

STUDENTS OF  
*MSB Educational Institute*

PRESENTS A RESEARCH PROJECT ON



*BREAD  
MATTERS*



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## CONTENTS

| <i>S. NO.</i> | <i>TOPIC</i>   | <i>PAGE NO.</i> |
|---------------|--|-----------------|
| 1.            | <i>ABSTRACT</i>  | 2               |
| 2.            | <i>INTRODUCTION</i>                                      | 3               |
| 3.            | <i>METHODOLOGY</i>                                       | 6               |
| 4.            | <i>FINDINGS and RESULTS</i>                              | 9               |
| 5.            | <i>DISCUSSION</i>  | 12              |
| 6.            | <i>REFLECTIONS</i>                                       | 13              |
| 7.            | <i>APPENDIX</i>  |                 |
|               | <i>a) Citations</i>                                      | 14              |
|               | <i>b) Survey questionnaire</i>                           | 15              |
|               | <i>c) Observation and inference chart</i>                | 17              |
|               | <i>d) Scanned copy of readings</i>                       | 19              |
|               | <i>e) Photographs of students performing experiments</i> | 21              |
| 8.            | <i>ACKNOWLEDGEMENT</i>                                   | 23              |
| 9.            | <i>REFERENCES</i>  | 24              |



# 1

## ABSTRACT



*Bread is a staple of the human diet. After thousands of years, it remains the most regularly consumed food in the world, due to its convenience, portability, nutrition, and taste. But these days it is being treated with harmful substances which enhance its quantity and characteristics but reduces its quality. Hence our research question, "How safe and healthy are the different varieties of bread available in the market?" Using secondary data, we conducted a series of experiments to detect the presence of Calcium propionate and Potassium bromate in bread. The results of the experiment showed that more than 50% of the samples showed presence of preservatives and additives. Through questionnaire (google forms), we were able to study the level of awareness in the public domain. Thus, from our survey we conclude that children preferred to consume bread, also consumers are aware that there are chemicals added to bread and they are harmful to health. Having said this the consumers are ready to shift to a healthier option. Our findings were conclusive and our hypothesis was proved to be right, that commercially available breads are not safe and healthy because of certain ingredients used in bread to manipulate the characteristics of the finished product. Our project will help people by making them aware about the ill effects of consuming commercially available bread. Also, this will urge people to choose a healthier option to replace bread in their daily diet.*



## 2

# INTRODUCTION

*Bread is a staple of the human diet. After thousands of years, it remains the most regularly consumed food in the world, due to its convenience, portability, nutrition, and taste.*



***Breads** are rich in complex carbohydrates. Carbohydrates are an **important** part of our diet as they provide us with energy. **Bread** contains various vitamins, including Thiamin (Vitamin B1) and Niacin (Vitamin B3) which are essential for releasing energy from food. Bakery products, due to high nutrient value and affordability, are an item of huge consumption. Due to the rapid population rise, the rising foreign influence, the emergence of a female working population and the fluctuating eating habits of people, they have gained popularity among people. One more benefit of bakery products is time saving. By serving bakery products to sudden guests, homemakers save their time and prove their homely skills. It does not require much time in preparing meals if you have ready-made breads or buns at home. Their durability, taste, and eye-catching appeal make the product famous.*

*Traditionally bread has only four ingredients: flour, yeast, water and salt – but things have changed and many harmful ingredients are used in the bread making process. Dough conditioners, preservatives, artificial sweeteners, artificial flavours and colours are added to make bread look more attractive.*



On the basis of information given above,  
Our research question is, *“How safe and healthy are the different varieties of bread available in the market?”*

*We all agreed upon, why we wanted to work on the above question was because we had some notions in our minds which needed answers. The personal reasons were:*

- *Whenever I have readymade bread, I get an upset stomach. I want to know if there is any correlation between packaged bread and my stomach problem.*



- *My granny says that readymade breads have chemicals and preservatives added to it.*





It has been reported in the media and newspaper that commercially available bread is not a very healthy nor safe for consumption. Some very recent news references have been cited below,

1) A news article written by Sonal Mehrotra has highlighted the fact that there are indeed toxic chemicals found in breads.

<https://www.ndtv.com/india-news/toxic-chemicals-in-bread-burgers-pizza-health-ministry-orders-probe-1409288>

2) Also an article by Elizabeth Thatcher emphasizes on the negative effects of calcium propionate on children, which is used as a preservative in breads

<https://www.livestrong.com/article/314019-the-side-effects-of-calcium-propionate/>

Therefore, we think that commercially available breads are not safe and healthy because of certain ingredients used in bread to manipulate the characteristics of the finished product.



## CONCLUSION

Bread is a staple of the human diet. After thousands of years, it remains the most regularly consumed food in the world, due to its convenience, portability, nutrition, and taste. But these days it is being treated with harmful substances which enhance its quantity and characteristics but reduces its quality.

Through our survey and tests, it is clear that bread sold in market has additives present in them which is harmful for human health. With the complete analysis of the scenario we conclude that public health is an important issue, but consumers knowing the fact that bread has chemicals added to still tend to consume it due to its easy of availability and convenience.

We concluded that more than 50% of the samples showed presence of preservatives and additives. Also most of the consumers are aware that chemicals are added to bread to make it soft and increase its shelf life and they are ready to accept other healthier options and include them in their daily diet.

