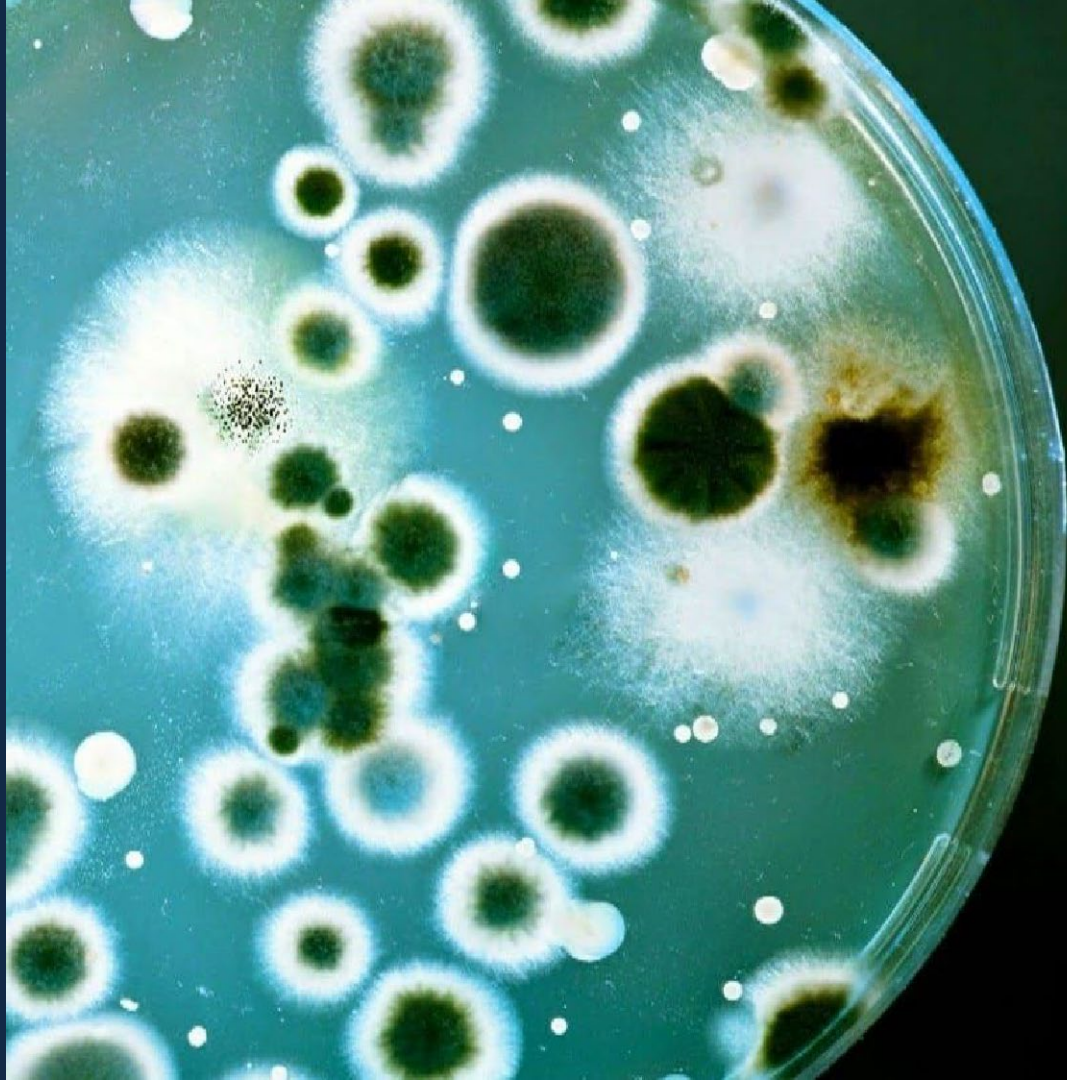


Do you know how air affects
food quality and safety, as
well as health of workers?



Potok air decontamination
technology



Food processing industry issues: mold fungi, yeast, bacteria, and viruses



Up to 10–20 % of product is lost during production and sale, including due to contamination with pathogenic microflora.

Conventional methods for controlling microbial growth:

01

Low temperature in workshops

(increases electricity costs, increased stress for the health of employees).

02

Preservatives

(fail to meet the market's demand, require changes of production processes).

