St. WILFRED'S SCHOOL

CBSE AFFILATION NO.1130474

SHEDUNG, PANVEL

PREPARATION OF SOYABEAN MIK AND ITS COMPARISION WITH NATURAL MILK

A CHEMISTRY PROJECT REPORT

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IN PARTIAL FULFILMENT OF THE CBSE GRADE XII (SCIENCE) IN CHEMISTRY

St. WILFRED'S SCHOOL, PANVEL

CERTIFICATE

This is to certify that Ms. Nandhana Menon, class XII of

St. Wilfred's school Panvel with register number _____

Independently carried out the investigatory project in chemistry entitled, **"Preparation of Soyabean Milk and its Comparision with Natural Milk"** for the partial fulfillment of All India Secondary School Certificate Examination (AISSCE) as prescribed by CBSE in the year 2020-21.

Date- _____

_____ _____

Signature of Candidate Signature of Teacher Incharge

_____ _____

Signature of the Principal Signature of the External Examiner

ACKNOWLEDGEMENT

I would like to thank my teacher, **Mr. Kuldeep Singh** for guiding me through this project and for his valuable inputs which provided me with a constant nudge for improvement.

It is imperative to thank our Vice Principal, **Ms. Rashu Navgekar** for providing me the opportunity to work on this project.

My parents have also played a part in helping me in this project.

This project and reading-up on the same as provided with me an in depth understanding of the topic. It has matured my scientific temperament and curiosity.

Signature of the Candidate.

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INTRODUCTION

Natural milk is an opaque white fluid secreted by the mammary gland of female mammals. The main constituent of natural milk are proteins, carbohydrates, minerals, vitamins, fats and water and is a complete balanced diet in itself. Fresh milk is sweetish in taste. However, when it is kept for a long time at a temperature of 35±5°C it becomes sour because of bacteria present in air. These bacteria convert lactose of milk into lactic acid which is sour in taste. In acidic conditions casein of milk starts separating out as precipitate. When the acidity in milk is sufficient and temperature is around 36°C, it forms semi solid mass, called curd.

Soya bean milk is made from soya beans. It resembles natural milk. The main constituents of soya bean milk are proteins, carbohydrates, fats, minerals and vitamins. It is prepared by keeping soya beans dipped in water for some time. The swollen soya beans are then crushed to a paste which is then mixed with water. The solution is filtered and filtrate is soya bean milk.

EXPERIMENT

➢ AIM:

Preparation of soya bean milk and its comparison with the natural milk with respect to curd formation, effect of temperature and taste.

➢ HYPOTHESIS:

As per my knowledge the curd formation in natural milk will be formed more quickly at different temperatures in comparison to the curd formed by soya bean milk and will also be of better quality.

➢ REQUIREMENT:

- Beakers
- Pestle and mortar
- Measuring cylinder
- Glass rod
- Tripod stand
- Thermometer
- Muslin cloth
- Burner
- Soya beans
- Buffalo milk
- Fresh curd
- Distilled water

➢ PROCEDURE

- Soak about 150g of Soya beans in different amount of water so that they are completely dipped in it. Keep them dipped for 24 hours.

- Take out swollen Soya beans and grind them to a very fine paste with pestle and mortar.

- Add about 250ml of water to this paste and filter it through a muslin cloth. Clear white filtrate is Soya bean milk. Compare its taste with buffalo milk.

- Take 50ml of Buffalo milk in three beakers and heat the beakers to 30°C, 40°C and 50°C respectively. Add ¼ spoonful curd to each of the beakers. Leave the beakers undisturbed for 8 hours and curd is formed.

- Similarly, take 50ml of Soya bean milk in each of the three other beakers and heat the beakers to 30°C, 40°C and 50°C respectively. Add ¼ spoonful curd to each of these beakers. Mix well with a spoon and leave the beakers undisturbed for 8 hours and curd is formed.

Observations

Types of Milk	Beaker Number	Temperature	Quality of Curd	Taste of Curd
Buffalo Milk	1	30°C	Perfectly Dense, Semi Solid	Sour
	2	40°C	Comparatively Watery	Less Sour
	3	50°C	Highly Watery	Tasteless
Soybean Milk	1	30°C	Almost Dense	Almost Sour
	2	40°C	Semi Solid, Little bit Watery	Sour
	3	50°C	Highly Water Content	Tasteless

- **RESULT:**

For buffalo milk, the best temperature for formation of good quality and tasty curd is 33°C and for soya bean milk, it is 35-40°C.

Data Analysis

(Comparison Chart)

	Buffalo Milk	Soybean Milk
Source	Mammal (usually cow or buffalo	Soy beans
Lactose	Contains lactose	Lactose-free
Vegetarian	Yes	Yes
Vegan	No	Yes
Protein	3.22 g	3.27 g
Carbohydrates	5.26 g	6.28 g
Polyunsaturated Fat	0.195 g	0.961 g
Calcium	113 mg (11%)	25 mg (3%)
Magnesium	10 mg (3%)	25mg (7%)
Thiamine (Vitamin $B_{1)}$	0.044 mg (4%)	0.060 mg (5%)
Saturated Fat	1.865 g	0.205 g
Riboflavin (Vitamin $B_{2)}$	0.183 mg (15%)	0.069 mg (6%)
Potassium	143 mg (3%)	118 mg (3%)
Sodium	43 mg (3%)	51 mg (3%)
Energy	60 kcal	54 kcal

NATURAL MILK V/S SOYA BEAN MILK

- **NUTRITION:**

  A cup of cow's milk contains lactose (a sugar found only in milk), proteins, carbohydrates, fats, and calcium which are also present in soya milk but in varying quantities.

  Lactose can be hard to digest by some people if they lack the required digestive enzyme lactase and will not be able to digest milk easily. Soya milk is mostly used as an alternative to milk by people with lactose intolerance since it is completely lactose free.

❖ HEALTH BENEFITS :

There are a number of health benefits of drinking soya milk. These are as follows:

- Improves lipid profile
- Strengthen blood vessel integrity
- Promote weight loss
- Prevent prostate cancer
- Prevents post-menopausal syndromes
- Prevents osteoporosis
- Soya protein reduces the level of LDL (bad cholesterol) and increases the level of HDL (good cholesterol) in our body.

❖ DISADVANTAGES:

Soya bean mil contains high percentage of phytoestrogens, which may decrease fertility in men if they consume more than 3 quarts per day.

Too much estrogen can also cause hormone imbalance in women when consumed too much and also has a difficulty breaking down.

Consuming these simple sugars can cause some people to experience lot of gas. Soya bean milk also contains substances called phytates which interfere with calcium absorption.

CONCLUSION

Both natural milk and soya bean milk have almost same constituents except the presence of lactose in natural milk. Soya bean milk can easily be used as an effective alternative for people whose diet is lactose free. But on the other hand natural milk curd requires lesser time (as per the hypothesis taken earlier) than soya bean milk curd. It also requires temperature slightly greater than room temperature.

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