But with proper awareness among the people and understanding of the criticality of the issue, consumers can avoid bread by using other healthier options or by baking bread at home.

Hence our hypothesis was proved to be right, that commercially available breads are not safe and healthy because of certain ingredients used in bread to manipulate the characteristics of the finished product.



# 3

## METHODOLOGY

Data collection is a process of collecting information from all the relevant sources to find answers to the research question, test the hypothesis and evaluate the outcomes. The choice of appropriate data collection methods should be based on the research questions and the possible data sources. Data forms the basis for testing our hypothesis. Accurate process of measurement, analysis, testing and reaching inferences help in getting answers to our question.

We used the following methods of collection of data in order to reach our project goals.

The following are our project goals,

1) **To determine the harmful additives, present in commercially packaged bread.**

To achieve this goal, we used the method of **EXPERIMENTATION and SECONDARY DATA**. We collected **SECONDARY DATA** on the different additives present in bread and about the various test to be conducted on bread. Based on this information we formulated our strategy for conducting tests in our school laboratory. We collected 18 different bread samples and tested for presences of adulterants. We conducted the test on 2 different days with different samples (a total of 36 samples). From the secondary data we collected we gathered the following information.

**White bread may do more harm than good**, by providing excess calories and few nutrients. Packaged and pre-sliced white bread is made of highly-processed, simple carbohydrate. This is digested quickly without providing many nutrients or benefits to the body. **Consuming too much commercially packaged white bread can contribute to obesity, heart disease, and diabetes.** Potassium bromate is an additive widely employed by bread makers to improve bread quality. In addition to the above **Fats, Flour treatment agents, Bleach, reducing agents, emulsifiers and preservatives** are added to bread. Out of all the additives in bread we only tested two additives that we felt we should investigate and find out the extent of their presence.

We have attached the observation and inference chart and the format for recording our test results in the appendix for reference.

a) **Test for detection of Calcium propionate (Preservative)**

- I. Ferric ammonium sulfate solution is added to the bread sample. A red-brown complex indicates the presences of Calcium propionate.
- II. To the sample of bread add 5ml of 6M sulphuric acid and 3 or 4 ml of 95% ethanol, heat the contents just upto boiling point. A pineapple like odour indicates the presences of Calcium propionate.



## *6) Test for detection of Potassium bromate (Additive)*

*I. Test was performed directly on a portion of each bread sample with 2ml of 0.01M promethazine and 0.6ml of 12M hydrochloric acid. The change in colour of each bread sample to pink indicates the presence of potassium bromate.*

*II. Water was added to wet the samples. 0.5ml of 1% potassium iodide solution in 2M HCl was added. The test tubes, covered and allowed to stand for a day. The appearances of black spots on the samples indicate the presence of potassium bromate in the bread samples.*

*The following tests were conducted in our school laboratory between 6<sup>th</sup> September and 16<sup>th</sup> September 2018. Most of the required chemicals were available in our laboratory, but we had to order for Ferric ammonium sulfate and promethazine to test the presence of calcium propionate and potassium bromate respectively.*

*2) To evaluate the trend of additives and preservatives added in different types of bread that are available in the market.*

*To fulfill this goal, we used the method of **OBSERVATION**.*

*By **observation** of the results of the chemical tests conducted on 36 samples of different types of bread, we were able to find out the trend of additives added to bread and also the presence of preservatives.*

*3) To test public knowledge about bread, its harmful effects and some options to substitute commercially available bread.*

*To fulfill this goal, we used the method of **QUESTIONNAIRE**.*

*We used Google Forms and prepared a questionnaire, we collected **responses of 88 people online** which gave us information relating to people responses about commercially packaged bread and if there are any other options that can be used to substitute commercially available bread. We conducted this survey between 02<sup>nd</sup> November and 12<sup>th</sup> November 2018. The questionnaire is attached in the appendix for reference.*

*The strategies that we have discussed above helped us in uncovering the appropriate data about different types of additives present in commercially packaged bread. With this data we made children aware about the harmful effects of these additives in commercially available bread so that an appropriate step can be taken by them.*





*Following are some of the health issues caused due to Potassium bromate and calcium propionate.*

*Perhaps the most dangerous ingredient used in bread-making is potassium bromate. This is used as a flour improver to strengthen dough and produce a higher rise in bread.*

*Consumption of **potassium bromate** has been linked to damage of the kidneys and nervous system. The International Agency for Research on Cancer considers the chemical a possible carcinogen. It places Potassium Bromate in the list of 290 other chemicals, which are 'possibly carcinogenic to human'.*

***Calcium propionate** – an antifungal preservative, has the ability to permanently damage stomach lining by exacerbating gastritis and inducing severe ulcers. A study in the Journal of Pediatric Child Health found that chronic exposure to calcium propionate may induce a variety of behavioral changes, including irritability, restlessness, inattention, and sleep disturbance. If you have chronic migraines, the cause may be calcium propionate.*

*Every year, 6000 people are diagnosed with kidney cancer, and studies have found that eating highly refined foods like white bread could account for a significant percentage of those cases. Sadly, 3400 people die from this cancer each year.*

