

BACTERIOLOGICAL ANALYSIS OF THE POND WHERE „SALMO TRUTTO“ IS RAISED

Abstract: The sample of this study is a pond or a basin in the city of Prizren, more specifically about the open type of pond but with fresh water from the water source (spring that comes out of the modified pond, a very rare case that certainly influences the quality of water).

The purpose of this paper is to present the actual condition of water where the fish is grown which more concretely is the fish of flowing water- trout.

Based on the citizens' requirements, the quality of fish and the possibility to grow this specific type-trout, today in many places in the world including our country (Kosovo) is possible to see many artificial basins of the open and close type, generally affected by many businesses like restaurants and mini-restaurants.

The method of research and its procedure are conducted in a professional way in the laboratory of the University of Prishtina "Hasan Prishtina", by preserving the water of the pond during the transportation, the way is conserved and isolated from the biotic and abiotic outside the pond.

Based on many laboratory expertise, is concluded that the location where the fish is being cultivated and conserved, in our case the trout, is being affected by many parasites (bacteria and pathogens).

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Introduction

A characteristic of our laboratory work was the research about the presence of bacteria in the pond (streptococci and other types like salmonella and shigelle), to verify the cleanliness of water where the trout is grown that is food for the visitors.

Our team (prof.dr m.Plakolli and me as a researcher) went to the field and examined some of the basins where fish is grown in Prizren. We distinguished a specific basin with specific conditions, the sample is chosen from there and its analysis are done in the laboratory of Biology department searching for specific types of bacteria.

It is worth emphasizing that this kind of specific laboratory work with this format of research from the institution I studied (University of Prishtina "Hasan Prishtina", Biology department) has achieved very reliable and credible results that are proven in practice.

The trout "salmo trutto"

The trout lives in rivers and has all the characteristics that other types of salmons have including the cleanliness of water and the large amount of Oxygen they need. Californian trout showed abilities to adjust itself in different living conditions. Another characteristic for this type of fish is catadromous and anadromous migration. If during migration one stops by any barriers i.e. its fin, then it will migrate in the sides of the river wherever possible to propagate.

If one compares this trout with the trout that lives in streams, the latter one is characterized with a faster tempo of growth. They propagate during winter months whereas reach their sexual maturity after the second year and the third year of their lifetime. This fish can grow one more meter and can

weigh up to 20 kg. They generally are fed with caterpillars and insects that are found near water. According Vukovic and Ivanovic (1971) as well as Rakaj (1985) it is all because of their great abilities in adapting to the varied ecological factors like the concentration of Oxygen in water, water temperature or other physical obstacles that made this type of fish very attractive to be raised in many countries including our country.

Fishing includes many procedures and professional skills, including the needed methods, knowledge about biology of water territory (streams, swamps, lakes, seas, oceans) etc.

Another important required knowledge is that of animals that live in waters and which mostly are the objective of fishing including those that live in the bottom or the surface of water territory, manipulating with the pray (fish), preserving, colonizing, freezing, transporting, and distributing the fish in the wanted destination.

Otherwise, the staff that does this need to know that when is held in ice, one tone ice should be combined with two tones of fish, crab and similar animals and that should be kept fresh.



Photo 1. The fish pond in "Shqiponja" restaurant that is placed in the second km of Prizren-Kukes street. February/April 2009

If the fishing time is shorter (some days) then the pray (fish) should be placed in ice 5-10 days, if the fishing lasts more than this period then the fish should get frozen, get cold in the sea water or continental water.

Usually after fishing, specifically after fishermen are turned to the port, fish is washed, water is added and then is packed in wooden boxes.

In microbiological aspect, there should be known:

1. When the pray(fish) is caught the clean tissue and intensity can be 10^3-10^7 of micro-organisms in 1cm^2 or gram capable for multiplicity.
2. The fresh meat is considered aseptic although its surface contains bacteria.
3. The fish that comes from hot seas contains mesophilic micro flora.
4. The fish that is caught by the net has 10-100 times more bacteria than the one that is hooked.

5. If the fish is kept on a board for a longer period of time then the amount of micro flora will increase in its surface.
6. If it is not opened for immediate cleaning or is not immediately consumed then autolytic enzymes will explode the wall of digestive system, as a consequence the bacterial invasion will spread from the visceral system in muscles.
7. The washing or the detailed cleaning of the fish will reduce 80-90% of bacteria.
8. The ice kept in nets can get contaminated with bacteria of the sea surface so it will have 10^5-10^6 bacteria for causing contamination.
9. Even after is frozen or treated with ice, there are the possibilities to see flora present.

So in 20⁰ Dominates corinebacteria, Flavobacterium whereas pseudomonas (which can be accompanied by Flavobacterium and Achromobacter) is quickly grown in that way in 0⁰C for 9 or 10 days will achieve the density of $10^{-7}-10^{-8}$ per gram **M, FUGS**.

The characteristics of Bacteria

Bacteria that are part of bacteriophyta concretely are divided in Monera (the kingdom). In the food microbiology context usually is used the term bacterial flora. The bacteria that causes the food to be spoiled is important for food microbiology.

According to Mossel and Ingram (1955) there is a specified a number of bacteria that can cause food spoilage in standard storage conditions. In the following table (table 1) the bacteria that causes food spoilage are showed.

The bacteria that poison the food are:

1.1.CLOSTRIDUM BOTULINUM, 1.2.STAPHYLOCOCCUS AUREUS

Whereas those that infect it are:

2.1.SALMONELLA, 2.2.SHIGELLA

As pathogen bacteria of plants are considered those that can cause diseases in living herbal and animal organisms.