03

Hygiene and sanitation practices

(hard to control, ineffective if packages are stored in the processing workshops)

04

Packaging

(significant investments fall short of expectations if air is contaminated).

Ozone, UV and similar technologies cannot decontaminate air quickly and effectively:

01 **Ozonation** must be done in empty workshops, that is why it produces a one-time effect. 80% of contaminations present in air are produced by personnel and packaging, which means that it is essential to decontaminate air also in the presence of people.

02 **UV** is ineffective in low-temperature workshops. The quantity of UV recirculators depends on the type of microorganisms for inactivation and is calculated using the following formula:

$$No \text{ (pcs)} = H_v * V / (DEC * S * BRP * t * 3600)$$

this formula calculates the quantity of 1000 m³/h UV recirculators with a bactericidal radiation power of 320 W, required for a 1000 m³/h workshop to kill bacteria contained in the air in contact with the product:

1 pc.: to kill E. coli,

2 pcs.: to kill Salmonella,

42 pcs.: to kill mold.

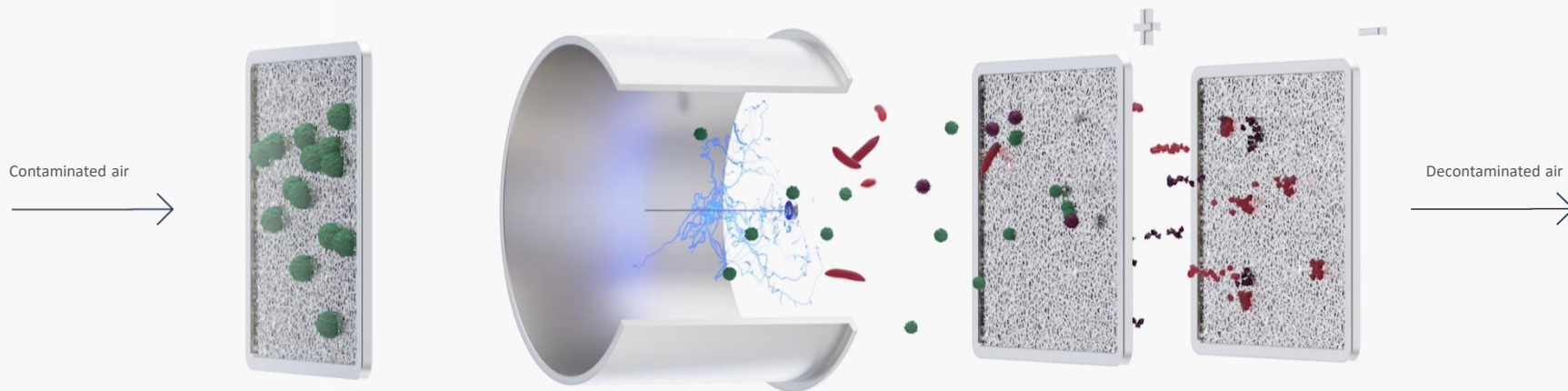
Where H_v is the dose (exposure) for a microorganism at a given bactericidal efficiency (BE, J/m³), V is the room volume (m³), DEC is the decontamination efficiency coefficient (0.4 for closed recirculators), TBRP is the total bactericidal radiation power of lamps (W), t is the irradiation time (1 h).

Innovative solution

Potok technology reduces all types of microbial air contamination in workshops effectively, at all temperatures, and in the presence of staff



Potok: a unique patented air decontamination technology,
kills all types of microorganisms (including bacteria, mold, yeast, and coronaviruses)



The technology is based on the physical method of microbial inactivation (viability control). No HEPA filters, ozone, ultraviolet light, or other hazardous substances are used to decontaminate the air.

The air is decontaminated by exposing microbial cells and secondary/tertiary structures of virus proteins to constant electric fields of critical strength. The air flow passes through constant electric fields created by transversely spaced air-permeable electrodes made of highly porous electrically conductive foamed metal plates. The electrodes are connected to a high voltage power supply so as to have alternating polarity.