*Why put yourself or your children at risk of such a deadly disease? By eating just five slices a day, you are more than doubling your risk of cancer. Foods like white bread are high on the glycemic index, they cause sugar to be released quickly instead of over time, which triggers the release of insulin and other chemicals that spur the growth of cancer cells. People who eat more whole grains, poultry, and vegetables, on the other hand, are at a much lower risk for the illness.*

### *Timeline for our project*

| <i>Time period</i>  | <i>Task completed.</i>                                  |
|---|---|
| <i>2<sup>nd</sup> August to 16<sup>th</sup> August</i>      | <i>Brainstorming for research question</i>              |
| <i>17<sup>th</sup> August to 27<sup>th</sup> August</i>     | <i>Rationale and Citations</i>                          |
| <i>24<sup>th</sup> September to 5<sup>th</sup> October</i>  | <i>Introduction</i>                                     |
| <i>6<sup>th</sup> October to 13<sup>th</sup> October</i>    | <i>Methodology and collection of secondary data</i>     |
| <i>15<sup>th</sup> October to 2<sup>nd</sup> November</i>   | <i>Experimentation in laboratory</i>                    |
| <i>19<sup>th</sup> November to 25<sup>th</sup> November</i> | <i>Collection of data through questionnaire</i>         |
| <i>26<sup>th</sup> November to 7<sup>th</sup> December</i>  | <i>Analysing, Compilation and completion of project</i> |

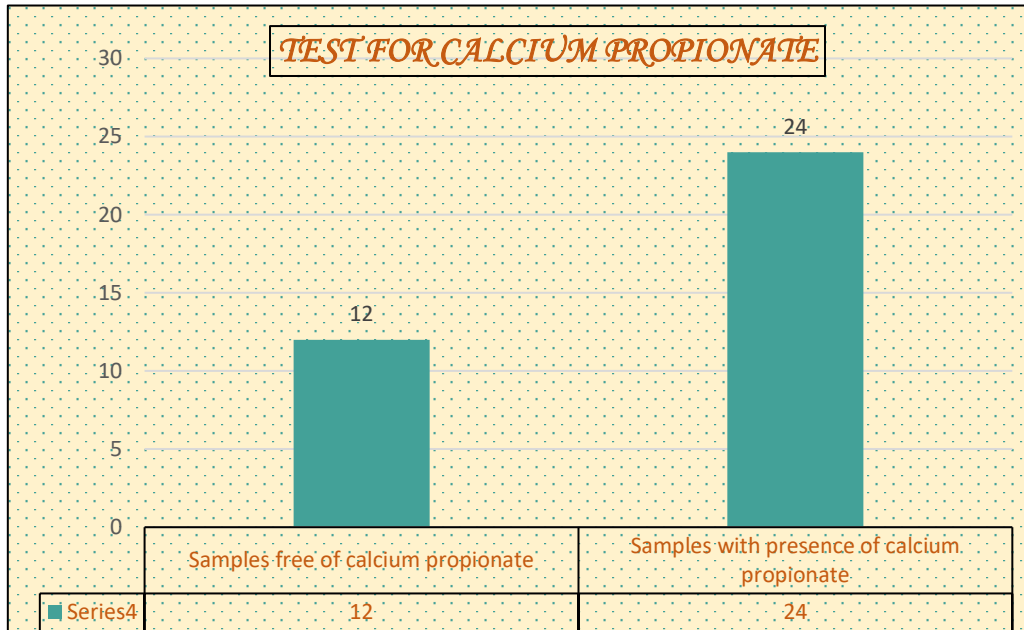


# 4

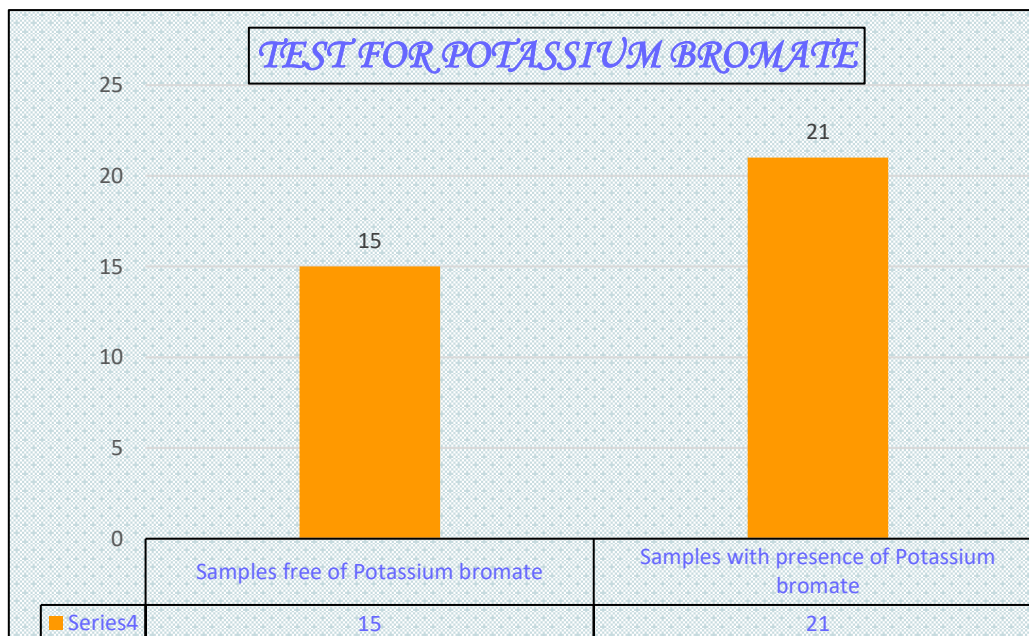
## FINDINGS AND RESULTS

As mentioned in our methodology section for objective 1, we have collected the samples for different types of bread available in the market. We did chemical tests (mentioned in methodology) on these samples for indication of additives like calcium propionate and potassium bromate. Following results were obtained:

