

B.Sc. (MzC) 1st year.

1) Activity of Antibacterial medicinal plant extract.

Plant extracts of ~~mustard~~ turmeric, ~~Amala~~ ^{mustard} Amala, Aloe-veer, turmeric, hibiscus, Neem, Carom seeds, cloves were extracted using Acetone. The effect of these plant extracts were tested against E. coli, Bacillus, Klebsiella. It was observed that highest zone of inhibition is shown by Amala with ZOI of 2.0 cm with E. coli and Bacillus. It was followed by cloves extract with ZOI of 2.2 cm with E. coli and 1.7 cm with Bacillus.

M. Varsha Singh.

Maina - Amreen.

B. Sony.

P. Mounica.

Shivani.



Medicinal plants

(2). Airborne microorganisms at different places.

Quality of air

→ Isolation and Entrapment of Airborne microbes at different places. We have identified different Sources of Airborne microbes in the Environment i.e. (Busstop, railway station, metro, hospitals, and Hotels).

We prepared the Media than Incubated for 24 hours and then we identified the colony count of Bacteria. We have observed maximum growth of microbes in Rhythu Bazar, Minimum growth in metro, we performed staining technique and observed those slides under microscope and we observed Gram positive & Gram negative Bacteria, and which are different in shapes.

A. Divya Sai.	108519457001
U. Mounika.	108519457024
G. Shreetha.	108519457012
Soumya. CH.	108519457006
B. Shriha.	108519457004.

(a). Estimation of Casein protein in milk samples.

→ Analysis of different samples of milk to determine the amount of casein protein.

By using saturated ammonium sulphate solution to the milk to precipitate milk casein, followed by addition of 20ml water, 1.6% acetic acid drop wise and filter the precipitate and dry weigh.

The weight of precipitate gives the amount of casein present in milk. It was observed that the amount of milk protein casein is more in buffalo sample when compared to other milk sample. The concentration of casein protein in Buffalo sample is 1.65gms.

N. Ranjitha.

S.V. Priyanka.

Bhambhani S

Renuka P.

Archika K.

Project Title: Isolation of Rhizobium and its effect on production of biofertilizers

The production of cost effective biofertilizers using optimized media for Rhizobium to meet increasing nutritional food requirements with biotechnology to increase crop yield by reducing use of chemical fertilizers to maintain ecological balance for sustainable production in minimum cost to increase percent of proteins, vitamins, nitrogen containing products which helps to increase yield, physical and chemical profile of soil to evaluate the profile of soil to evaluate the fertility status has been observed during study that optimized inoculants with coal powder added is more beneficial when compare with for germination rate and growth of plants.

This project is done by -

- 1) B. Anjali Devi - 108519458005
- G. Shireesha - 108519458013
- M. Sindhu - 108519458022
- P. Lakshmi priya - 108519458026
- R. Sowmya - 108519458029
- K. Sankeerthana - 108519458014
- S. Vaishnavi - 108519458035

B.Sc (MBC) 3rd year.

Project Title:- Bacteriological Analysis of Water.

The bacteriological examination of water is performed routinely by water utilities and many governmental agencies to ensure a safe supply of water for drinking, bathing, swimming and other domestic and industrial uses. The examination is intended to identify water sources which have been contaminated with potential disease-causing microorganisms. Such contamination generally occurs either directly by human or animal feces, or indirectly through improperly treated sewage or improperly functioning sewage treatment systems. The organisms of prime concern are the intestinal pathogens, particularly those that cause typhoid fever and bacillary dysentery. Instead, it is much easier to test for the presence of nonpathogenic intestinal organisms such as "E. coli".

This project is done by.

- ① CH: Sreeksha 108519458009
- ② Kavadi Ramya 108519458016
- ③ Nenavath Swaroopa 108519458024
- ④ Pesara Sangeetha 108519458027
- ⑤ Racha Swathi 108519458028
- ⑥ Sanganamoni srarani 108519458031

B.Sc [MBC] 3rd Year

► Project Title :

Study of Milk Adulteration in Hyderabad.

• Milk is an important source of nutrients required for growth in infants and children and for maintenance of health in adults. Milk is a perfect food, readily digested and absorbed.

• Normally the adulteration in food is done either for financial gain or lack of proper hygienic conditions of processing, storing, transportation and marketing.

• Methodology.

• Viable Count.

• Antibiotic Sensitivity.