Major advantages of Potok technology



**Decontamination (inactivation)
efficiency**
NLT 99.99 %*

Non-selectivity
kills all types of bacteria, mold fungi,
and viruses (including coronaviruses)**

Safety
round-the-clock operation in rooms
with personnel without interrupting
the production processes

**Continuous automatic monitoring of
decontamination (inactivation)
efficiency**

Durability
equipment service life: up to
10 years

Energy efficiency
equipment consumes 10 W
per 1,000 m³/h

Environmental friendliness
no chemicals are used for
air decontamination

**No consumables, hence no
need for regular maintenance**

Food processors declare:

“We monitor the air, it is clean!”

But!

Most of the food processing companies is doing it in an outdated way.

In particular, the “sedimentation” or passive air sampling is not sufficient to control air contamination.



Results of Potok air decontamination

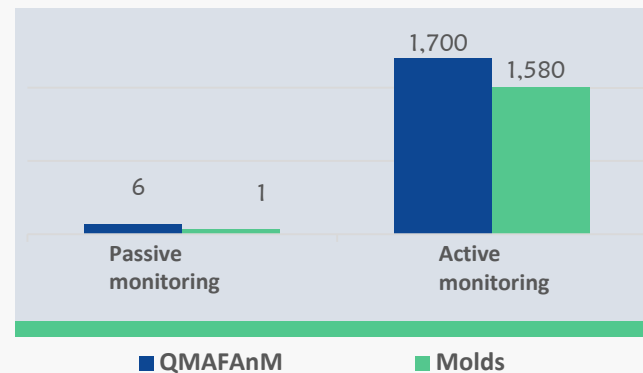


01

Different approaches to air sampling

Passive monitoring (CFU/dish) allows detecting only presence or absence of certain types of microorganisms in the air.

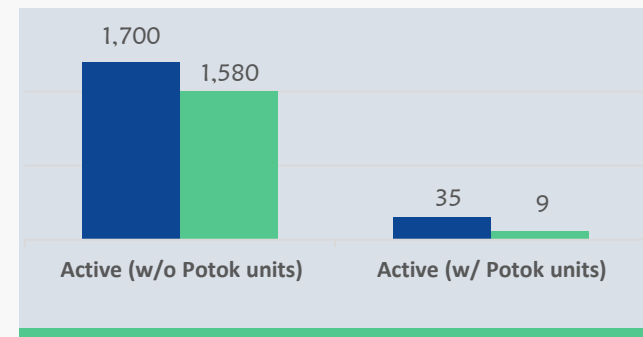
Active monitoring (CFU/m³) allows identifying the degree of contamination of air in contact with the product (permanent colony count for 1 m³ of production space).



02

Potok units decontaminate air nonselectively

The concentration of mold fungi and yeast, bacteria, and viruses in the air in contact with the open product is reduced. Measurements taken using the active monitoring when the unit was operating show that no more than 200 colonies of microorganisms are retained in 1 m³ of air in food production shops (air contamination level suitable for surgeries).



Potok has been tested and recognized as an effective measure by leading scientific institutes



Scientific Research Institute for Poultry Processing Industry

- It has been shown that air contaminated with microorganisms can act as a source of microbial contamination of poultry carcasses, which in turn affects quality of finished products and reduces shelf life of poultry products.
- The total viable count (QMAFAnM and mold count) decreased by 2–10 times after 1 hour of operation.
- Potok air decontamination unit is recommended for permanent use in poultry and egg processing facilities.

East Bavarian Technical University of applied sciences Amberg-Weiden (Germany)

Studies have shown that Potok air decontamination system reduces bacterial contamination of the air in an operating room to 5 CFU/mi. This means that Potok can meet the specifications for ventilation systems in operating rooms in accordance with the Swedish Standardization Institute (SIS-TS 39: 2012 2016).

Scientific Research Institute of Butter and Cheesemaking

Potok air decontamination unit effectively (up to 99.9 %) reduces concentration of the most dairy-industry-critical groups of microorganisms