### Presence of Calcium propionate



### Presence of Potassium bromate

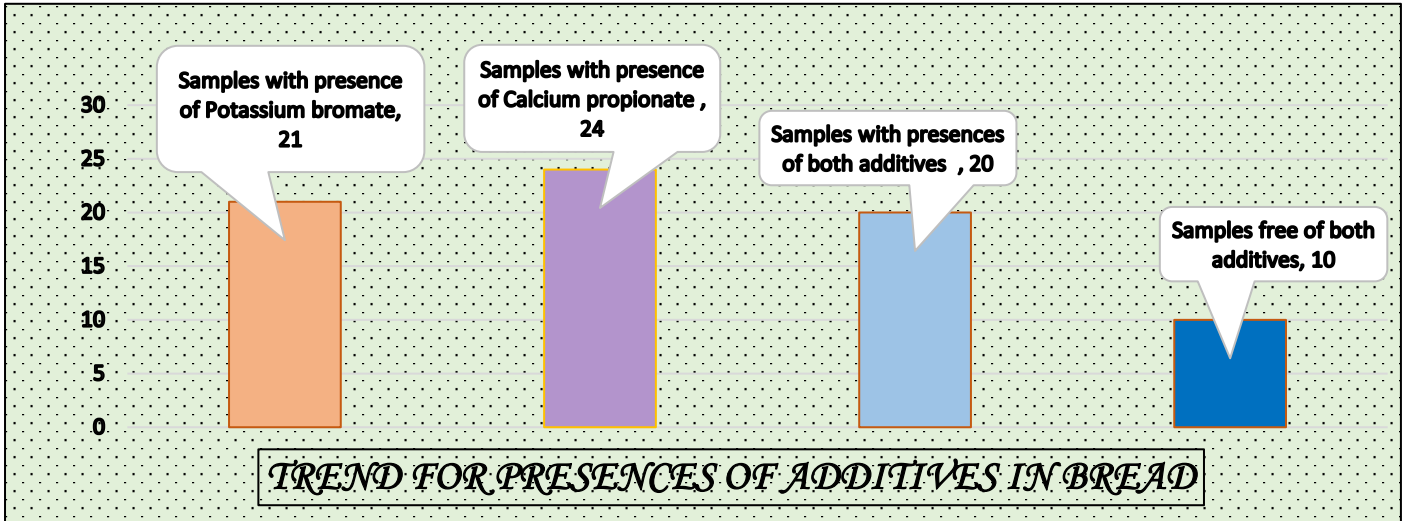


From the tests conducted we analyzed that

- 67% of the samples tested positive for presences of Calcium propionate
- 58% of the samples tested positive for presences of Potassium bromate



By **observation** of the results of the chemical tests conducted on 36 samples of different types of bread, we were able to find out the trend of additives added to bread and also the presence of preservatives and hence reach our second objective. After recording the observations for different types of bread samples, we analyzed it in the form of a histogram chart.

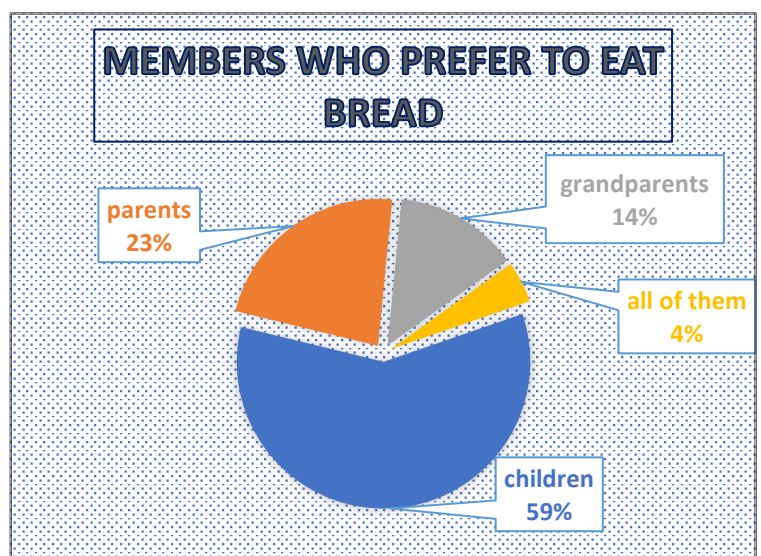


This graph infers the trend for presence of additives in bread as follows:

- Calcium propionate which is a preservative was found in 67% of bread samples.
- Potassium bromate a carcinogenic substance was found in 58% of bread samples.
- 56% of the samples were found to have both the additives.
- Only 28% of the samples were found to be free of additives