• Journal (INDIAN JOURNAL OF NUTRITION)

This Project is done by:

1. A. Anisha - 108519458001 - BSc (MBC) III year
2. M. Sai Sushma - 108519458019 - BSc (MBC) III year
3. C. Sushma - 108519458008 - BSc (MBC) III year
4. M. Poojitha - 108519458018 - BSc (MBC) III year
5. K. Ankitha - 108519457011 - BSc (MBC) III year

X

project title :

MICROBIAL EXAMINATION OF SPOILED FRUITS

Microorganisms are everywhere. They can be found in the air, in water, in soil on animals and even on humans. Some are beneficial such as those used to make fermented dairy and meat products. Other cause spoilage of various food products. Eating fruit is a healthy practice due to its nutritional composition but when it gets spoiled by microbes it can be harmful for human consumption. Microorganisms have been reported to cause extensive deterioration of fruits.

The organisms isolated and observed were bacteria and fungi majorly. This is due to various processes taking place in the rotten fruit which favoured bacterial and fungal growth. This work finds that there are microorganisms that could be responsible for inducing spoilage in the fresh fruits.

This project is done by

B. Sumalatha	-	108519458007
G. Gnanasri	-	108519458012
M. Sai priyanka	-	108519458017
S. Deepika	-	108519458033
V. Mohana varsha	-	108519458038

Project Title :-

ANTIMICROBIAL PROPERTIES OF HONEY

Honey is a sweet food. Honey bees prepare honey by using nectar from flowers of different plants. Honey bees belong to genus *Apis*. It is consumed by humans. A well-known antimicrobial agent hydrogen peroxide is present, in small concentration, in honey.

Antibacterial activity of honey is dependent on amount of hydrogen peroxide. Indeed, medicinal importance of honey has been documented in the world's oldest medical literatures, and since the ancient times, it has been known to possess antimicrobial property as well as wound-healing activity.

This project is done by:-

Afska Anjum	- 108519458002
Allu Abhigna	- 108519458003
M. Emily Evangiline	- 108519458021
Nasreen Banu	- 108519458023
Nikhat Saleem	- 108519458025
Samiya Zareen	- 108519458030
Shireen Begum	- 108519458034

Project Title:

Estimation of Ethanol in Soft drinks by Potassium dichromate method:

A little amount of alcohol is present in soft drinks. A method for estimating ethanol in alcoholic drinks by direct reaction is presented. The method consists of colour reaction of ethanol with Potassium dichromate. Low concentration of ethanol will be present in non-alcoholic beverages. As an additive to deliver or modify a component ingredient. For example soft drinks and flavoured beverages have been shown to contain trace amounts of alcohol with concentrations ranging upto 0.12 percent.

This project is done by:

J. Neha Thanmayee - 108519457013.

M. Sai Sruthi - 108519457015

D. Shouthi - 108519457009.

STUDY PROJECT 2

2016-17				5	
సంఖ్య	పాఠశాల పేరు	పేరు	వృత్తి	ప్రొఫెషన్	అవార్డు
8.	1701085278005	డి. వీణ	వైద్యురాలి	B.A.	Dr. Veena
9.	170108511506	కె. వెంకటేశ్వర్లు	కలకాండ బోధకుడు (T.P.P)	(E.P.A)	K. Venkatesh
19.	170108511501	కె. కృష్ణమూర్తి	గుండ్ల బోధకుడు	E.P.P	Krishna
20.	170108511503	కె. వీణ	వైద్యురాలి	E.P.P	Veena
21.	170108511510	ఎం. లక్ష్మి	బోధకుడు	E.P.P	Emma
22.	1701085278003	సి.ఎం. సీత	అధ్యక్షురాలు	(E.P.C.A)	f
23.	1701085266008	ఎ. శారద	బోధకుడు	(M.P)	Shirani
24.	170108511507	ఎ. శారద	అధ్యక్షురాలు	(E.P.A)	Chartham
BSc and year					
1.	1701085118091	కె. శారద	అధ్యక్షురాలు	B.Sc (L)	Kejri
2.	1701085118092	ఎం. సీత	కలకాండ బోధకుడు	B.Sc (L)	M. Siree
3.	1701085118096	కె. కృష్ణమూర్తి	అధ్యక్షురాలు	B.Sc (L)	Krishna
4.	1701085118098	కె. కృష్ణమూర్తి	అధ్యక్షురాలు	B.Sc (L)	V. Jayalaxmi
5.	1701085118099	కె. శారద	అధ్యక్షురాలు	B.Sc (L)	Shirani
6.	1701085118101	కె. శారద	అధ్యక్షురాలు	B.Sc L	K. Analakshmi