BACTERIA AND PRODUCT DECOMPOSITION	
PSEUDOMANS	Soil, water, eggs, fermented and dry meat, fish, milk
ALCALIGENES FACEALIS	Milk, addled eggs, water, organic and decomposed materials
ESHERICHA COLI	It is an indicator of faecal contamination, some stereotypes cause infections- enteric diseases in humans.
SALMONLLA SPP	It infects the food and has the same effects on humans and animals.
SHIGELLA	It is found in human and animal intestines and causes dysentery
SERRATIA MARCECENS	It is found in soil and water and it makes vegetable rot
EREINIA CAROTOVORA	It rots the plants
FLAVOACTRIUM SPP	It is found in soil and water and makes vegetables rot.
MICROCOCCUS ROSEUS	It is found in dust, water and in the food that contains salt. It causes the red colour in milk.
MICROCOCCUS VARIANS	It is found in milk, dairy products, dust, soil and meat.
STEPTOCOCCUS AUREUS	It causes infections in boiled food, more specifically poisoning.
STEPOCOCCUS AGALACTIE	It is found in meat and in cattle (cows)
S. FACEALIS	In human and animal's facealis

Isolation procedure

Insemination, incubation, identification (defining their morphological and physiological characteristics) are known and defined in the following table:

Some of them serve for isolation, cultivation, and to identify the dominant flora and the reasons they rot			
BACTERIA	ISOLATION	CULTIVATION	IDENTIFICATION
Streptococcus	Eungonbroth Eungonagar TSA,TSB	Eugongar Eungonbroth	Medium thiogel
Coliform	Brilant-green Bile agar Lactose powder	TSA TSB	Medium MR-VP
Salmonella	Dysoxycholate-citrat agar	TSA	Triple Sugar agar and medium iron
Shigella	Desoxycholate-citrat agar	TSA	Triple Sugar agar and medium iron

Table 2. Some facts for isolation, cultivation, identification of dominant flora and the reasons why the food is spoiled

Bacteria classification is a characteristic that can never be definite. There should be pointed out that in practice usually as a criteria to classify are included their morphological characteristics (form, size, structure, color, presence, or absence of spores, flagella) and physiological characteristics (pigment and acid creation, enzyme production, tolerance to sugar and salt, pH, gas creation, sugar fermentation, photosynthesis, etc.)

The material and research methodology

The material used for the experiments is the water of basins (ponds), in this case the water of the basin (pond) in “Shqiponja” restaurant.

The sample is taken from the pond through chemistry flask, which beforehand is sterilized in oven with the temperature of 160 °c, for 15 min. The water present in the chemistry flask is isolated from the temperature, the light and other biotic factors. Transport, till the place where the examination is done, took 2.5 h. Based on the required bacteria group the dilution is done from 1 x 10 to 2 x 10 to 3 x 10. The insemination is done with the method of membrane filters. Bacteria incubation is done in the specific time and the temperature needed for development, in 37 °C, 24 or 48h, depending on which type is examined.

Preliminary, the field nourishing preparations are done with agar peptonic meat and agar agar. After the cold procedure happened in 45-50 °C, the sample is poured in a Peter’s tile that is not sterilized then 10 ml of triphenyltetrazolium (TTC)1% is added. The sample is carefully mixed in a way that the distribution of TTC is done in a uniform way. The insemination procedure and its incubation lasted 24h in 75 °C temperature, Fecal streptococcus are present in water this shows the pollution with fecal of the animal origin. The phase of incubation is different for different groups of microorganisms.

Fecal streptococcus



- Fecal streptococcus, a characteristic of these bacteria is their poisoning character, are very less distinguishable in membrane filter, after 24 h of incubation, in 37⁰ C

The headcount of colonies and the definition of the number of cells is done according to the standard formula, given below:

$$Nq / 100 \text{ m} = \frac{NK \times SHH \times 100}{SMF}$$

Results

According to the bacteria analysis, we are specifying the characteristic type just as fecal streptococcus are an special indicator of pollution where represented with 256 cells in 10ml of the sample, whereas Salmonella and Shigella had a bigger number (270 in 100 ml).

Fecal streptococcus present a specific group of coliform bacteria that are found in digestive system of humans, in pets, food products and waters. According to Gabuti and his coauthors (2000) and Sinton (2002) is important to emphasize that these bacteria are more resistant than metal coliforms. It is important to point out at the end that this group representatives are streptococcus Faecalis and streptococcus faecium, like other bacteria, this group too is defined by membrane filters just as Rosser and Sartory (1982) and Bridge and Sneath (1983) suggested.

Conclusion

Fish ponds are everyday and more used in our country. Their purpose is to save time in order to serve better the clients, excluding the conditions and the water quality where the growth happens. In this casewhere we took the water where the trout “salmo trutto“ is growing in order to analyze it. It turned out that that pond is a very qualitative environment, where instantly the fresh water gushes, although the presence of bacteria with poisoning characteristics is a consequence of the presence of poultry in these waters.

Based on the conducted study in the laboratory of the department of Biology in University of Prishtina “Hasan Prishtina” is confirmed an extra-ordinary number of streptococcus Faecalis and mostly Salmonella and Shigella because of the poultry that are very frequent in open basins. Then is a need to emphasize that the trout that lives in basins can never be equal with the trout that lives in rivers, considering the quality of meat, for its cleanliness from other different parasites that the river has.

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