WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 6, June, 2022

# INFLUENCE OF SEASONAL MUD OF THE NARIN RIVER FOR THE COAGULATION PROCESS

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**Abstract**
The seasonal turbidity of the Narin River is presented for the selection of an effective treatment method by soaking in coagulants in spring and autumn. The sedimentation process is characterized by the deposition of highly turbid river water.
Low water temperatures require an increase in the optimal doses of the coagulant by almost two times, and the flocculant by more than two times. It has been shown that the color of the water varies by 5-10 degrees, and the maximum transparency is achieved in the zone of optimal pH. Empirical dependences of the coagulant dose on the initial water color are given, taking into account its temperature. The efficiency of low-temperature water purification essentially depends on the flocculation process, the duration of which increases several times during the period of low water temperatures. Under these conditions, the most appropriate and effective method of clarification is pressure flotation.

**Ключевые слова:** коагулирование, цветность, коагулянт, флокулянт, подщелачивающий реагент, осветление, температура воды, хлопьеобразование, напорная флотация.

**Kalit so'zlar:** koagulyatsiya, rang, koagulant, flokulyant, gidroksid, tiniqlash, suv harorati, flokulyatsiya, bosim flotatsiyasi.

**Keywords:** coagulation, color, coagulant, flocculant, alkalizing agent, clarification, water temperature, flocculation, pressure flotation.

## Introduction

Currently, for the preparation of drinking water in the water intake and pumping facilities of Kyzylrovot, the traditional cleaning scheme for flocculation-coagulation chambers, horizontal clarifiers, fast and slow filters is used. Aluminum sulfate was used to dilute the water. Primary and secondary chlorination was carried out in normal modes and at increased doses during periods of low water temperature, when coagulation was excluded from the water purification process.

Under such conditions, the purification of low-turbidity water of the Narin River turned out to be ineffective, the required water quality was not provided by a number of indicators standardized by O`z D St 950-2011. "Drinking water" is primarily determined by turbidity, color and suitability for drinking. Most often, purified water supplied to water intakes, including its temperature quality, post-coagulation filtration processes, arises after secondary chlorination and indicates a non-optimal mode of water coagulation, possibly during the test phase of coagulation "Drinking water" expands the list of basic criteria for purified water and includes mandatory control of residual aluminum (up to 0,5 mg/l). During this period, a two-stage technology was introduced at the water treatment plant - filtration based on contact coagulation. It was necessary to provide the optimal doses of coagulant for objects with contact coagulation in conditions of seasonal variability of the quality and temperature of the coagulation scheme of free water and source water. The composition of residual aluminum was one of the main indicators that made it possible to evaluate the results of experimental coagulation of clothes with haze, color, and permanganate. Currently, to control the efficiency of coagulation, the indicator of the molten part of the residual aluminum is taken into account with the simultaneous use of aluminum at the station. It is known that after coagulation treatment, water can contain from 0,05 to 0,5 mg/l of residual aluminum in the form of dissolved compounds [1;2]. In order to reduce the concentration of residual aluminum, it is necessary to take into account the possible sources of the formation of dissolved compounds and the basic principles of regulating the process of coagulation of low-turbid colored waters on specific examples of optimization of reagent water purification from different sources, the features of the process of seasonal coagulation of turbidity of colored waters of low turbidity, including the Narin River, are disclosed. [3].

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ISSN: 2776-0979, Volume 3, Issue 6, June, 2022

Determination of water turbidity based on a graduated graph by the mass index of the KFK-2 device, (Mg / d3) D = 540 nm, L = 50 mm.

