

### A NEW METHOD OF ANALYSIS OF GRANULATED HOPS

Svitlana Litvynchuk, Volodymyr Nosenko, Anatolii Meletev, Inna Hutsalo

*National University for Food Technologies, 68, Volodumyrska Str., 01601, Kyiv, Ukraine*  
*Litvynchuk@nuft.edu.ua*

The main brewing indicators of quality of hops are the content of  $\alpha$ -acids and moisture. The diffuse reflectance spectra of hops were investigated in order to create a rapid method of assessing the quality of granulated hops with simultaneous determination of key indicators (without the use of chemicals and prolonged dry). Researches have been conducted on the infrared analyzer "Infrapid-61" in the wavelength range 1,33-2,37 microns. For the researches there were used such varieties of granulated hops as Clone 18, Lubliner, Traditional, Tettnanger and Norden Brever 7,51-19,11% of moisture content and  $\alpha$ -acids 3,2-16,0%.

On the basis of the conducted investigations it has been established the dependence of reflection coefficient from the degree of dispersion of crushed pellet hops. Optimal degree of it's grinding is 0,294-1,000 mm, which is used in further studies. For the analytical purposes in determining the moisture content of hops there were selected wavelengths of 1.47 and 1.93 microns. The wavelengths 2.27 and 2.36 microns were determined as characteristic for the analysis of  $\alpha$ -acids.

The results of measurements of control and experimental samples showed that the new method for determining moisture content and  $\alpha$ -acids in hops are sufficiently accurate (absolute deviation relative to the standard methods for moisture content does not exceed 0.4% for  $\alpha$ -acids - 0.3%, which within the limits is allowed by the standard). An express method makes it possible to determine the content of these components immediately before entering the wort taking into account the tiniest changes that occur during storage.

**KEY WORDS:** hops, analysis, moisture, content of  $\alpha$ -acids infrared analyzer.

### INNOVATIVE WASTEWATER DAIRY

Olena Semenova, Nataliya Bublienko, Jelizaveta Smirnova, Tatyana Tkachenko\*

*National University for Food Technologies, 68, Volodumyrska Str., 01601, Kyiv, Ukraine*  
*\*tata\_t2008@ukr.net*

Wastewater of some food industries due to pollution is related to concentrated. It contains substantial amounts of organic matter that get into them during processing of raw materials.

The construction of wastewater treatment facilities took place on the basis of conventional biological treatment technology used for the disposal of sewage. However, this technology is not suitable for concentrated polluted wastewater purification.

To solve the problem of concentrated wastewater treatment the anaerobic-aerobic treatment technology was proposed.

The main point of it is that the concentration of contaminants initially is sharply reduced by methane fermentation, followed by the purification method of aerobic fermentation in the aeration tanks.

The range of dairy products and technologies of its production involves the formation of some waste at each plant which differs in terms of pollution indicators: chemical oxygen demand (COD) - 1000 ÷ 5000 mg O<sub>2</sub>/dm<sup>3</sup>; biochemical oxygen demand (BOD) - 700 ÷ 3700 mg O<sub>2</sub>/dm<sup>3</sup>; total nitrogen content - 20 ÷ 170 mg/dm<sup>3</sup>; pH - 4,5 ... 10.4.

Methanogenic fermentation of concentrated wastewater milk processing plant reduced the pollution indicators for SOD of 4500 to 600 mg O<sub>2</sub>/dm<sup>3</sup>; got about 4 dm<sup>3</sup> biogas from 1 dm<sup>3</sup> wastewater, methane content in biogas is about 75%. The cleaning efficiency is 87%.

At the next stage, the wastewater treatment method of aerobic fermentation in the aeration tanks.

In laboratory conditions, they had to need 12 hours, during which the concentration of contaminants for COD decreased upto 25 mg O<sub>2</sub>/dm<sup>3</sup> that corresponds to BOD within 12-13 mg O<sub>2</sub>/dm<sup>3</sup> i.e. purification of wastewater by standards is achieved that allows to discharge wastewater into natural water bodies.

The analysis determined the feasibility of an integrated anaerobic-aerobic wastewater treatment technology that enables energy-valuable biogas. In terms of contamination of treated wastewater is allowed to drop into a natural pond.

**KEY WORDS:** concentrated wastewater, aerobic fermentation, chemical oxygen demand, culture liquid, aeration tanks