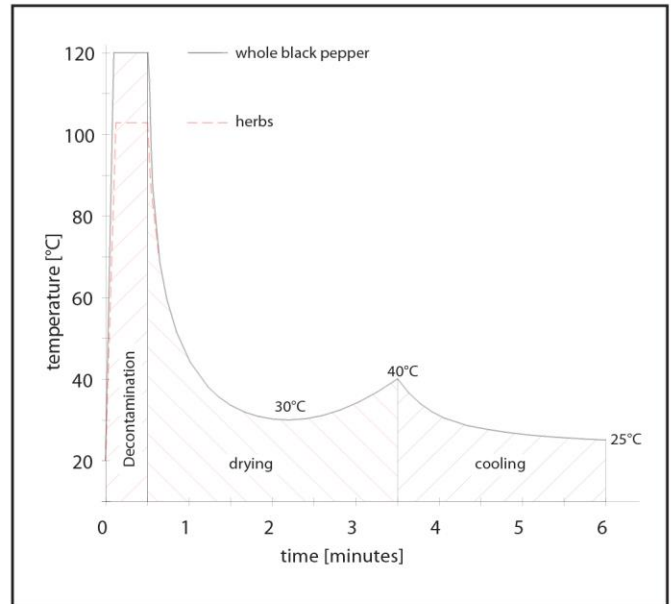
4. How does Ventilex steam decontamination work?

Ventilex continuous steam sterilization/pasteurization systems are designed for high-temperature, short-time (HTST) decontamination. Steam is the fastest possible way of heating product to an exact preset temperature.

The HTST process exposes materials that are considered contaminated to high temperature steam for just a short time. The material is then dried and cooled. This is a simple idea, but is one of the most practical and effective methods for treating products in this industry.



STEAM PASTEURIZER FOR NUTS.



PRODUCT TIME / TEMPERATURE CURVE.

Steam-pressurized chamber

The process works by feeding and discharging the product through a self-cleaning pressure rotary valve that isolates an autoclave from the ambient room. Inside this autoclave, a shaking table transports product through a steam-pressurized chamber at a specific speed





and creates a thin layer of product. Condensation builds on the product surface and this imparts high energy into the surface of the product. This kills unwanted bacteria and pathogens.

Tightly controlled

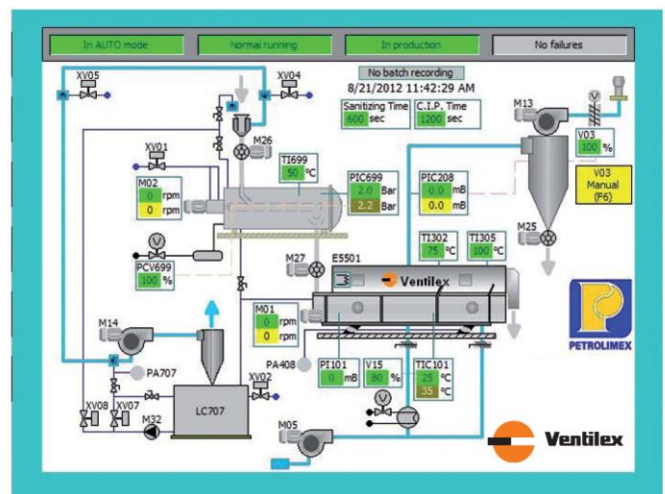
The time, pressure and steam temperature within the chamber is tightly controlled – just the minimum that is required to achieve the desired kill is what is applied. Afterwards in the dryer the temperature is tightly controlled so that the product is returned to a precise moisture level. In this way, the final moisture content can be specified and controlled to maximize yield.

Specific parameters

We understand how critical temperature, treatment time, and pressure are when decontaminating a product. All three of these parameters can be set for individual products and each pathogen to be eliminated. Repeatability is required to validate a system and ensure effective decontamination, so our systems are designed with advanced PLC controls to provide this. The operators simply choose the right recipe from a menu and all process parameters are controlled and measured for traceability.

DATA LOGGING AND PLC INSTRUMENTATION.

	Choose	Menu	
1		Pepper	✓
2		Turmeric	
3		Chili	
4		Ginger	
5		Blend A	





Ventilex sterilization / pasteurization system features:

- Minimal operator intervention – automated controls; operator only needs to select the right recipe, setpoints are always the same.
- Data logging and PLC instrumentation, which makes processes repeatable and verifiable. Stores all critical data permanently.
- Automatic sanitary Clean-in-Place (CIP) design – fastest system to clean on the market today.
- Recipe based (for processing multiple products) – validated process.
- Hygienic design, high quality finish.
- Product is decontaminated, dried and cooled.
- Shortest duration of steam of any commercial system in use today – product still 'natural'.
- Low energy consumption and low maintenance costs.
- 5 log kills are typical.
- Deactivation of enzymes.
- Minimal loss of flavor, color and volatile oil.

Available sizes:

- Sterilizer: 0.9 / 2.5 / 4.5 m³ / hr.
- Pasteurizer: 0,5 / 1,0 / 2,0 / 5,0 T/hr.

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