

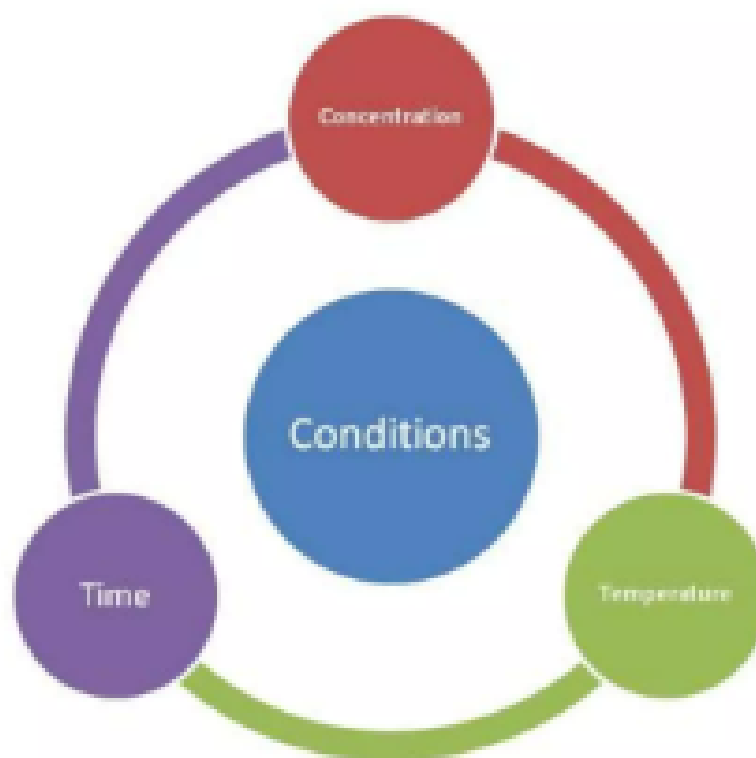
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## ABTRACT

The objective of this project is to Study of effect of Potassium bisulphite as a food preservative under various conditions



## INTRODUCTION

Growth of microorganisms in a food material can be inhibited by adding certain chemical substances. However the chemical substances should not be harmful to the human beings.

**Such chemical substances which are added to food materials to prevent their spoilage are known as chemical preservatives.**

In our country, two chemical preservatives which are permitted for use are:

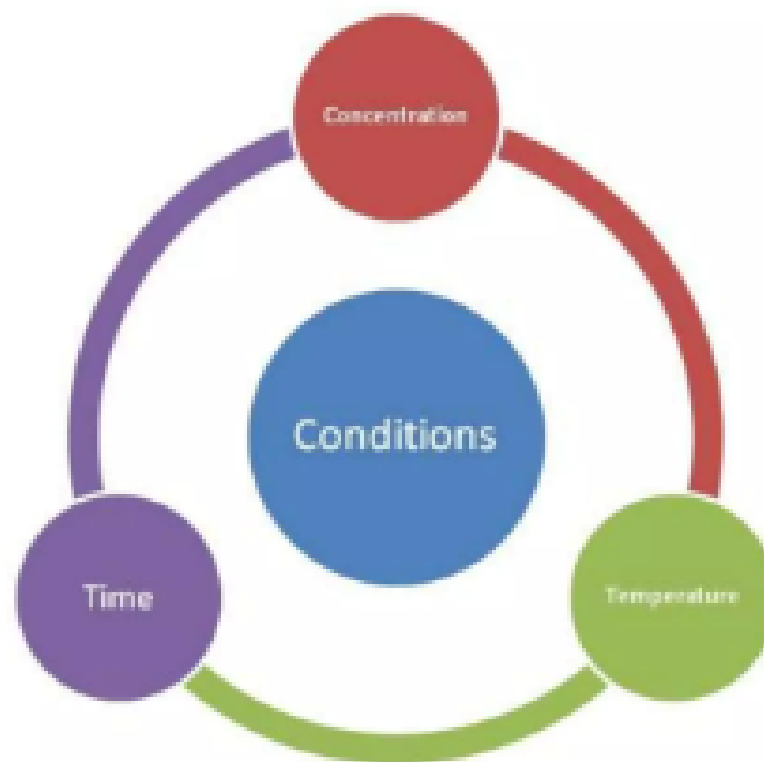
1. Benzoic acid(or sodium benzoate)
2. Sulphur dioxide(or potassium bisulphite)

**Benzoic acid** or its sodium salt, sodium benzoate is commonly used for the preservation of food materials. For the preservation of fruits, fruit juices, squashes and jams sodium benzoate is used as preservative because it is soluble in water and hence easily mixes with the food product.