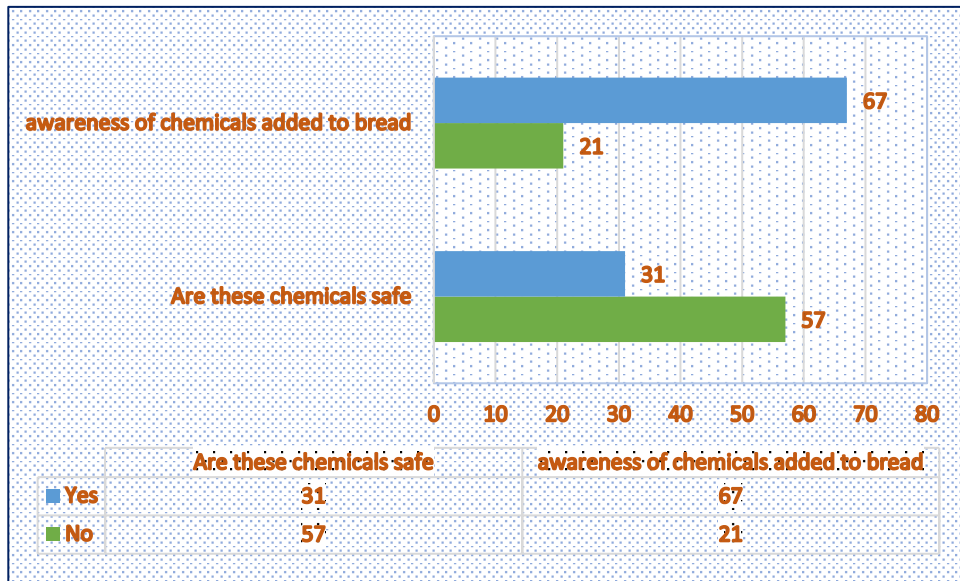
To test public knowledge about bread, it's consumption pattern and some options to substitute commercially available bread, we conducted a survey by using a preplanned set of questions on google forms. We collected responses of 88 people which gave us the following results:

|                     |    |     |
|---------------------|----|-----|
| 1. Children         | 52 | 59% |
| 2. Parents          | 20 | 23% |
| 3. Grandparents     | 12 | 14% |
| 4. All of the above | 4  | 4%  |

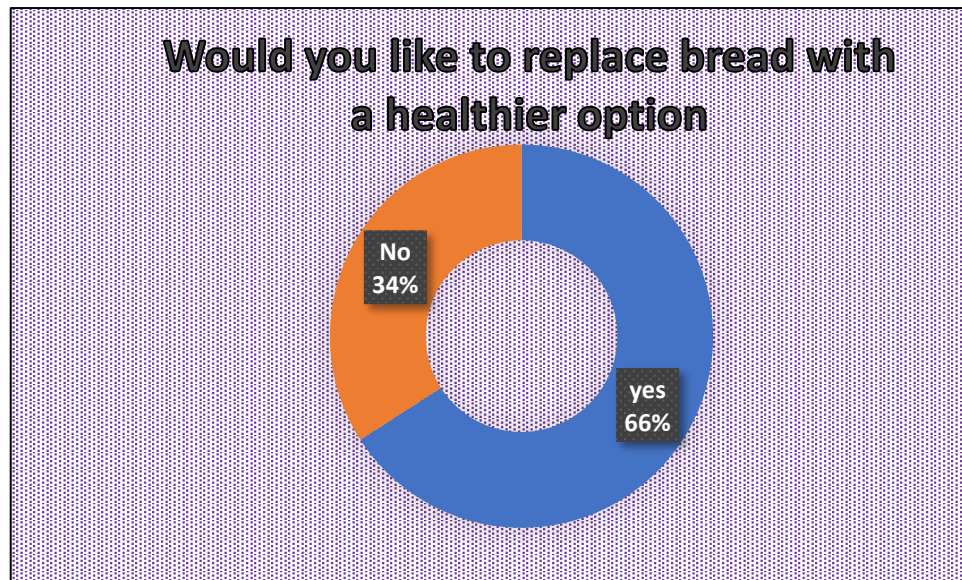


Formula used for percentage calculation:  
 $(\text{No. of responses} * 100) / \text{Total responses}$

After studying survey questions of 88 sample sizes, we found that 59% of children preferred to consume bread.



*Most consumers were aware that chemicals are added to bread and it is harmful for health.*



*Most consumers were ready to shift to a healthier option.*

*After surveying and testing the bread samples, the results showed that the younger generation preferred bread. Also people are not very conscious about the harmful effects on bread on human health.*

*We also inferred that*

- *More than 50% of the samples showed presence of preservatives and additives*
- *Most of the consumers are aware that chemicals are added to bread to make it soft and increase its shelf life.*
- *From the survey we learnt that majority of the consumers are willing to accept other healthier options and include them in their daily diet.*



## 5

### DISCUSSIONS

From the above findings we conclude that commercially available bread has additives like calcium propionate added to increase its shelf life and there is presence of potassium bromate a carcinogenic which is added to make the dough viscoelastic such that it can retain the carbon dioxide gas produced by the yeast. This makes the bread rise in the oven, increase its loaf volume and texture.

Thus from our survey we conclude that children preferred to consume bread, also consumers are aware that there are chemicals added to bread and they are harmful to health. Also, the consumers are ready to shift to a healthier option.

Thus this answers our research question is, “How safe and healthy are the different varieties of bread available in the market?”

