SOFTWARE DEVELOPMENT FOR OBJECTIVE AUTOMATIC COUNTING OF LACTIC ACID BACTERIAL COLONIES GROWN IN MRS AGAR

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Abstract

Microbiological analyses are a significant part of food production and food quality evaluation. A commonly used method for food quality evaluation is the identification whether the food is contaminated with microbiological agents or not. This identification is performed by determining the total microbial number in a taken certain sample which (determining) can be done by counting bacterial colonies. Nowadays, there are manual, semi-automatic and automatic methods for counting bacterial colonies. The automatic methods require the usage of special systems rather quite expensive hardware and software. In comparison the manual counting is a cheaper solution but it is a time consuming method and it is subjective. This paper presents a computer based approach for objective and automatic counting of lactic acid bacterial colonies grown in a MRS agar.

The research is based on a previous research of possibilities for application of open-source software for microbiological analyses. A group of petri dishes with MRS agar and *Lactobacillus plantarum* Pro are captured by a digital camera. A software for digital images processing with graphical user interface is developed. The application is used for automatic detection and counting of bacterial colonies. It is developed in object oriented programing language Java as a plug-in for a well-known open-source software – ImageJ. The program is tested in the University of Food Technologies - Plovdiv.

A comparison analyze of the results obtained using the developed software is performed with the results obtained using manual counting.

The analysis shows that the proposed software can be successfully used for automatic detection and counting of the lactic acid bacterial colonies grown in the MRS agar.

***Key words**: Digital image processing (DIP), Bacterial colonies counting, ImageJ, Lactobacillus plantarum Pro.*