**Potassium hydrogen sulphite or potassium bisulphite** is a chemical compound with the chemical formula  $\text{KHSO}_3$ . It is used during the production of alcoholic beverages as a sterilising agent.

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**Potassium hydrogen sulphite or potassium bisulphite** is a chemical compound with the chemical formula  $\text{KHSO}_3$ . It is used during the production of alcoholic beverages as a sterilising agent.

It is made by the reaction of sulphur dioxide and potassium carbonate. The sulphur dioxide is passed through a solution of the potassium carbonate until no more carbon dioxide is given off. The solution is concentrated and then allowed to crystallize

**Potassium bisulphite** is used for the preservation of colourless food materials such as fruit juices, squashes, apples and raw mango chutney. This is not used for preserving coloured food materials because Sulphur dioxide produced from this chemical is a bleaching powder.

Potassium bisulphite on reaction with acid of the juice liberates Sulphur dioxide which is very effective in killing the harmful micro-organisms present in food and thus prevents it from getting spoiled.



The advantage of this method is that no harmful chemical is left in the food.

The aim of this project is to study the effect of potassium bisulphite as food preservative.

- i. At different temperatures.
- ii. At different concentrations and
- iii. For different intervals of time.



- Beaker, pestle and mortar, glass bottles, balance and peeler.

## MATERIALS AND CHEMICALS

## THEORY

Food materials undergo natural changes due to temperature, time and enzymatic action and become unfit for consumption. These changes may be checked by adding small amounts of potassium bisulphite. The effectiveness of  $\text{KHSO}_3$  as preservative depends upon its concentration under different conditions which may be determined experimentally.

### **Procedure:**

1. Take fresh fruits, wash them thoroughly with water and peel off their outer cover.
2. Grind it to a paste in the mortar with a pestle.
3. Mix with sugar and colouring matter.
4. The material so obtained is fruit jam. It may be used to study the effect of concentration of sugar and  $\text{KHSO}_3$ , temperature and time.



1. Take three wide mouthed reagent bottles labelled as I II III.
2. Put 100 gm of fruit jam in each bottle.
3. Add 5.0 gm, 10.0 gm and 15.0 gm of sugar to bottle No. I, II and III respectively.
4. Add 0.5 gm of  $\text{KHSO}_3$  to each bottle.
5. Mix contents thoroughly with a stirring rod.
6. Close the bottle and allow them to stand for one week or 10 days at room temperature.
7. Observe the changes taking place in Jam every day

**RECORD:**

Bottle number	A	B	C
Weight of jam taken	100 gm	100 gm	100 gm
Weight of sugar added	5 gm	10 gm	15 gm
Weight of $\text{KHSO}_3$	0.5 gm	0.5 gm	0.5 gm
Observation (Days)			
Day 1	Colour	Dark orange	Dark orange
	Odour	Pleasant smell	Pleasant smell
	Fungus	Fungus not formed	Fungus not formed
Day 2	Colour	Dark orange	Orange
	Odour	Pleasant smell	Pleasant smell
	Fungus	Fungus not formed	Fungus not formed
Day 3	Colour	Dark orange	Orange
	Odour	Pleasant smell	Pungent smell