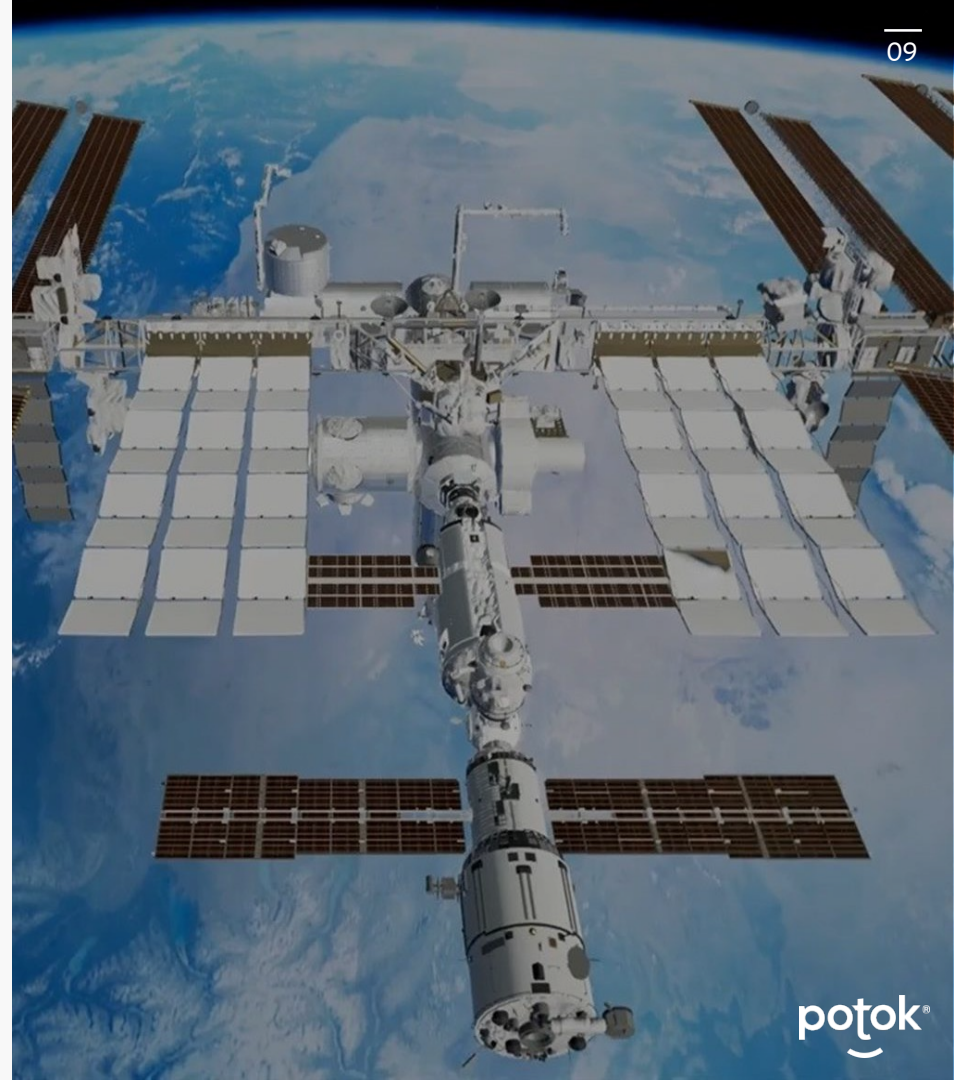
- lactic acid microorganisms,
- spore-forming aerobic bacteria,
- spore-forming anaerobic bacteria,
- E. coli,
- Yeast,
- mold fungi.

Under experimental conditions, Potok unit decontaminates the air down to the standardized level within 0.5–2 hours.

Harvard School of Public Health (USA)

- Bacillus subtilis spores
- Serratia marcescens
- Aspergillus niger
- Pseudomonas aeruginosa
- Staphylococcus aureus

Potok is the only air
decontamination technology
used in space (on board the
International Space Station)



Potok is effective in all types of production premises



01

Dairy industry:

25 % increase in shelf life of dairy products; total yeast and mold count 5 to 10 times lower than the standard.

02

Meat processing:

microorganisms and mold air count is reduced by 90–98 % in cutting and packaging shops, which increases the shelf life of processed meat products.

03

Poultry processing:

80–100 % increase in shelf life of chilled semi-finished products and 40–60 % increase in shelf life of chilled poultry products.

04

Confectionary industry:

reduced concentration of mold fungi in the air in contact with confectionery products, which increases the product shelf life.

05

Mushroom farming:

reduced concentration of molds in the air inside the growing chambers during the pick-up and inside the warehouse of finished products at stages of packaging and unloading into the “clean corridor”, hence lower losses.

