

Dambal-khacho - Unique Georgian Product

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Introduction:

Among numerous cultural monuments of Georgia, Dambal-khacho (cottage cheese) takes one of the most important places. An independent, new product is produced by secondary processing of milk. It is noteworthy that no mechanical means or modern technologies are involved in its production.

In 2014, the National Agency for Cultural Heritage Preservation of Georgia recognized Dambal-khacho making technology and culture as a monument of intangible cultural heritage. The biochemical composition of its mold is partially studied and it has been established that due to the abundance of cephalin, lecithin and other lipids, it prevents the accumulation of cholesterol in blood vessels and fights against tuberculosis. Its microbiome, has not been investigated at a molecular level yet, which is extremely important to study this unique product thoroughly.

At the first stage of our research, a cover and inner layers of the Dambal-khacho were inoculated on Petri dishes and fungal and bacterial cultures existed in its microbiome were separated, after which the aim of our research became the fungal cultures we obtained as a result of these divisions.

Aim:

The composition of Dambal-khacho has not been studied at the molecular level. Thus, our goal was to find and discover a number of “good bacteria” and fungi for the first time in Georgia as well as its popularization as Georgian product with unique features.

Materials and methods:

We met with local people in Tianeti and Pshavi and conducted a sociological survey amongst the active users of this unique product. We made an experiment on fungi, which naturally arose and separated DNA from it. Qiagen kit was used for the extraction of DNA.

Picture 1. Research Plan. Utilised Primers

We have taken samples of fungi from 3 different products of Dambal'khacho mold fungi. DNA was extracted from samples of fungi, grown on solid food. DNA extraction was done in the following 4 steps. Lysis, Binding, Washing and Elution.

Step1:Lysis

Lysis is the first step in cell fractionation and DNA is released in the reaction area. We have used RNase (a) for the DNA extraction from fungi for 10 minutes at 65 degrees. The bath should be set in advance.

Step 2: Binding

The binding is performed by adding a corresponding buffer to a solution that holds DNA molecules. We add P3 Buffer to the solution and leave it for 5 minutes on the ice. After that, the unwanted impurities such as proteins, RNase and PCR inhibitors, are carried through a special eppendorf in which a filter is placed. As a result, DNA remains on the spin and the supernatant is removed.

Step 3: Washing

For better purification of DNA molecules, washing method is used. We used AW2 ethanol-containing buffer and centrifuges. Finally, we add solvent –buffer in which DNA is dissolved.

Step 4: Elution

Elution is the final process, in which the obtained DNA is washed with water. (+)

In the obtained reaction zone we have increased DNA section of interest, which is specific and confirm the existence of mold in all three samples of cottage cheese.

The result of the test:

In the reaction zone we have obtained increased DNA section, which is specific and confirms the existence of mold in all three samples of Georgian cottage cheese-Dambal'khacho.

Conclusion:

We believe that in case of proper advertising and production, Dambal'khacho, which is quite similar to French and Swiss flavored cheeses, but at the same time differs from taste and production technology, will raise interest not only in Georgia, but also among foreigners with its original cheese-making Georgian method and unique biological and tasting properties.

Future plans:

For more detailed classification of fungi, we are planning to sequence and then perform bioinformatic analysis, with a view to accurately analyzing the nucleotide sequences and compare fungi species. Finally, our aim is to study the whole microorganisms and implement its production in laboratory conditions.

References:

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