| Graphical indicators of water turbidity | | | | Color | |
|---|---|---|---|---|---|
| KFK-2 indicator | According to the schedule | KFK-2 indicator | According to the schedule | KFK-2 indicator | According to the schedule |
| 0,01 | 0,232 | 0,26 | 6,32 | 0,01 | 1,0 |
| 0,02 | 0,464 | 0,27 | 6,26 | 0,02 | 1,6 |
| 0,03 | 0,696 | 0,28 | 6,496 | 0,03 | 2,3 |
| 0,04 | 0,928 | 0,29 | 6,728 | 0,04 | 3,0 |
| 0,05 | 1,16 | 0,3 | 6,96 | 0,05 | 4,0 |
| 0,06 | 1,392 | 0,31 | 7,192 | 0,06 | 4,7 |
| 0,07 | 1,62 | 0,32 | 7,442 | 0,07 | 5,5 |
| 0,08 | 1,856 | 0,33 | 7,656 | 0,08 | 6,1 |
| 0,09 | 2,088 | 0,34 | 7,888 | 0,09 | 7,0 |
| 0,10 | 2,32 | 0,35 | 8,12 | 0,10 | 7,7 |
| 0,11 | 2,552 | 0,36 | 8,352 | 0,11 | 8,4 |
| 0,12 | 2,784 | 0,37 | 8,584 | 0,12 | 9,2 |
| 0,13 | 3,016 | 0,38 | 8,816 | 0,13 | 10,0 |
| 0,14 | 3,248 | 0,39 | 9,048 | 0,14 | 10,8 |
| 0,15 | 3,480 | 0,40 | 9,28 | 0,15 | 11,6 |
| 0,16 | 3,712 | 0,41 | 9,512 | 0,16 | 12,2 |
| 0,17 | 3,944 | 0,42 | 9,744 | 0,17 | 13,0 |
| 0,18 | 4,176 | 0,43 | 9,976 | 0,18 | 13,8 |
| 0,19 | 4,408 | 0,44 | 10,208 | 0,19 | 14,6 |
| 0,20 | 4,464 | 0,45 | 10,44 | 0,20 | 15,4 |
| 0,21 | 4,872 | 0,46 | 10,672 | 0,21 | 16,2 |
| 0,22 | 5,104 | 0,47 | 10,904 | 0,22 | 17,0 |
| 0,23 | 5,336 | 0,48 | 11,136 | 0,23 | 17,8 |
| 0,24 | 5,568 | 0,49 | 11,368 | 0,24 | 18,4 |
| 0,25 | 5,80 | 0,50 | 11,6 | 0,25 | 19,2 |
| | | | | 0,26 | 20,0 |
| | | | | 0,27 | 20,7 |

