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The efficiency of using new brands silica gel for colloidal stabilization of beer

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Keywords:
Colloidal stability, Turbidity , stabilization agents, Silica gel

The **colloidal stability** of beer is still to be one of the most critical challenges facing the brewing industry. In brewing**, the stabilization agents** are used to increase the colloidal stability. The most widely used products today are silica gel for protein stabilization and polyvinyl polypyrrolidine (PVPP) for polyphenol stabilization [1,2]. In Russia, the **silica gel** of foreign brands is widely used in brewing **as an adsorbent for proteins** (30-50 g / hl), which leads to a rise in production costs[3]. Since any company strives to produce quality products at lower production costs, the ability to use domestic products in production that allows achieving the desired goal, rather than foreign (imported) products, is considered one of the preferred ways to reduce costs. In this regard, the aim of the study is to investigate the adsorption capacity of some **brands of silica gel produced** in Russia and their effectiveness in increasing the colloidal stability of beer

Research Objective:

- The objects of the study were four samples of silica gel. Three samples of **Russian-made silica gel** produced by OOO Tobisorb (Ufa). Hydrogel (sample No. 2) and xerogel (samples No. 1 and No. 3).As a control, we used **foreign-made silica gel** Stabifix (Germany) (sample No. 4).
- The silica gel addition rate was **30 g / hl** beer per ADB.
- For the experiment, **a light 12% beer** produced at the Knightberg MPZ LLC (St. Petersburg) was taken for the study

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Results

Table 1 - Indicators characterizing the colloidal stability of beer using various samples of silica gel.

Indicators	Russian-made silica gel			foreign-made silica gel
	1 (xerogel)	2 (Hydrogel)	**3 (xerogel)**	**4 (Stabifix)**
Turbidity (λ=560 nm), EBC	0,154	0,148	**0,137**	**0,133**
Turbidity (turbidity-meter), EBC	0,44	0,42	**0,39**	**0,38**
Ammonium sulfate,ml	25	26	27	26

Table 2 - Turbidity of beer during artificial aging

Number Cycles 60/0	Turbidity (turbidity-meter), EBC			
	1	2	3	4
1	1,56	1,47	1,49	1,47
2	1,80	1, 87	1,79	1,80
3	2,41	2,37	2,29	2,49

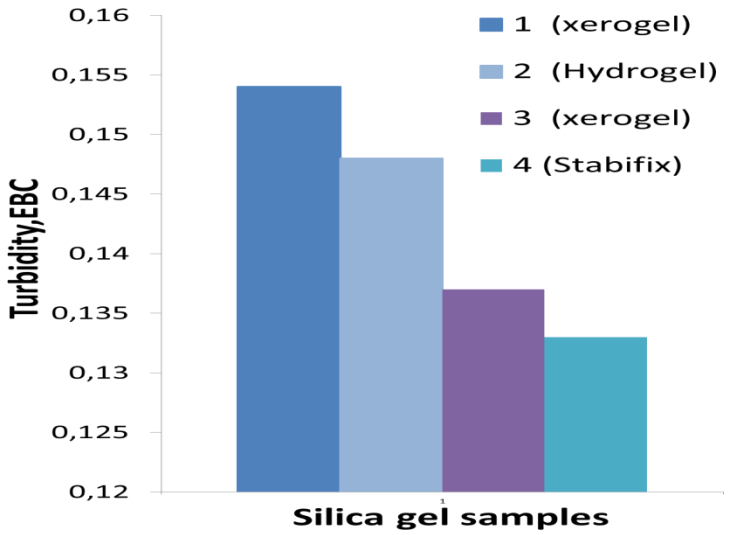

Fig 1.Turbidity of beer using different samples of silica gel as stabilization agents

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Discussion and conclusion

- The best results were obtained in the beer treated with silica gel of the "Stabifix'' brand (H90 = 0.133 EBC units) and "xerogel'' of domestic production (H90 = 0.137 EBC units).
- All beer samples treated with silica gel had a high protein precipitation limit of 26 ± 1 ml, which corresponds to shelf life of at least 3 months. This conclusion is confirmed by the results obtained during the artificial ageing of beer. The method used assumes alternating temperatures of 60 ° C and 0 ° C.
- Measurements are carried out until the turbidity value reaches 2 EBC units. One day of ageing at 60 ° C corresponds to one month of storage of beer without the appearance of turbidity. It was found that all beer samples subjected to artificial ageing after 3 cycles of temperature alternation of 60 ℃ / 0 ℃ had practically the same turbidity, the value of which ranged from 2.29 to 2.41 EBC units in the experimental samples and 2.49 in a control sample of beer with silica gel "Stabifix''.
- On the basis of laboratory studies, it has been proved that silica gel "xerogel" of domestic brands, which is not inferior to foreign ones in its absorbing properties, can be used as stabilizers to increase beer stability.

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Thank you for your attention!

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