06

Other food production facilities:

reduced concentration of microorganisms in the air in contact with products, which improves the shelf life, product losses, and geography of sales.

Effect of Potok in dairy industry



106-fold

reduction in QMAFAnM in cheese-making shop

40-fold

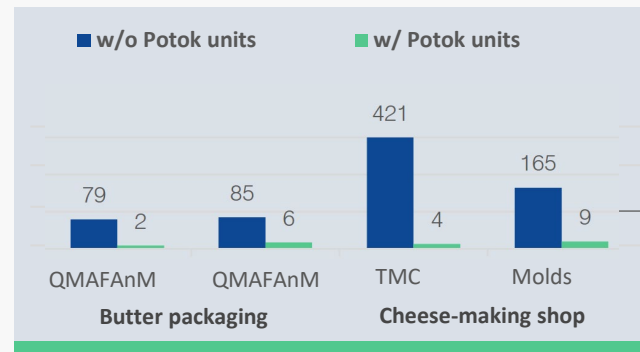
reduction in QMAFAnM in butter packaging area

18-fold

reduction in mold fungi count in cheese-making shop

15-fold

reduction in mold fungi count in butter packaging area



Air measurements (CFU/50 L)

In 2016, for the assessment purpose of the level of microbial contamination of air in contact with product, the Experimental Cheese-Making Factory conducted research on the operation of Potok units in the butter packaging room and cheese-making shop.

Effect of Potok in meat processing



98 %

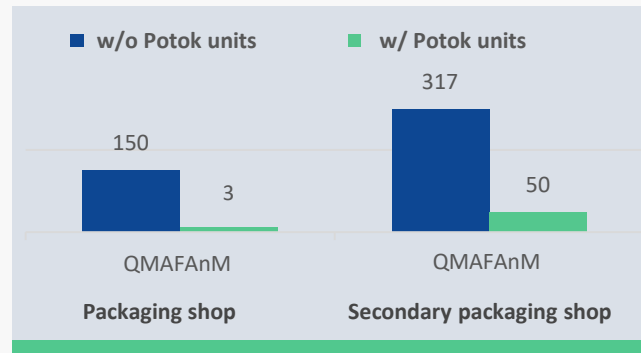
reduction in QMAFAnM in packaging shop

27-fold

reduction in mold fungi air count in packaging shop

6-fold

reduction in QMAFAnM in secondary packaging shop



Air measurements (CFU/m³)

Microbial air contamination measurement protocols for premises of large and medium-scale meat processing facilities prove the microbial decontamination performance of Potok units.

Effect of Potok in poultry processing



100 %

increase in shelf life of chilled semi-finished products

66 %

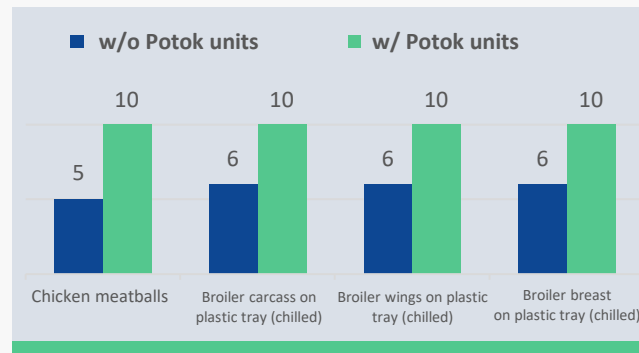
increase in shelf life of chilled poultry products

2 times

wider sales geography

0

rate of returns from retailers achieved



Shelf life of poultry products (days)

Poultry meat is a favorable environment for reproduction of microorganisms. Signs of spoilage may be already observed during the initial period of storage of chilled products. Spoiled products make it to the shelves, and labor costs related to management of expired products increase. Therefore, the most advanced poultry factories have already equipped their slaughter, dressing, and processing departments with Potok equipment.

Effect of Potok in mushroom farming →

Prevention of product losses during the production process, including due to contamination with pathogenic microflora.

Areas requiring decontamination:

- 01 **Technical floor above the growing chambers**
(to protect the mushrooms from mold that comes with the outdoor air from the supply ventilation and with the staff during the pick-up).
- 02 **Clean corridors**
(to protect collected mushrooms from microbial contamination during unloading).
- 03 **Sorting and packaging rooms**
(to reduce the level of microflora that gets on the product when the staff is working).
- 04 **Finished product warehouse**
(to prevent cross-contamination of mushrooms from containers, personnel, or infected product).

