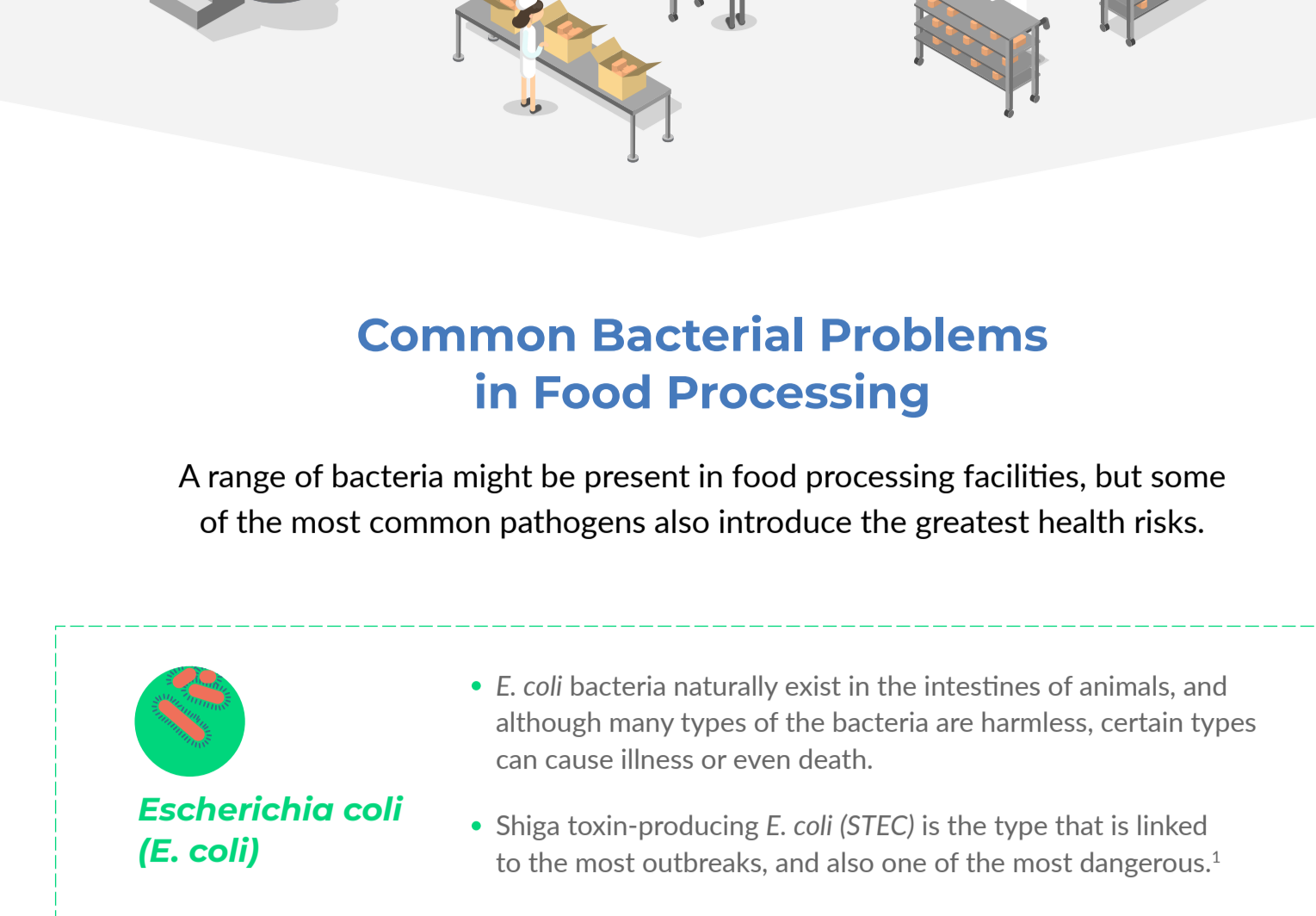


How D7 Works

Do You Understand the Costs of Contamination?

Preventing bacterial contamination in a food processing environment is serious business.

When a food processing company fails to take the necessary measures to prevent contamination, it could lead to long-term financial consequences. Implementing methodical sanitation protocols and using products that are both effective and easy to apply will help reduce the risk of contamination.



Common Bacterial Problems in Food Processing

A range of bacteria might be present in food processing facilities, but some of the most common pathogens also introduce the greatest health risks.



Escherichia coli (E. coli)

- E. coli bacteria naturally exist in the intestines of animals, and although many types of the bacteria are harmless, certain types can cause illness or even death.