	Fungus	Fungus not formed	White Fungus formed	White Fungus formed is more than B
Day 4	Colour	Orange	Light Orange	Light Orange
	Odour	Pungent Smell	Pungent Smell	Pungent Smell
	Fungus	White Fungus is formed	White fungus has increased	Fungus turned greenish in colour
Day 5	Colour	Dark orange	Light Orange	Yellow Colour
	Odour	Pungent smell	Pungent smell	Smells ethanolic
	Fungus	White fungus has increased	Fungus turned greenish in colour	Greenish colour fungus has increased
Day 6	Colour	Light Orange	Yellow colour	Yellow colour fades
	Odour	Smells Ethanolic	Smells Ethanolic	Smells Ethanolic
	Fungus	Fungus turned greenish in colour	Greenish colour fungus has increased	Fungus turned in black colour
Day 7	Colour	Yellow colour	Dark orange	Yellow colour fades
	Odour	Smells ethanolic	Smells ethanolic	Smells ethanolic
	Fungus	Greenish colour fungus has increased	No fungus is formed	Spoilt

**(B) Effect of concentration of  $\text{KHSO}_3$  :-**

1. Take bottles labelled as I, II, III.
2. Put 100 gm of Jam in each bottle.
3. Add 5.0 gm of sugar to each bottle.
4. Add 1.0 gm, 2.0 gm and 3.0 gm of  $\text{KHSO}_3$  to bottle No. I, II and III respectively.
5. Mix the contents thoroughly with a glass rod.
6. Keep all the bottles at room temperature for about 10 days and observe the changes everyday.

**RECORD:**

Bottle No.	Wt. of jam taken added	Wt. of sugar	Wt. of $\text{KHSO}_3$	Observations (Days)				
				1	2	3	4	5
I	100 gm.	5.00 gm.	1.0gm	no	no	no	few	some
II	100 gm.	5.00 gm.	1.0 gm.	no	no	no	no	few
III	100 gm.	5.00 gm.	1.0 gm.	no	no	no	no	no

**Result:** The increase in concentration of  $\text{KHSO}_3$  increase more time of preservation.

**(C) Effect of temperature:-**

1. Take 100 gm of Jam in three bottles labelled as I, II and III.
2. Add 10.0 gm of sugar and 1.0 gm of  $\text{KHSO}_3$  to each bottle.
3. Mix the contents thoroughly with a stirring rod.
4. Keep bottle No. I in the refrigerator at  $0^\circ\text{C}$ , bottle No. II at room temperature ( $25^\circ\text{C}$ ) and bottle No. III in a thermostat at  $50^\circ\text{C}$ . Observe the changes taking place in the jam for 10 days.

**RECORD:**

Bottle No.	Wt. of jam taken added	Wt. of sugar	Wt. of $\text{KHSO}_3$	Observations (Days)				
				1	2	3	4	5
I	100 gm.	5.00 gm.	2.0gm	no	no	no	no	no
II	100 gm.	10.00 gm.	2.0 gm.	no	no	no	no	Few Fermented
III	100 gm.	15.00 gm.	2.0 gm.	no	no	Few Fermented	Some Fermented	Some more Fermented

**Result:** The increase in Temperature causes fast fermentation of jam

## **Conclusion**

Food containing more amount of sugar is not favourable to keep for a long time. Potassium bisulphite is a good preservative.

### **Uses**

There are a number of uses for potassium bisulphite as a food preservative. The Manitoba Agriculture, Food and Rural Initiatives reports this product works to prevent the growth of mold, yeast and bacteria in foods. It is also an additive for homemade wine. Potassium bisulphate is found in some cold drinks and fruit juice concentrates. Sulphites are common preservatives in smoked or processed meats and dried fruits. In spray form, it may help prevent foods from discolouring or browning.

### **Availability**

Potassium bisulphite is primarily a commercial product. You might find this chemical compound at meat processing plants. Manufacturers of juice drinks and concentrate will use potassium bisulphite to increase the shelf life of their products. The preservative is also available for home use.

### **Allergies**

Sulphites such as potassium bisulphite can trigger an attack for those with asthma. Potassium bisulphite may cause lung irritation.

## **Bibliography**

The necessary information for the project is collected from the references stated below:

- [http://en.wikipedia.org/wiki/Potassium\\_bisulfate](http://en.wikipedia.org/wiki/Potassium_bisulfate)
- <http://www.thetrustedtrolley.com.au>
- <http://www.livestrong.com/article/308673-potassium-bisulphate-as-a-food-preservative/>