Spect. Deter. Of Benzoic Acid in 7up

Introduction:

Food additives are substances that are not normally consumed as food itself but are added to food intentionally for one or more technological purposes. Food additives are classified into many functional classes, for example, acidity regulators, antioxidants, colors, emulsifiers, preservatives, stabilizers, sweeteners, and thickeners. Approval of substances for use as food additives, identity and purity criteria of approved additives, maximum use level of the approved additives at the different commodities in which they may be used, and food items in which their use is not acceptable are regulated by international or national authorities.

What is/are:

Food Additives?
Preservatives?
Possible Main Side Effects of Preservatives?
Benzoic Acid?
Sodium Benzoate?
SFDA & FDA Limits?
Used λ_{MAX}?
Used Cuvette?

Food Additives:

Substances that are added to food to maintain or improve the safety, freshness, taste, texture, or appearance of food are known as food additives. Some food additives have been in use for centuries for preservation – such as salt (in meats such as bacon or dried fish), sugar (in marmalade), or sulfur dioxide (in wine).

Preservatives:

A wide variety of compounds that help slow or prevent bacterial growth in a wide range of products, including foods, medicines, and personal care products. These compounds can be natural or synthetic. Preservatives play important roles in many products people use every day – for example, by helping prevent the growth of harmful microorganisms and protect products from spoilage or contamination.

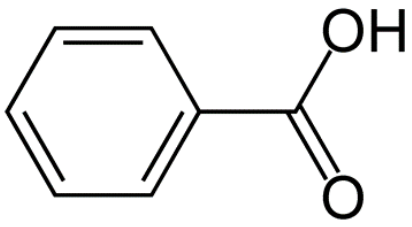
Possible Main Side Effects of Preservatives:

1. One of the possible harmful effects of preservatives could be a trigger for breathing problems asthma, bronchitis.
2. Preservatives can cause problem within young children like hyperactive behavior. This problem is also measured by parental and objective reporting.
3. Sustained and excessive consumption of artificial preservatives can weaken heart tissues which is dangerous especially for the aged people.
4. They could contain BHA and BHT food additives which could be cancer causing. BHT is used in cereals and fats while BHA could be present in potatoes, meats and other baked goods.
5. Preservatives could cause obesity in some as it contains fatty acids especially in processed foods.

Benzoic Acid:

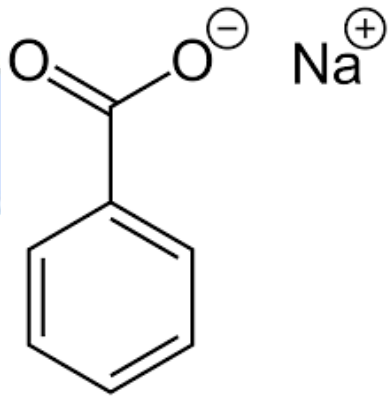
Benzoic acid, also known as benzoate or E210, belongs to the class of organic compounds known as benzoic acids. These are organic Compounds containing a benzene ring which bears at least one carboxyl group. Benzoic acid exists as a solid, slightly soluble (in water), and a weakly acidic compound (based on its pKa).

Benzoic acid has been found throughout most human tissues, and has also been detected in most biofluids, including saliva, feces, urine, and sweat. Within the cell, benzoic acid is primarily located in the cytoplasm and endoplasmic reticulum. Benzoic acid exists in all eukaryotes, ranging from yeast to humans. Benzoic acid is also a parent compound for other transformation products, including but not limited to, 4-(2-carboxyphenyl)-2-oxobut-3-enoic acid, 4-hydroxy-3-octaprenylbenzoic acid, and hydroxybenzoic acid. Benzoic acid is a potentially toxic compound.

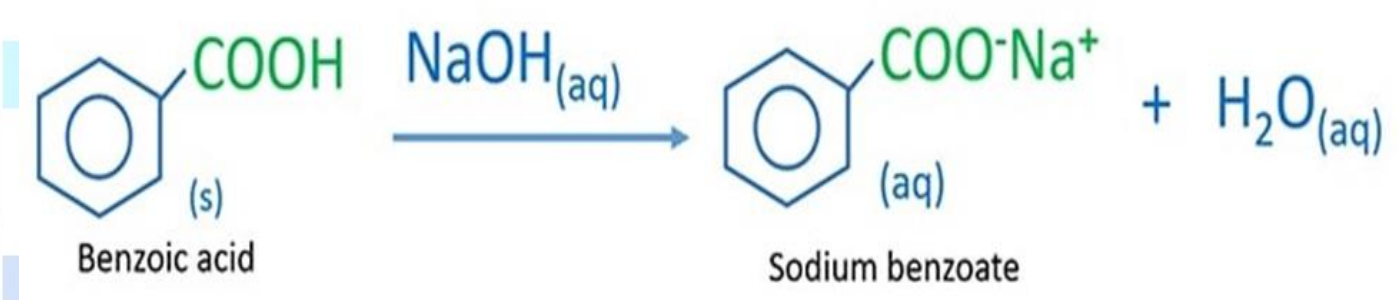


Sodium Benzoate:

Sodium benzoate or E211 is an organic sodium salt resulting from the replacement of the proton from the carboxy group of benzoic acid by a sodium ion. It has a role as an antimicrobial food preservative, a drug allergen, an EC 1.13.11.33 (arachidonate 15-lipoxygenase) inhibitor, an EC 3.1.1.3 (triacylglycerol lipase) inhibitor, an algal metabolite, a human xenobiotic metabolite and a plant metabolite. It contains a benzoate. It is used as an antifungal preservative in pharmaceutical preparations and foods. It may also be used as a test for liver function.



Sodium Benzoate Formation reaction:



SFDA & FDA Limits:

The U.S. Food and Drug Administration (FDA) specifies a maximum level of (0.1 percent) of Both Sodium Benzoate & Benzoic Acid.

The Saudi Food and Drug Administration (SFDA) specifies a maximum level of (500ppm/day) of Both Sodium Benzoate & Benzoic Acid.

Used λ_{MAX}:

276nm

Used Cuvette:

UV Quartz has an extended transmission range of 190-2,500 nm. For UV experiments, you absolutely need a UV quartz cuvette. This type of high purity synthetic quartz is also known as "Fused Silica". The crystal clear amorphous silicon dioxide material contains only silicon and oxygen and almost no impurities. Only these unique quartz glass grades offer an excellent transmission for deep UV-light.

Expermental:

1- Prepare 500ml Of [0.1M] (NaOH) using distelled water.

2- Prepare 50ml of [100ppm]Benzoic acid using **[0.1M] (NaOH)**.

3- Prepare next (all in **50ml** Volumetric Flask):

NO	1	2	3	4	5	Blank	Unknown
50ml							
BA (ppm)	5	10	15	20	25	NIL	NIL

4- Take 5ml of the given unknown in 50ml Volumetric Flask.

5- Fill all with **NaOH [0.1M]** and **SHAKE** well.

6- Move to the next Laboratory and determine the concentration of Benzoic Acid (As Sodium Benzoate) in a can of soft drink (330ml).

Results:

No.	$C_{(ppm)}$	Absorbance
Blank	NIL	0
1	5	A_1
2	10	A_2
3	15	A_3
4	20	A_4
5	25	A_5
Unknown	?	?

Calibration Graph: