




При биоэлектрохимическом производстве водорода из сточных вод солодового завода происходит уменьшение значения ХПК от 2500 мг/дм³ до 120 мг/дм³ при эффективности продуцирования водорода 0,01 мг Н₂/мг ХПК.

Полученные данные доказывают эффективность биоэлектрохимического способа получения водорода и позволяют сделать выводы про размещение данной стадии в технологии очистки сточных вод. 

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REMOVAL OF As (V) COMPOUNDS FROM THE AQUATIC PHASE BY COAGULATION

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Arsenic compounds are very dangerous due to its toxicity, but the greatest threat to human health are inorganic compounds of arsenic entering the human body with drinking water [1]. Prolonged usage of arsenic drinking water leads to negative health effects causing carcinogenic effects (cancer of the blood, lungs, skin, sinuses, liver, etc.) and non-carcinogenic effects (immunological, neurological and endocrine disorders and genotoxic effect) [2].

As some effects of arsenic on organism are irreversible, the basic health measure is to prevent the occurrence of these contaminants in drinking water [1], that's why the removal of arsenic compounds is very important.

Because As (V) is more characteristic than As (III) for surface water and coagulation method is useful when suspended impurities is in the water, i.e. for the case of surface water, the study of removing of As (V) compounds by coagulation is appropriate and important.

Arsenic compound removal from water phase by iron coagulant was carried by converting of arsenic substances in virtually insoluble iron arsenate ($-lg K_S (FeAsO_4) = 20,24$).

The table shows the dependence of concentration of As (V) in solution after coagulation (C_{As} , µg/L) and level of removal (X, %) from the coagulant dose (D, mg/L). FeCl₃ was used as a coagulant. Models of water are solutions of Na₂HAsO₄ in distilled water and in tap water (with alkalinity of 4.13 mmol/L and total hardness of 5 mmol/L) with concentration of As (V) of 200 and 500 µg/L and at pH 11. Coagulation time is 90 minutes.

Table - As (V) removal from solutions by coagulation

D, mg/L	$C_p=200 \mu\text{g/L}$				$C_p=500 \mu\text{g/L}$			
	Distilled water		Tap water		Distilled water		Tap water	
	C_{As} , µg/L	X, %	C_{As} , µg/L	X, %	C_{As} , µg/L	X, %	C_{As} , µg/L	X, %
1,25	146,7	26,7	160,0	20,0	360,0	28,0	233,3	53,3
2,5	113,3	43,3	120,0	40,0	346,7	30,7	186,7	62,7
5,0	93,3	53,3	73,3	63,3	313,3	37,3	73,3	85,3
7,5	80,0	60,0	20,0	90,0	286,7	42,7	53,3	89,3
10,0	93,3	53,3	6,7	96,7	273,3	45,3	6,7	98,7
12,5	66,7	66,7	0,0	100,0	253,3	49,3	0,0	100,0
15,0	53,3	73,3	0,0	100,0	206,7	58,7	0,0	100,0
25,0	16,0	92,0	0,0	100,0	166,7	66,7	0,0	100,0



Should be mentioned that the complete removal of As (V) from solutions with tap water with concentrations of As (V) of 200 and 500 $\mu\text{g/L}$ is achieved by coagulant dose of 12.5 mg/L, while the model with distilled water have the maximum removal ratio of 92.0% for the initial concentration of As (V) of 200 $\mu\text{g/L}$ and 66.7% for the initial concentration of 500 $\mu\text{g/L}$, and coagulant dose increases in twice.

As the table shows, removal of As (V) compounds by coagulation in tap water is better than in distilled water. This result can be explained by the fact that tap water contain some amount of suspended solids, which may act as centers of flakes formation in the coagulation process.

So FeCl_3 dose of 12.5 mg/L is sufficient to remove the compounds of As (V) completely from models of natural waters under these conditions. In the case of study of water with higher content of suspended solids it is possible to reduce the required coagulant dose due to intensification of flake formation and sorption of dissolved arsenic substances on insoluble impurities.

References:

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