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## AUTOMATION OF TECHNOLOGICAL PROCESS OF CANNED MEAT PRODUCTION

Food and raw materials of animal and plant origin contain a significant amount of water (30 - 80%), proteins, fats, carbohydrates, organic acids, biologically active and mineral substances, etc. During storage in natural conditions, they undergo various biochemical, physicochemical and microbiological processes, as a result of which the appearance, taste and nutritional value of food and raw materials deteriorate. This leads to rapid spoilage of products that become unfit for consumption. To increase the duration of storage and prolong the life of food and the use of raw materials have long been used methods of their preservation - salting, drying, cooling and freezing. However, the most reliable method of preservation is to store them in airtight containers after processing for some time at a temperature above 100 ° C (sterilization). Food products sealed in airtight containers and processed for some time at a temperature of about 100 ° C are called canned food. During heat treatment at a temperature of about 100 ° C, denaturation and coagulation of proteins occur, as a result of which the activity of microorganisms is suppressed, enzymes are inactivated, and so on. Hermetic barrier packaging protects sterilized products from the environment. If canned food is properly sterilized and the container has proper chemical resistance and mechanical strength, canned food is stored for a long time even under adverse conditions without significant changes in nutritional and biological value. The optimal storage regime for canned meat is a temperature of 1 - 5 ° C and a relative humidity of not more than 75% [1]. Canned food has a pleasant taste, aroma, appearance, convenient for transportation and consumption.

Canned meat is produced in accordance with state standards and regulatory and technical documentation for their production: technical conditions (TU) and technological instructions (TI). Technological schemes for the production of canned meat of different types and groups consist of certain technological operations. General technological operations are transportation, inspection, acceptance and preparation of raw materials (thawing, cleaning and disassembly of carcasses, rolling, trimming and grinding), basic technological operations (heat treatment of raw materials, canning, packaging, sealing cans, leak testing, sterilization) and final operations (sorting, packaging, storage and registration of finished products). At the same time, technological schemes for the production of different types of canned food differ significantly in the preparation of raw materials (salting, frying, blanching, varying degrees of grinding, mixing with pasteurized flour, etc.), packaging (pasty masses, meat in pieces), heat treatment (pasteurization, typing) , different modes of sterilization), etc. [2].

Quality indicators and description of the technological process:

1. **Eating meat.** When accepting raw materials, the requirements and rules for determining the condition, type and fatness of meat carcasses (quarters), color and consistency of meat should be followed, considering the weight and veterinary condition of the batch being accepted.

2. **Disassembly.** The process of disassembly of beef carcasses (quarters) involves their division into separate parts.

3. **Trimming meat.** The trimming process involves removing cartilage, coarse connective tissue, tendon plates, large blood and lymph vessels, lymph nodes, and bone debris from pieces of collapsed meat.

4. **Shredding.** The method and degree of mincing of meat depends on the type of canned food. For natural stewed canned food, the meat is minced immediately after trimming on meat slicers, lard cutters or by hand into pieces (depending on the size of the container used) weighing from 30 to 200 g. Poultry and rabbit carcasses are cut into pieces of 50-60 g or for in the form of cans. Tongues are placed in jars whole, in pieces along the height of the jars or cut into slices 5 mm thick.

5. **Preparation of offal.** By-products come to the canning shop from the refrigerator in a cooled or frozen state. After identification and examination by a veterinarian, the raw materials are weighed and accepted. Frozen offal is thawed.

6. **Portioning.** The contents of almost all canned food are prepared using stirrers. The meat and offal are mixed with salt, spices, fried onions, flour, fat, etc. When mixed, the components of the recipe are evenly distributed throughout the volume, intensify physico-chemical processes (eg, absorption of fat by the liver), improves the consistency of the contents of canned food.

7. **Packing of raw materials into jars.** A separate portion room is provided for filling cans at meat canneries, where appropriate equipment is installed, and technological operations are carried out.

8. **Sealing cans.** Reliable sealing of cans is the most important technological operation, which determines the duration of storage of canned food and their quality.

9. **Sterilization of canned food.** Sterilization of canned food is the most important technological operation

10. **Sorting, washing, drying and packaging of canned food.** After heat treatment, canned food arrives at the "hot" sorting site. Canned food is sorted in accordance with the Instructions for sorting canned food and the use of canned food with manufacturing defects.

Automating the canning process at any of the following steps will help you get the job done much faster and better. If we replace a human with a robot, then the process of completing the task will be much more productive, because the human factor plays a significant role, on which the result of the work depends.

To automate the production process, you can use work on such processes as: Receiving carcasses, moving cans (moving from one place to another), disassembling meat (automatic separation of carcasses instead of human participation), when sorting canned food (automatic packing of cans according to parameters)

Advantages and disadvantages of using robots in production. The advantages include automation of many production processes, higher quality production, reducing economic costs. The disadvantages include possible malfunctions (stoppage of production), economic costs of repairs (rarity of parts, etc.).

### References

1. Prots Ya. I. Exciting devices of industrial robots: Textbook. / Ya.I. Proc - Ternopil: Ternopil State Technical University them. I. Pulyuya, 2008. - 232 p.
2. Technology of meat and meat products: Textbook / M.M. Klimenko, L.G. Vinnikov, IG Birch, etc. ; For the order. M.M. Klimenko. - Kyiv: Higher Education, 2006. – 640p.