- Shiga toxin-producing E. coli (STEC) is the type that is linked to the most outbreaks, and also one of the most dangerous.¹

The CDC estimates that each year, STEC strains of E. coli cause:²

More than **265,000** illnesses

More than **3,600** hospitalizations

30 deaths

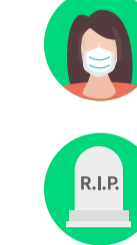
STEC E. coli outbreaks in the U.S. have been linked to foods such as:³

Romaine lettuce

Leafy greens

Soy nut butter

Sprouts



Salmonella enterica

- Salmonella enterica are rod-shaped, Gram-negative bacteria that can cause an illness called salmonellosis.

The CDC estimates that each year in the United States, Salmonella enterica causes:⁴

1.2 Million illnesses

23,000 hospitalizations

450 deaths

Salmonella enterica outbreaks have been linked to fresh produce and a range of food processing facilities, including those that produce:⁵

Nut butters and tahini

Ready-to-eat pasta salad

Frozen seafood

Cereal

Eggs

Meat and poultry products



Listeria monocytogenes (L. monocytogenes)

- This bacteria thrives in moist environments, such as soil, water, animals, and decomposing vegetation.

- Because it can also survive in harsh environments, such as refrigerators, freezers, and food preservation chemicals, L. monocytogenes is particularly challenging to address in a food processing environment.

L. monocytogenes causes an infection called listeriosis, which is estimated to annually cause:⁶

1,600 illnesses

260 deaths

The FDA has discovered L. monocytogenes outbreaks linked to:⁷

Soft cheeses

Frozen vegetables

Leafy greens

Ice cream

Sprouts

Biofilms

Biofilms form when groups of bacteria adhere to surfaces and become surrounded by a matrix of extracellular polymeric substances (EPS).

This creates a film that is invisible to the naked eye.

The biofilm serves to protect the bacteria within it, including from chemical disinfectants.

The presence of a biofilm makes it more difficult to remove the bacteria enclosed in it and provides an environment for them to grow and thrive.

Removing a biofilm often requires mechanical action, which can be very difficult in large plants because of the manpower required to scrub every surface.

Biofilms also thrive in hard-to-reach areas, small crevices, and drain systems because they are often neglected during the scrubbing process.

When a biofilm comes into contact with food, it can cause an unwanted outbreak, which is why it is so important to prevent and remove them.

Costs of Contamination and Food Recalls

When bacterial contamination is discovered and a recall is required, it can be quite costly for the individuals affected, the healthcare system, the economy, and companies involved.

The Cost to Consumers

The USDA Research Service estimated that the annual economic burden to the public is \$15.5 billion.⁸

This includes the costs associated with:

Physician office visits

Emergency room visits

Outpatient clinic visits

Hospitalizations

Premature death

Productivity loss

- However, these are not the only costs that contribute to the overall economic burden—one estimate puts the total at about **ten times** the direct costs associated with healthcare.

- The Pew Charitable Trusts and the Produce Safety Project at Georgetown University published a report that estimates the annual economic impact of foodborne illness in the United States to be around **\$152 billion**.⁹

- Of this total, **\$39 billion** is attributed to fresh, canned, and processed produce.

This study includes the costs associated with:

Medical costs
hospitalization, physician visits, and medications

Reduced quality of life
pain, suffering, functional disability, and death

The Cost to Food Processing Facilities

Foodborne illness also has a major economic impact on food processors. One report commissioned by the Food Marketing Institute and the Grocery Manufacturers Association indicates that for food processors, the average direct costs related to a food recall total \$10 million, not including the costs to grocery stores.¹⁰

Direct costs could include expenses for:¹¹

Assembling a crisis team

Removing products from the market

Investigating the cause of the outbreak

Managing public relations

These are not the only financial consequences of an outbreak. Indirect costs could also include expenses related to:¹¹

Reduced efficiency and production in the facility

Lost business

Litigation

Fines

Corrective actions

Time spent working with regulatory officials

Decrease in stock value

The Cost to Food Brands

Although the short-term effects of a food recall can be costly, the lasting brand damage can have a significant long-term impact on a company's reputation.

Even after making major changes, it can be difficult for a brand to regain consumer trust.

A Harris Interactive poll found that after a food recall:¹³

55% of consumers would temporarily switch to another brand

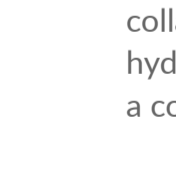
15% would never purchase the brand again

21% would avoid using any other product made by the manufacturer

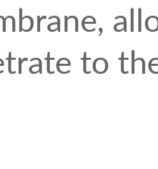
History of D7



D7 was originally created by Sandia National Laboratories for other applications, but it was clear that the chemistry had potential in the food and biosecurity industry.



