

# MEASUREMENT UNCERTAINTY OF DENSITY OF ANISE EXTRACT AS ONE OF THE COMPONENTS OF A NEW TINCTURE

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At present day for Ukraine the development the new and the improvement the known technologies of the producing of liquor-vodka drinks with using plant raw materials is actual.

Evaluation the measurement uncertainty of the density of the anise water-ethanol extract at the researches in the frame of the development of the new tincture is a purpose of the work.

The questions of the measurement uncertainty evaluation of the parameters of the quality of the components of the food products were considered in [1], the questions of the measurement uncertainty evaluation of the parameters of the quality of the sunflower seeds were considered in [2, 3].

The chemical researches in this work were aimed at the development of the receipt of the new tincture with improved taste-aromatic organoleptic properties. The density of the anise extract significantly influences on these properties.

There are two methods of the determination of the density of the raw materials of the semi-products and final products: picnometrical and aerometric.

The water-ethanol solutions are usually used for obtain the plant extract for liquor-vodka industry.

It was determined, that ethanol's concentration, temperature of the process and duration of the extracting are the main factors, that influence on the density of the anise extract.

The realization of the full factorial experiment by type 2<sup>n</sup> allowed to determine the optimal values of these factors. Therefore, the following optimal conditions of the technological process were determined: ethanol's concentration – 50 % vol, temperature of the process – 50 °C, duration of the extracting – 60 min.

The measurements were performed in reference conditions. Therefore, only the intrinsic error of measurement was in measurement results (the complementary errors were absent).

The measurement of the density of the anise extract was performed three times at each line of the matrix plan by picnometer [4]. The results of the replicated measurements were used for calculation the type A standard measurement uncertainty of the density of the anise's extract.

The relative density of the extract at the temperature 20<sup>0</sup> C is calculated by formula [5]:

$$d^{20} = \frac{m_2 - m}{m_1 - m}, \quad (1)$$

where  $m$  – the mass of the empty picnometer, g;

$m_1$  – the mass of the picnometer with distilled water [6], g;

$m_2$  – the mass of the picnometer with researched extract, g.

Taking into account the formula (1), the measurement model was formed and the analysis of the contributions of each input values to the measurement uncertainty of the measurand was done.

The input quantities in a measurement model were measured by the analytical weigh AXIS of the series ANG. Taking into account, that the given in the technical instruction of the weigh value of the absolute error of the measurement of the mass is equal  $\Delta m = \pm 0,0001\text{g}$ , the type B standard measurement uncertainty of the mass was calculated.

The sensitivity coefficients of the input quantities of the measurement model were defined.

The combined standard measurement uncertainty and the expanded measurement uncertainty of the density of the anise extract were calculated for each line of the matrix plan.

Therefore, the evaluation of the measurement uncertainty of the density of the anise extract at the realization of the picnometrical method of the determination of the density was done in this work.

The components of the of the input quantities' measurement uncertainty of the density of the measurement model were analyzed.

## References

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