

# Autoclave: Moist heat sterilization



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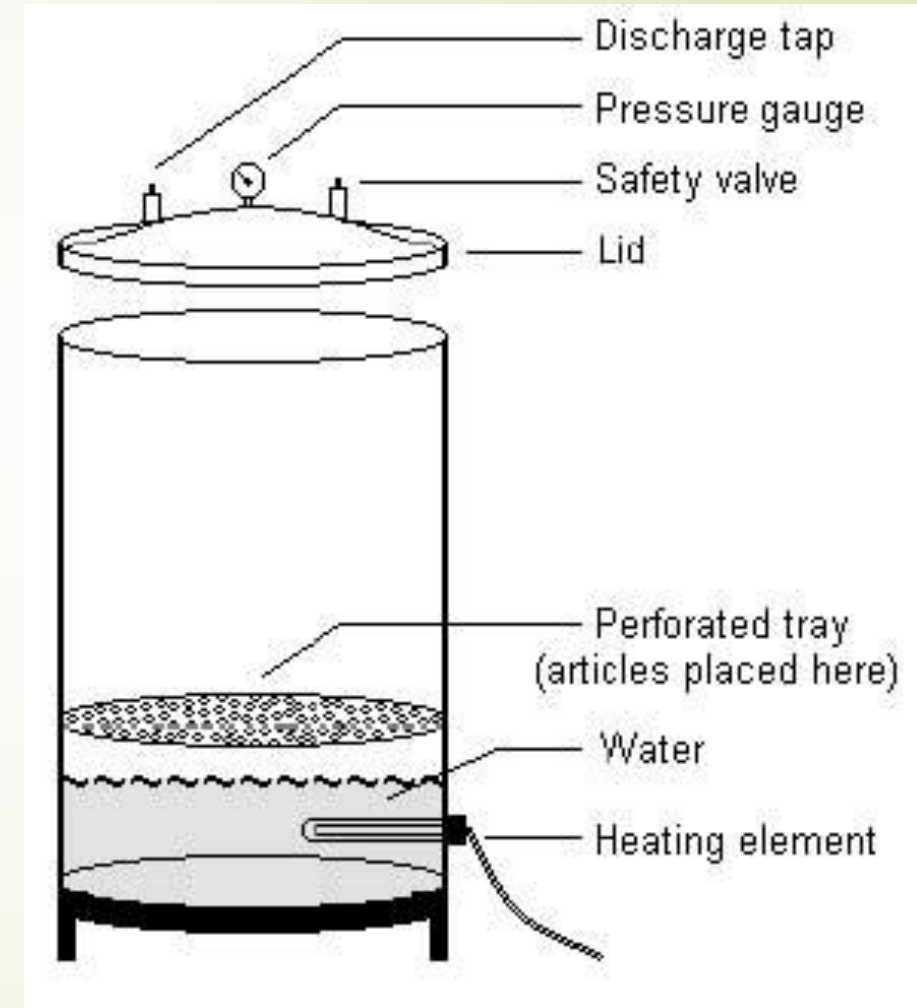
# Introduction

- **Sterilization:** process of eliminating all forms of life including biological agents like bacteria, fungi, viruses, spores etc. present in inanimate objects.

Various means include heat, gas, chemicals, irradiation.

- **Autoclave - moist heat sterilization**

- Use of steam heated under pressure to achieve sterility.
- Invented in 1880s by Pasteur's collaborator Charles Chamberland.



Autoclave



# Working Principle

- Water is boiled under pressure and the steam is enclosed within the chamber.
- Pressure serves as a means to obtain the high temperatures necessary to quickly kill microorganisms.
- The steam circulates around objects placed inside and penetrates them.
- Moist heat coagulates cell proteins of the microorganisms and thus kills all the living entities.
- The recommendations for sterilization are **15 to 20 minutes, 121°C at 100-200 kPa.**

## Alternative conditions:

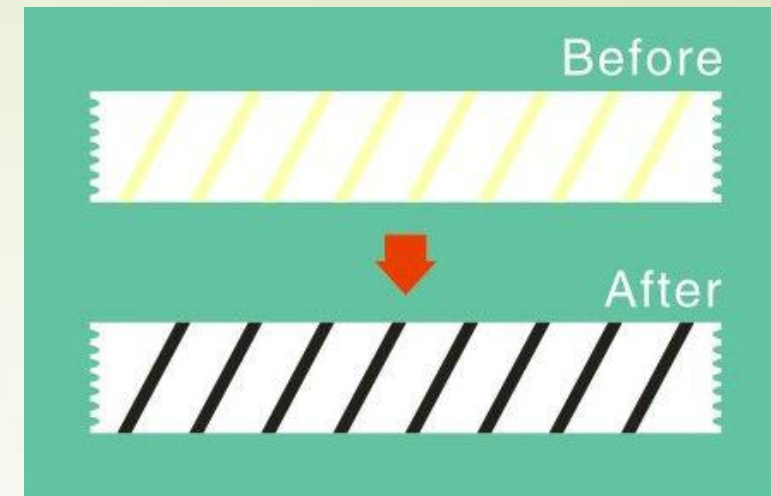
Temperature (°C)	Pressure (kPa)	Min sterilization time (min)
126-129	250	10
134-138	300	5

### What can be Autoclaved?

- Glassware
- Plastic tubes and pipette tips
- Culture and stocks of infectious material
- Discarded Live and attenuated vaccine
- Media and solutions
- Waste

# Performance indicators

- Indicators can be used to ensure an autoclave reached the correct temperature and pressure for the correct amount of time.
- Chemical: heat sensitive autoclave tape which change colour once the correct temperature conditions have been met. Not an indicator of successful sterilization
- Biological: These contain spores of a heat resistant bacterium. If the autoclave did not reach the right temperature, the spores will germinate, and their metabolism will cause change in pH resulting in change in colour.



Chemical Indicator



Biological Indicator



## Other uses:

- medicine
- veterinary medicine
- dentistry
- prosthetics fabrication

## References

- CDC: Guideline for Disinfection and Sterilization in Healthcare Facilities
- <https://microbeonline.com/moist-heat-sterilization>
- Wikipedia
- <https://ehs.princeton.edu/book/export/html>
- <http://www.explainthatstuff.com/autoclaves.html>

Thank you