Also our hypothesis that commercially available breads are not safe and healthy because of certain ingredients used in bread to manipulate the characteristics of the finished product, was proved to be right as the results of the tests conducted on bread samples showed that most of the samples had presence of calcium propionate and potassium bromate.

We proved that our hypothesis was right, but there may have been certain factors which might have influenced our results like:

- ❖ We may have failed to follow the exact procedures specified for the experiments.
- ❖ We may have unintentionally transmitted our expectations to match our results.
- ❖ The sample size selected by us for our questionnaire may not be a true representation of the entire population.
- ❖ People may not have answered our questionnaire sincerely.

Having said the above, we still feel that our research can help people by making them aware about

- ❖ There are additives added to bread.
- ❖ The ill effects of consuming commercially available bread.
- ❖ Help people choose a healthier option to replace bread in our daily diet.

As students even after our research is over, we will try to continue to create awareness by writing articles about additives present in bread in our school bulletins. To create further awareness our school is including “baking bread at home” as part of our home science and cooking classes. Our teachers are talking to the children and making them aware of the ill effects of consuming bread on a regular basis.

After conducting the tests on different samples of bread we had new questions in our minds how safe are the biscuits available in the market. We would also like to do research on “How safe and healthy are the different varieties of biscuits available in the market?”



# 6

## REFLECTIONS

### 1) *Hozefa Kader*

*The best part of our research project was conducting the survey. I learnt how important it is to work as a team. I had imagined the research project as easy and a short activity but it was challenging and took a lot of time. It was time consuming as we searched the internet for information, read news paper articles. If given an opportunity I would like to research on poverty in India and the education system in schools of India.*

### 2) *Maria Sidpurwala*

*I learnt many things from this project. It was very difficult to work on Fridays and Saturdays. I couldn't manage my time with my tuitions, tests and assessments. What have I learnt? Yes, the research project has helped me in self-development because I had to use a lot of vocabulary and I was reading a lot of books, articles etc....Doing all this in research will surely help me and others in the future.*

### 3) *Mustafa Bankwala*

*While doing this research project I learnt a lot of things. I learnt how to interact with people. The most enjoyable part of this research project was meeting every single day and discussing the project. It helped us to bond well as teammates. At the same time it required a lot of hard work, brainstorming of ideas, focus and concentration to complete the project. I had to juggle all this with my studies and assessments but it was fun.*

### 4) *Zainab Sapatwala*

*The most exciting part of this project was moving out of the classroom and learning new things. The basic difficulty I faced was due to compilation of data and matching time with my group due to our busy schedule. If I had to research again, I would love to do a new and different topic with a new set of friends.*



# 7

## APPENDIX

Here we have attached all our forms, filled results sheet, scanned questionnaire copy, photographs and citations. Which have been mentioned in the serial order and with page nos. in our CONTENT page.

### a) CITATIONS

Some very recent news references have been cited below,

#### 1) Toxic Chemicals in Bread, Burgers, Pizza? Health Ministry Orders Probe

Written by Sonal Mehrotra | Updated: May 24, 2016

**AT A GLANCE – THE STUDY RESULTS**

| Sample type            | Brands with potassium bromate/iodate                | Concentration (ppm) | % Samples with potassium bromate/iodate |
|------------------------|---|---------------------|---|
| White bread            | Harvest Gold White Bread– Premium Quality           | 17.32               | 100% (4/4)                              |
|                        | Britannia Daily Fresh Healthy Slice Bread           | 17.12               |   |
|                        | Perfect Premium Quality White Bread– A Classic Bake | 15.01               |   |
|                        | Le Marché Jumbo Bread Slice (White Bread)           | 11.52               |   |
| Whole wheat/Atta bread | Le Marché Whole Meal Bread                          | 4.67                | 75% (3/4)                               |
|                        | Britannia 100% Whole Wheat Bread                    | 2.58                |   |

<http://cseindia.org/content/what%E2%80%99s-our-bread>

<https://www.ndtv.com/india-news/toxic-chemicals-in-bread-burgers-pizza-health-ministry-orders-probe-1409288>

#### 2) The Side Effects of Calcium Propionate

by Elizabeth thatcher oct. 03, 2017

An article on the side effects of using calcium propionate as a preservative in bread

<https://www.livestrong.com/article/314019-the-side-effects-of-calcium-propionate/>



## 6) SURVEY QUESTIONNAIRE

# Bread Matters

*This questionnaire is a part of a research project and is designed to seek public opinion about bread, its harmful effects and some options to substitute commercially available bread.*

*We, the students of MSB Educational Institute would be glad to have your contribution to test public knowledge about the same.*

*Thank you*

*How often do you and your family consume bread?*

- Regularly
- Once a week
- Once a month

*Which members of the family prefer to eat bread?*

- Children
- Parents
- Grandparents
- All of the above

*How many slices of bread do you consume in a meal?*

- 1-2
- 2-4
- more than 4

*What type of bread do you eat?*

- Locally made (bakery)
- Commercially packed
- Reputed stores/bakers

*Why do you prefer to eat bread?*

- Taste
- Ease of availability
- Ready to eat
- Hygienic

*In what form do you consume bread?*

- Pizza/Burgers
- Sandwichs
- Pav bhaji/ Vada Pav
- all of the above





*Do you think consuming bread is good for health?*

- Yes*
- No*
- Don't know*

*What nutritional value do you think commercially bread have?*

- Makes one energetic*
- Has added vitamins*
- provides carbohydrates to the body*
- No nutritional value*