Potok is effective in the administrative premises of food production facilities



Decontamination of air in crowded areas protects personnel from COVID-19 and other airborne infections (influenza, SARS, etc.).

Solutions employing Potok units have been successfully implemented to protect personnel from airborne infections in banking and insurance companies, government agencies, and head offices of major food holding companies.

Critical control points for personnel safety:

01

Entrance units

(general inspection will miss an asymptomatic employee, while air decontamination will prevent the infection from spreading).

02

Workshops, adjacent rooms, canteens, halls

(with employees contacting each other the risk of transfer of infection from one employee to multiple staff members grows, air decontamination will resolve this issue).

03

Office space, meeting rooms

(air decontamination will protect employees and office visitors from airborne infections).

Potok equipment

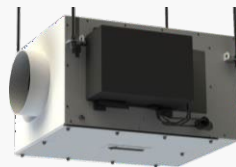


01

Standalone units for production workshops, lines, and sections, as well as for administrative premises

designed to create local clean zones by indoor air recirculation

Capacity, m3/h	120–1,000
Power consumption (max), W	10–250
Version	desktop/overhead/floor



02

Induct mount units for fitting in ventilation in production workshops/areas/warehouses/maturation and drying chambers/filling machines

designed for integration into gaps in ventilation ducts

Capacity, m3/h	90–8,000
Power consumption (max), W	10 per 1,000 m3
Version	duct-mounted

Major food production facilities equipped with Potok equipment



01

Danone

production workshops, filling machines
(eight dairy plants)

02

PepsiCo

filling machines for fermented milk products in
three dairy plants

03

Yandex.Chef

cutting and order assembly shops

04

KL Meat Processing Plant

cutting, slicing, and packaging areas

05

Molvest dairy plant

Processing and packaging areas

06

Kazan dairy plant

processing and packaging areas

07

PRODO Poultry plants

cutting and packaging areas

08

Starodvor meat processing plant

cutting, slicing, and packaging areas

Air decontamination with Potok equipment

Plant of one of the largest European dairy producer



01

Equipment location:

fermented milk product processing
and packaging area

The plant equipment project included Potok
150-M-01 standalone recirculation units in
stainless steel housing.



02

Results:

- reduced concentration of mold and yeast, bacteria, and viruses in the air in contact with product;
- increased product shelf life;
- occupational protection of personnel from viruses (including SARS-CoV-2).



Air decontamination with Potok equipment

Meat processing manufacturing facility

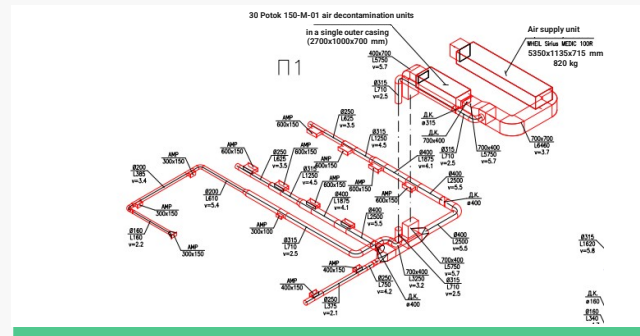


01

Equipment location:

slicing and packaging areas,
sausage cooling chamber.

Potok 150-M-01 induct units are integrated into the existing central supply and exhaust ventilation of the building (into a gap of the ventilation duct in the technical floor).



02

Results:

- reduced losses of spoiled sliced sausage in individual packages and, accordingly, reduced quantity of returned products from retailers;
- lower percentage of sausage mold in cooling chambers and, accordingly, lower cost of processing (cleaning from mold).



Air decontamination with Potok equipment

Snacks and confectionery producer



01

Equipment location:

cooling line for sponge drops with filling.

The plant equipment project included air decontamination and recirculation systems based on Potok 150-M-01 air decontamination unit (this technical solution is suitable for places with many sources of microorganisms (e.g., people and packaging materials)).



02

Results:

- increased product shelf life,
- less product losses during production and sales,
- lower preservatives' content in the product.





Innovation in air
decontamination for food
industry



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