

Short communication

AUTOMATIC ELECTRONIC SYSTEM “ECOLOGY-MICROCLIMATE”

R. S. Asatryan

National Institute of Metrology, Komitas ave. 49/4, 0051, Yerevan, Armenia

H. S. Karayan

Yervan State University, 1 A. Manoogian str., 0025, Yerevan, Armenia

N. R. Khachatryan

National Institute of Metrology, Komitas ave. 49/4, 0051, Yerevan, Armenia
E-mail: as_ruben@yahoo.com



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ABSTRACT

Developed by us the "Ecology-Microclimate" system is intended for measurement, control and adjustment of temperature and relative humidity of air, and also control of extreme allowable concentration of gases CH₄ and NH₃ in the appropriate premises and volumes of agricultural complexes and various farms, with the purpose of maintenance and management of work of external executive mechanisms (for example, fans, conveyors, heaters and other). With the help of a feedback the system operates work of the specified above executive mechanisms. **Copyright © WJEAS, all rights reserved.**

Keywords: Control microclimatic parameters, agricultural farms, control of concentrations dangerous gases, external executive mechanisms.

1. Introduction

The present state of agriculture (especially in our republic) in general, and production of agricultural foods, in particularly, put manufacture before a science and technologies resolute requirements on creation qualitative new, instrumentations and systems providing a high level agricultural production and executed on the basis of achievements modern micro and optoelectronics.

There is no necessity to mark that high role both importance of the control and adjustment of microclimatic parameters (temperature, humidity and other) and also extreme allowable concentration of dangerous gases

polluting air (for example, Methane and Ammonia) on agricultural objects and premises(rooms), with the purpose of increase of productivity and long safe keeping of agricultural products.

Developed by us system “Ecology-microclimate” [1,2] is intended for measurement, control and adjustment of temperature and relative humidity of air, and also for the control of maximum-permissible (extreme allowable) concentration of gases CH_4 and NH_3 in corresponding premises and volumes of agricultural objects (including processing agricultural productions) and various farms, with the purpose of maintenance and management of work of the external executive mechanisms (for exempla, fans, conveyors, heaters, etc.). Equipment “Ecology-microclimate” is joined with personal computer. With the help of a feedback the system operates work of the above-stated executive mechanisms.

2. Short Description of “Ecology-Microclimate” System

Structurally the system consists of two main units: the block of the remote sensitive element (BSE), containing sensors of temperature, humidity, gases CH_4 and NH_3 with a preamplifier, and the block of

Electronic Control (BEC), joined with a personal computer (PC). BSE is established in corresponding premises and volume where it is necessary to measure, control and adjust microclimatic and ecological parameters of air and incorporates with BEC to the help of cables which length can reach up to 50m. BEC with a computer is possibly to establish in place convenient for the operator.

The sensor of humidity [3] invented by us little earlier, represents a microelectronic element in the sizes 5x5mm, executed on sitalic basis with put nickel (or gold) electrodes, and covered with a layer of a hydro sensitive liquid crystal (kardiolipin or fosfotidilcholin). As the temperature’s sensor in BSE is used silicon thermiod. In the block of a remote element sensitive for the gases NH_3 and CH_4 are used sensors of firm FIGARO [4, 5] TGS-826 and TGS-842 accordingly (see Fig. 1).

System “Ecology-microclimate” provides:

- A range of measurement and adjustment of relative humidity of air from 10 up to 90% with discrete steps in 10% with the error no more $\pm 1\%$ (at a level of the measured value)
- A range of measurement and adjustment of temperature of air from a minus 10 up to 40⁰C, with discrete steps 5⁰C, with the error no more $\pm 0.5\%$
- Presence of the target manager signal (of work of corresponding executive mechanisms) at the presence in air of gases NH_3 and CH_4 at a level 0.25 MPC (maximum permissible concentration)
- Automatic data processing measurements, and management of works of external executive mechanisms together with a personal computer.

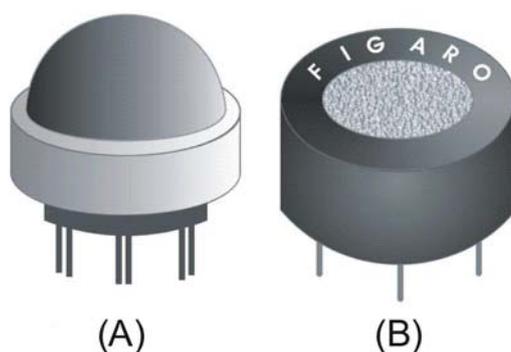


Figure 1: Sensors of gases CH_4 (A) and NH_3 (B).

The information about microclimatic and ecological parameters of environment from BSE acts in BEC which main units are the amplifier, the analogy-digital converter and the microprocessor executed on base KR 1816. Required values of relative humidity and temperature are established on board BEC, and managing signals for the internal executive mechanisms and equipments are removed from an output. From BEC output the results of measurements on the separate recording device is stipulated also. Appearance of system “Ecology-microclimate” is shown on Fig. 2.

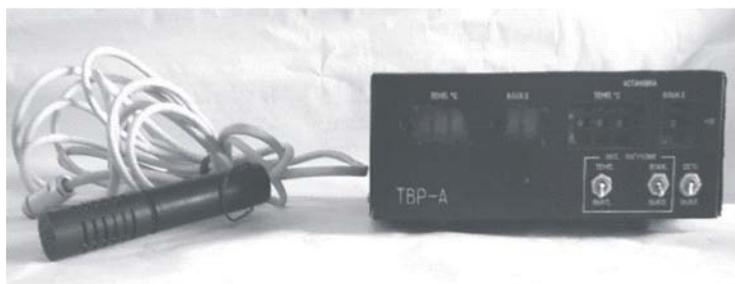


Figure 2: Appearance of “Ecology-microclimate” System.

3. Conclusion

Introduction of the developed system on poultry farms, the cattle-breeding enterprises, incubators and hotbed facilities, in refrigerating storages of fruits and meat-milk products, on storehouses of a grain, etc. objects, is doubtless provides the high technical and economic efficiency.

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