*Which type of bread do you think is safe to consume?*

- Locally available Pav and its variants*
- Commercially packed white bread*
- Multigrain*
- Brown bread*

*Chemicals are added to make bread softer and increase its shelf life, are you aware?*

- Yes*
- No*

*Do you think these chemicals are safe for consumption?*

- Yes*
- No*
- Don't know*

*Do you think our traditional breads like Roti, Dosa, Parathas..etc., are healthier to commercially available breads?*

- Yes*
- No*

*Would you like to replace bread with any other healthier option?*

- Yes*
- No*

*With what do you think it can be replaced?*

- Rotis/Parathas/Dosas*
- Home baked breads*

*Would you like to bake bread at home?*

- No*
- Yes*



c) FORM TO FILL READINGS OF TESTS CONDUCTED

TABLE FOR RECORDING TEST RESULTS

**Test for presences of Calcium propionate**

Tested by Name: \_\_\_\_\_

Date: \_\_\_\_\_

| TESTS     | Ferric ammonium sulfate solution is added to the bread sample.<br><b>A red-brown complex indicates the presences of Calcium propionate</b> | To the sample of bread add 5ml of 6M sulphuric acid and 3 or 4 ml of 95% ethanol, heat the contents just upto boiling point.<br><b>A pineapple like odour indicates the presences of Calcium propionate</b> |
|-----------|--|---|
| Sample 1  |  |   |
| Sample 2  |  |   |
| Sample 3  |  |   |
| Sample 4  |  |   |
| Sample 5  |  |   |
| Sample 6  |  |   |
| Sample 7  |  |   |
| Sample 8  |  |   |
| Sample 9  |  |   |
| Sample 10 |  |   |
| Sample 11 |  |   |
| Sample 12 |  |   |
| Sample 13 |  |   |
| Sample 14 |  |   |
| Sample 15 |  |   |
| Sample 16 |  |   |
| Sample 17 |  |   |
| Sample 18 |  |   |



## Test for presences of Potassium bromate

Tested by Name: \_\_\_\_\_

Date: \_\_\_\_\_

| TESTS     | Test was performed directly on a portion of each bread sample with 2ml of 0.01M promethazine and 0.6ml of 12M hydrochloric acid. <b>The change in colour of each bread sample to pink indicates the presence of potassium bromate.</b> | Water was added to wet the samples. 0.5ml of 1% potassium iodide solution in 2M HCl was added. The test tubes, covered and allowed to stand for a day. <b>The appearances of black spots on the samples indicate the presence of potassium bromate in the bread samples.</b> |
|-----------|--|--|
| Sample 1  |  |  |
| Sample 2  |  |  |
| Sample 3  |  |  |
| Sample 4  |  |  |
| Sample 5  |  |  |
| Sample 6  |  |  |
| Sample 7  |  |  |
| Sample 8  |  |  |
| Sample 9  |  |  |
| Sample 10 |  |  |
| Sample 11 |  |  |
| Sample 12 |  |  |
| Sample 13 |  |  |
| Sample 14 |  |  |
| Sample 15 |  |  |
| Sample 16 |  |  |
| Sample 17 |  |  |
| Sample 18 |  |  |

**BREAD MATTERS**



c) *SCANNED COPY OF READINGS FOR PRESENCE OF CALCIUM PROPIONATE AND POTASSIUM BORATE*

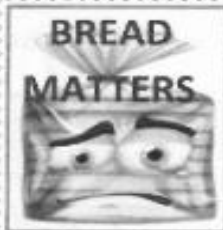


**Test for presences of Calcium propionate**

Tested by Name: Maria Sidpurwala

Date: 19/10/18

| TESTS     | Ferric ammonium sulfate solution is added to the bread sample. <b>A red-brown complex indicates the presences of Calcium propionate</b> | To the sample of bread add 5ml of 6M sulphuric acid and 3 or 4 ml of 95% ethanol, heat the contents just upto boiling point. <b>A pineapple like odour indicates the presences of Calcium propionate</b> |
|-----------|---|--|
| Sample 1  | ✓   | ✓  |
| Sample 2  |   |  |
| Sample 3  |   |  |
| Sample 4  | ✓   | ✓  |
| Sample 5  |   |  |
| Sample 6  |   | ✓  |
| Sample 7  | ✓   | ✓  |
| Sample 8  |   | ✓  |
| Sample 9  | ✓   | ✓  |
| Sample 10 | ✓   | ✓  |
| Sample 11 |   | ✓  |
| Sample 12 |   |  |
| Sample 13 |   | ✓  |
| Sample 14 | ✓   | ✓  |
| Sample 15 |   |  |
| Sample 16 |   |  |
| Sample 17 | ✓   | ✓  |
| Sample 18 |   | ✓  |



