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# APPLICATION OF SULFURIC ACID AND SALT SOLUTIONS IN DRYING AND STORAGE OF POTATOES

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**Abstract:**

Using solutions of sulfite acid and its salts in the processing of potatoes, the prevention of browning of potatoes during storage and its effect on quality indicators were studied. The safety of the product stored under the influence of solutions of sulfite acid and its salts has been analyzed.

**Keywords:** Sulfur, sulfite anhydride, sulfite acid, sulfites, bisulfites, sulfitation

## INTRODUCTION

Nowadays one of the most issues is to develop potatoes and essential preparing to meet the food needs of the population of our country. Potatoes are wealthy in chemically and naturally dynamic substances - vitamins C, V1, V2, RR and around 20 minerals (R, K, Mg, Ca, Fe, etc.) as well as protein. In the process of processing potatoes, using solutions of sulfite corrosive and its salts, we studied the properties of sulfite corrosive and its salts in arrange to prevent darkening of the potato. When potatoes are processed under the influence of arrangements of this corrosive and its salts, it is observed that they are harmless to human health and reduce the degree of darkening of potatoes

Potatoes are one of the most desirable nutritional products. At present, the cultivation of potatoes and the production of various products by primary processing is one of the most urgent issues in order to ensure the need for food products of the population of our republic. The main nutrient substance of potatoes is starch. In dried potatoes, starch is about 80%.

Potatoes are one of the products rich in chemical and biologically active substances; from vitamins C, V1, V2, RR and about 20 components of mineral substances, it is a product that is rich in phosphorus, potassium, magnesium, kaltsium, iron and protein and contains all irreplaceable amino acids with high activity.

Experimental section. In the technological process of processing potatoes, during storage of dehydrated and dried product, its blackening condition can occur.

When fruits and vegetables are peeled or mechanically injured, the phenolic compounds in them are oxidized by atmospheric oxygen to form dark-colored melanoidins. In this case, first; there will be a change in the chemical composition of fruits and vegetables. Second; a decrease in product brand quality is observed. In our research, we consider it expedient to use solutions of sulfite acid and its salts in the process of processing potatoes.

In order to prevent the potatoes from darkening during the processing of potatoes, we set ourselves the following tasks:

Firstly study of the properties and modes of application of solutions of sulfite acid and its salts:

Secondly the melting of vitamin C when an acid solution is applied to the product.

Thirdly to ensure the separation of solutions of Applied acid and its salts from the finished product and without harm to human health.

When obtaining dried products from grapes and other fruits in the storage of fruits and vegetables, sulfuric acid is used quite extensively. Any chemical substance that must be applied should be cheap and easy to find, as well as convenient for easy separation from products. We found it necessary to choose sulfuric acid and its salts as such a substance. The most basic raw material in the extraction of sulfuric acid and its salts is sulfur. When sulfur is burned, sulfite anhydride gas is formed, which destroys gaseous microorganisms, and its solution in water is sulfite acid.

Analysis of the obtained results. Sulfite anhydride is a colorless gas with a pungent odor. It is 2.5 times heavier than air and is usually transported in thick-walled steel balloons compressed to processing plants. Sulfite anhydride

dissolves well in cold water. As the temperature increases, its solubility decreases. The temperature dependence of the solubility of sulfite anhydride gas is studied below. Table 1

**Temperature dependence of SO2 gas solubility. Table №1.**

| Sulfite anhydride | Temperature 0C | Solubility, in% |
|---|---|---|
| | 0 | 23 |
| | 20 | 11,5 |
| | 30 | 7,8 |
| | 40 | 5,4 |

From the above data, the lower the temperature, the higher the solubility of sulfite anhydride gas. Therefore, processing of products with sulfuric acid solution should be carried out at low temperatures. Especially dried potatoes are stored for a long time and do not lose their appearance, nutritional and tasty properties. In addition to sulfite anhydride and its aqueous solution N2 SO3 (sulfite acid), the use of sulfite acid salts in sulfitation techniques has been identified.

1 gr. the amount by which its salts can be applied to the sulfating product instead of sulfite anhydride (SO2).

**Amount of sulfating salts (in grams) Table №2.**

| Name of sulfite acid salts | Formula | Consumption amount |
|---|---|---|
| Sodium bisulfate | $NaHS0_3$ | 1,6 |
| Potassium bisulfate | $KHS0_3$ | 1,8 |
| Calcium bisulfite | $Ca(HS0_3)_2$ | 3,1 |
| Sodium sulfite | $Na_2SO_3$ | 2,0 |
| Potassium sulfite | $K_2SO_3$ | 2,6 |

When cleaning the potato peel with a 0.1% solution of NaHSO3 - sodium bisulfite for 1-3 minutes, it is determined that the potatoes do not darken in air for 6-8 hours, it can be stored completely on a waterless conveyor belt. Peeling of sulfated vegetables improves sanitation and reduces water consumption. Improves the brand appearance of dried potatoes when the surface of potatoes cut and blanched with 0.5% sodium bisulfite is processed.

Sulfuric acid forms compounds with various plant nutrients, including a large number of antibodies in fruits and vegetables, which combine with colored substances to form colorless complexes. For this reason, all sulfated fruits and vegetables become colorless. This reaction is reversible, and when S02 - sulfite anhydride gas is released from the product, the color of fruits and vegetables is restored.

Sulfite acid is a strong reducing agent and eliminates various oxidation processes in fruits, especially ascorbic acid. Therefore, to a certain extent, S02 - sulfide anhydride gas is one of the best means of storing vitamin C. Solutions of sulfite anhydride and its salts are toxic at working concentrations and may cause vomiting, headache, and inflammation of the mucous membranes when ingested. S02 gas in finished or semi-finished products can be separated by heating under the influence of temperature. The residual content of sulfite in dried potatoes and fruits and vegetables should not exceed 0.04%. [2]

## CONCLUSIONS.

When drying and storing potatoes, aqueous solution of S02 - sulfite anhydride gas can be used instead of sulfite acid, solutions of Ca salts.

Working concentrations of solutions in the technological processes of primary processing of potatoes were determined. However, the properties of acids and salts were studied. In summary, the temperature dependence of the solubility of solutions of sulfite acid and its salts was studied, it was found that the percentage of solubility at low temperatures is high, and sulfitation should be carried out at low temperatures in the process of cleaning, drying and storage of potatoes. The use of 0.1-0.5% solutions of sodium bisulfite to prevent darkening of potatoes, the reversible properties of the dried product in the storage of vitamin C, as well as the process of decomposition of S02 - sulfite anhydride gas when heated or boiled.

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