The decontaminating foam technology was further developed specifically for food processing environments.



Decon7 licensed the technology for commercialization, and now D7 is a patented, EPA-registered sanitizer and disinfectant for live production and food processing applications.

D7 in Food Safety and Biosecurity

How the Product Works

- D7 kills bacteria and biofilm using a multi-part aqueous solution that includes both hydrogen peroxide and an advanced four-chain quaternary ammonia formulation.

- It destroys bacteria by chemically cleaving the spore wall, then neutralizing the mycotoxin inside.

- It also changes the osmotic pressure around the cell, which causes an imbalance in the internal cellular pressure. This all results in the total collapse of the cellular membrane, allowing the hydrogen peroxide to penetrate to the interior for a complete kill.

- The detergents in the formulation enable the chemical disinfectants to penetrate into grease, grime, and biofilms.

- This means that no mechanical action is required to remove biofilms.

- When applied as a foam, it adheres to both vertical surfaces and ceilings to ensure that the product stays on for the minimum recommended contact time.

- The detergent in the formulation lowers the surface tension of the liquid, which allows it to break into droplets for easier access to difficult-to-reach areas.

- A potable water rinse is required after application on food contact surfaces.

How D7 is Applied

D7 can be applied as a:

Foam

Spray

Fog

Characteristics of D7

Effective in extreme temperature ranges

Non-corrosive

Water-soluble

Colorfast

Contains no VOCs

Rapidly deployable

Final pH of 9.8

Contains no abrasives

Live Production Applications

Hatchers

Egg processing plants

Barn cleaning, disinfection, deodorization, and chemical neutralization

Feed delivery trucks, feeder bowls, and water feed lines

Transportation terminals, truck wash, and disinfection

Food Processing Applications

Daytime and nighttime sanitation

Slaughter, evisceration, and further processing

Ready-to-eat food processing facilities

Refrigeration units

Foot baths

Entryway foaming

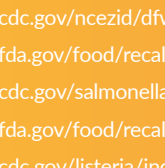
Drain covers and pans

Harborage areas: cracks, holes, hollow tubing, etc.

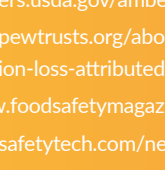
Decon7: Your Trusted Sanitation Partner



Decon7 offers more than just an effective, easy-to-apply sanitizer.



When you decide to try D7, our expert team of professionals provides a free site visit to evaluate your sanitation needs and provide recommendations for both product use and modifications to your protocols.



Using D7 on a daily basis can also help facilities save money by keeping bacteria at safe levels, eliminating persistent biofilms, and reducing contamination events.



We're always here when you need us, whether it's in response to an outbreak or to help develop preventive measures in your facility.

D7 | FOOD & BIOSECURITY

Schedule a consultation to learn more about how incorporating D7 into daily sanitation protocols can help reduce the risk of bacterial contamination.

Schedule a consultation

Sources

- https://www.cdc.gov/features/ecoliinfection/index.html
- https://www.cdc.gov/ncezid/difwd/PDFs/national-stec-surveillance-overview-508c.pdf
- https://www.fda.gov/food/recalls-outbreaks-emergencies/outbreaks-foodborne-illness
- https://www.fda.gov/food/recalls-outbreaks-emergencies/outbreaks-foodborne-illness
- https://www.fda.gov/food/recalls-outbreaks-emergencies/outbreaks-foodborne-illness
- https://www.fda.gov/food/recalls-outbreaks-emergencies/outbreaks-foodborne-illness
- https://www.fda.gov/food/recalls-outbreaks-emergencies/outbreaks-foodborne-illness
- https://www.ars.usda.gov/amberwaves/2015/september/quantifying-the-impacts-of-foodborne-illnesses/
- https://www.pewtrusts.org/about/newsroom/press-releases-and-statements/2010/03/03/foodborne-illness-costs-nation-\$152-billion-annually-nearly-\$39-billion-loss-attributed-to-produce
- https://www.foodsafetyinsights.com/signature-series/recall-the-food-industrys-biggest-threat-to-profitability/
- https://foodsafetytech.com/news_article/trends-real-cost-product-recalls/
- https://www.foodengineeringmag.com/articles/90492-top-five-ways-to-get-your-plant-sanitation-firma-ready
- https://theharrispoll.com/wp-content/uploads/2017/12/Harris-Interactive-Poll-Research-Crisis-Food-Recalls-2007-06.pdf