### Test for presences of Potassium bromate

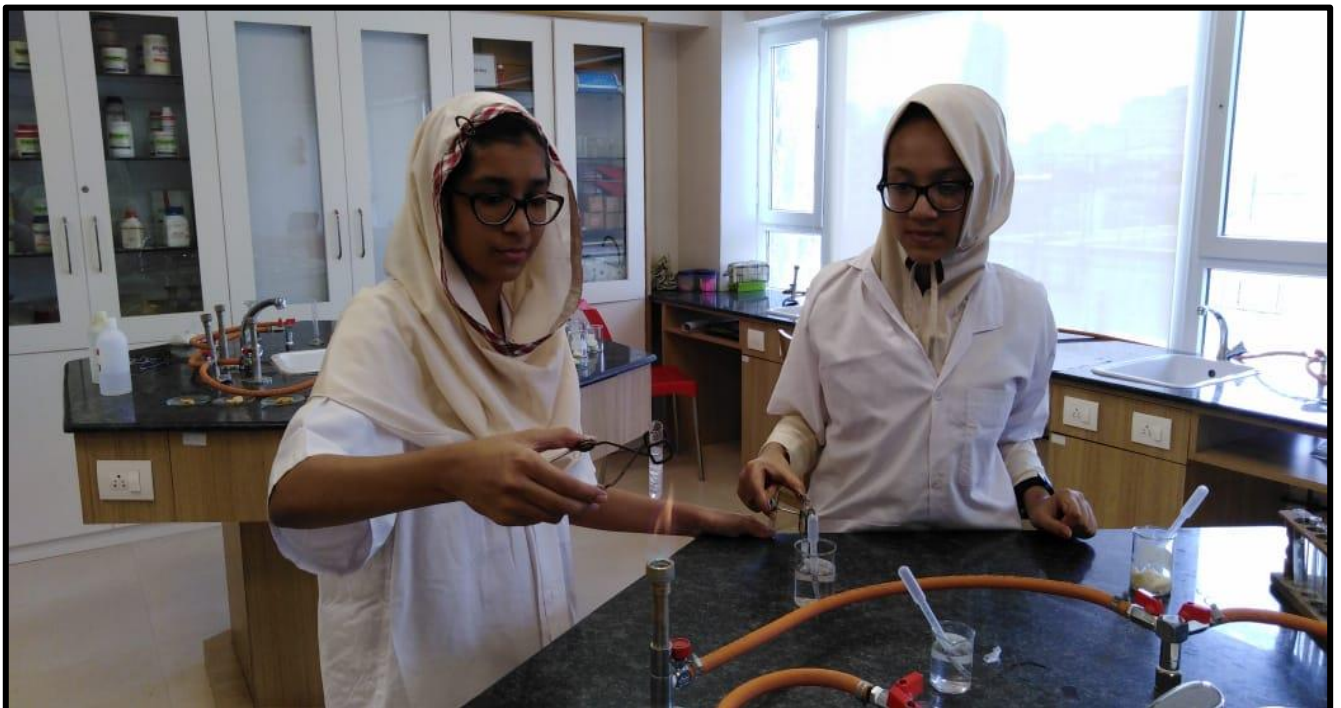
Tested by Name: Mustafa Bankwala

Date: 26-11-18

| TESTS     | Test was performed directly on a portion of each bread sample with 2ml of 0.01M promethazine and 0.6ml of 12M hydrochloric acid. <b>The change in colour of each bread sample to pink indicates the presence of potassium bromate.</b> | Water was added to wet the samples. 0.5ml of 1% potassium iodide solution in 2M HCl was added. The test tubes, covered and allowed to stand for a day. <b>The appearances of black spots on the samples indicate the presence of potassium bromate in the bread samples.</b> |
|-----------|--|--|
| Sample 1  | ✓  | ✓  |
| Sample 2  |  |  |
| Sample 3  |  |  |
| Sample 4  | ✓  | ✓  |
| Sample 5  |  |  |
| Sample 6  | ✓  | ✓  |
| Sample 7  | ✓  |  |
| Sample 8  | ✓  | ✓  |
| Sample 9  | ✓  |  |
| Sample 10 | ✓  | ✓  |
| Sample 11 | ✓  | ✓  |
| Sample 12 |  |  |
| Sample 13 | ✓  | ✓  |
| Sample 14 | ✓  |  |
| Sample 15 |  |  |
| Sample 16 |  |  |
| Sample 17 |  |  |
| Sample 18 |  |  |



*d) PHOTOGRAPHS OF STUDENTS PERFORMING EXPERIMENTS*



**BREAD  
MATTERS**





## 8

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# 9

## REFERENCES

- <https://www.choice.com.au/food-and-drink/bread-cereal-and-grains/bread/articles/bread-guide>
- <http://naturallysavvy.com/eat/scary-ingredients-used-in-bread-manufacturing>
- <https://www.health24.com/Diet-and-nutrition/Healthy-foods/Modern-bread-is-full-of-harmful-additives-20150623>
- <https://www.livestrong.com/slideshow/1011109-10-ingredients-always-avoid-bread-plus-7-bread-brands-bets/#slide=12>
- <https://alignlife.com/articles/autoimmune-diseases/beware-additives-bread>
- <https://www.timetocleanse.com/is-white-bread-the-most-dangerous-food-in-your-home/>
- <https://competitiveness.in/bread-butter-issues-food-safety/>
- [http://www.academia.edu/8665713/Analysis\\_of\\_Potassium\\_Bromate\\_in\\_Bread](http://www.academia.edu/8665713/Analysis_of_Potassium_Bromate_in_Bread)



# THANK YOU