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| Chromaticity | | Turbidity | | Turbidity | | Nitrite | | Nitrate | | Nitrate | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KFK | Schedule | KFK | Schedule | KFK | Schedule | KFK | Schedule | KFK | Schedule | KFK | Schedule |
| 0,01 | 1,0 | 0,01 | 0,14 | 0,28 | 4,20 | 0,01 | 0,004 | 0,01 | 0,3 | 0,28 | 6,8 |
| 0,02 | 1,6 | 0,02 | 0,30 | 0,29 | 4,35 | 0,02 | 0,008 | 0,02 | 0,6 | 0,29 | 7,1 |
| 0,03 | 2,3 | 0,03 | 0,44 | 0,30 | 4,50 | 0,03 | 0,01 | 0,03 | 1,0 | 0,30 | 7,3 |
| 0,04 | 3,0 | 0,04 | 0,58 | 0,31 | 4,64 | 0,04 | 0,015 | 0,04 | 1,2 | 0,31 | 7,5 |
| 0,05 | 4,0 | 0,05 | 0,75 | 0,32 | 4,80 | 0,05 | 0,02 | 0,05 | 1,5 | 0,32 | 7,8 |
| 0,06 | 4,7 | 0,06 | 0,90 | 0,33 | 4,94 | 0,06 | 0,023 | 0,06 | 1,8 | 0,33 | 8,0 |
| 0,07 | 5,5 | 0,07 | 1,04 | 0,34 | 5,1 | 0,07 | 0,027 | 0,07 | 2,0 | 0,34 | 8,2 |
| 0,08 | 6,1 | 0,08 | 1,2 | 0,35 | 5,25 | 0,08 | 0,031 | 0,08 | 2,3 | 0,35 | 8,5 |
| 0,09 | 7,0 | 0,09 | 1,35 | 0,36 | 5,40 | 0,09 | 0,035 | 0,09 | 2,5 | 0,36 | 8,7 |
| 0,10 | 7,7 | 0,10 | 1,5 | 0,37 | 5,55 | 0,10 | 0,04 | 0,10 | 2,7 | 0,37 | 8,9 |
| 0,11 | 8,4 | 0,11 | 1,64 | 0,38 | 5,70 | 0,11 | 0,043 | 0,11 | 2,9 | 0,38 | 9,2 |
| 0,12 | 9,2 | 0,12 | 1,8 | 0,39 | 5,85 | 0,12 | 0,047 | 0,12 | 3,2 | 0,39 | 9,4 |
| 0,13 | 10,0 | 0,13 | 1,95 | 0,40 | 6,0 | 0,13 | 0,05 | 0,13 | 3,4 | 0,40 | 9,7 |
| 0,14 | 10,8 | 0,14 | 2,1 | 0,41 | 6,15 | 0,14 | 0,054 | 0,14 | 3,6 | 0,41 | 9,9 |
| 0,15 | 11,6 | 0,15 | 2,26 | 0,42 | 6,30 | 0,15 | 0,059 | 0,15 | 3,9 | 0,42 | 10,1 |
| 0,16 | 12,2 | 0,16 | 2,4 | 0,43 | 6,45 | 0,16 | 0,062 | 0,16 | 4,2 | 0,43 | 10,4 |
| 0,17 | 13,0 | 0,17 | 2,64 | 0,44 | 6,60 | 0,17 | 0,065 | 0,17 | 4,5 | 0,44 | 10,6 |
| 0,18 | 13,8 | 0,18 | 2,68 | 0,45 | 6,70 | 0,18 | 0,069 | 0,18 | 4,7 | 0,45 | 10,9 |
| 0,19 | 14,6 | 0,19 | 2,85 | 0,46 | 6,90 | 0,19 | 0,072 | 0,19 | 5,0 | 0,46 | 11,1 |
| 0,20 | 15,4 | 0,20 | 3,0 | 0,47 | 7,05 | 0,20 | 0,074 | 0,20 | 5,2 | 0,47 | 11,3 |
| 0,21 | 16,2 | 0,21 | 3,14 | 0,48 | 7,20 | 0,21 | 0,076 | 0,21 | 5,4 | 0,48 | 11,6 |
| 0,22 | 17,0 | 0,22 | 3,3 | 0,49 | 7,35 | 0,22 | 0,079 | 0,22 | 5,7 | 0,49 | 11,9 |
| 0,23 | 17,8 | 0,23 | 3,44 | 0,50 | 7,50 | 0,23 | 0,081 | 0,23 | 5,9 | 0,50 | 12,2 |
| 0,24 | 18,4 | 0,24 | 3,58 | 0,51 | 7,65 | 0,24 | 0,083 | 0,24 | 6,1 | 0,51 | 12,5 |
| 0,25 | 19,2 | 0,25 | 3,75 | 0,52 | 7,80 | 0,25 | 0,085 | 0,25 | 6,4 | | |
| 0,26 | 20,0 | 0,26 | 3,9 | 0,53 | 7,95 | 0,26 | 0,087 | 0,26 | 6,6 | | |
| 0,27 | 20,7 | 0,27 | 4,04 | 0,54 | 8,10 | | | | | | |

The indicators in table 1 were obtained using the KFK-2 device in the laboratory for the preparation of drinking water in the water intake and transfer structures of Kyzylrovot. [4]. The main of them, coagulation should take place in the range of optimal pH values (5.2-7) to ensure minimum concentrations of residual aluminum in purified water for complete hydrolysis of the coagulant, water with a low alkaline reserve must be alkalized to ensure flocculation and minimize the dissolved part of residual aluminum, be at least 0.2–0.5 mg-eq / l in some cases with low alkalinity of water, preliminary alkalization is effective; it is necessary to take into account the effect of the intensity of mixing of the reagents with water. taking into account the achievement of standards for other indicators of water quality. [5].

## Conclusion

Optimization of the coagulation mode is the main technological task, on the solution of which the efficiency of preparation of drinking water depends on the whole. Therefore, when studying the possibility of using pressure flotation as the first stage of river water purification and simultaneously with the study of the nature of humic substances and their effect on the purification process, the efficiency of water coagulation was determined.

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