2017-18

క్ర.సం.	పాఠశాల పేరు	విద్యార్థి పేరు	ప్రవేశించిన కాలం	అధికారి	అధికారి పేరు	విద్యార్థి నంబరు	అధికారి నంబరు
1.	17011085054003	జి. కృష్ణ	భారతీయ రిజర్వ్ కాలేజి	BA HPT		2017085054003	
2.	17011085366015	ఎ.ఎం. శ్రీనివాస్	అంబేద్కర్ కాలేజి	BA HEP		2017085366015	
3.	17011085115002	కె. రమణ	గౌరీబి	BA-EPP		2017085115002	
4.	17011085366005	కె. సుధాకర్	అంబేద్కర్ కాలేజి	BA HEP		2017085366005	
5.	17011085278007	కె. సుధాకర్	అంబేద్కర్ కాలేజి	BA ERA		2017085278007	
6.	17011085111504	జి. కృష్ణ	అంబేద్కర్ కాలేజి	BA EPP		2017085111504	
7.	17011085366008	ఎం. కృష్ణ	అంబేద్కర్ కాలేజి	BA HEP		2017085366008	
8.	17011085061004	జి. సుధాకర్	అంబేద్కర్ కాలేజి	BA PJCE		2017085061004	
9.	17011085061002	ఎం. కృష్ణ	అంబేద్కర్ కాలేజి	BA PJCE		2017085061002	
10.	17011085061006	ఎం. కృష్ణ	అంబేద్కర్ కాలేజి	BA PJCE		2017085061006	
11.	17011085061011	ఎం. కృష్ణ	అంబేద్కర్ కాలేజి	BA PJCE		2017085061011	
12.	17011085061005	జి. కృష్ణ	అంబేద్కర్ కాలేజి	BA PJCE		2017085061005	
13.	17011085366016	ఎం. కృష్ణ	అంబేద్కర్ కాలేజి	BA(H.E.P)		2017085366016	
14.	17011085366001	ఎం. కృష్ణ	అంబేద్కర్ కాలేజి	BA(H.E.P)		2017085366001	
15.	17011085366012	కె. రమణ	అంబేద్కర్ కాలేజి	BA(H.E.P)		2017085366012	
16.	17011085366007	కె. రమణ	అంబేద్కర్ కాలేజి	BA(H.E.P)		2017085366007	
17.	17011085111509	R. Akhila	అంబేద్కర్ కాలేజి	BA(E.P.P)		2017085111509	

2018-19

క్ర.సంఖ్య	హాల్ టికెట్ నెం	విద్యార్థి పేరు	(వర్క్ షిప్ ప్రాజెంట్ పేరు)	అధికారి	అధికారి అధికారము	విద్యార్థి నెంబర్	ఇతర వివరము
01.	18011085401046	డి. శోభ	(పాపిస కళాశాల)	B.com(Cy)-1 st yr	K. అశోక్	28322	
02.	18011085401057	కె. శామి	"	"	"	కె. శామి	
03.	18011085401040	బి. సాంధ్య	"	"	"	బి. సాంధ్య	
04.	18011085401117	ఎం. శోభ	"	"	"	U. శోభ	
05.	18011085401016	బి. రమ్య	అలంకార (పాపిస కళాశాల)	"	"	B. Ramya	
06.	18011085401031	డి. (పాపిస)	"	"	"	Paipusa	
07.	18011085401085	ఎస్. శోభ	"	"	"	S. Shobha	
08.	18011085401067	కె. శోభ	"	"	"	K. Shobha	
09.	18011085401068	కె. అనుష్క	జనీవ గిరియం / పాపిస కళాశాల	"	"	K. Anusha	
10.	18011085401118	వి. గిరిమధ	"	"	"	V. girimadha	
11.	18011085401007	ఎ. నాగేశ్వరి / ఎ. శోభ	"	"	"	N. Akhila / R. Shobha	
12.	18011085401086	ఎస్. అశోక్	"	"	"	A. Nagalaxmi	
13.	18011085401051	బి. సుధ	"	"	"	B. Sudha	
14.	18011085401055	కె. రమ్య	అలంకార (పాపిస కళాశాల)	"	"		
15.	18011085401017	బి. శోభ	"	"	"	B. Shobha	
16.	180110854081	ఎం. శోభ	"	"	"	Em. Shobha	
17.	1801108540	డి. సుధ	"	"	"		
18.	1801108540	బి. సుధ	"	"	"		
19.	18011085401006	ఎ. నాందీ	అలంకార (పాపిస కళాశాల)	"	"	A. Nandini	
20.	18011085401020	బి. అనుష్క	"	"	"	B. Anusha	
21.	18011085401023	బి. సాంధ్య	"	"	"		
22.	18011085401071	ఎం. శోభ	"	"	"	Em. Shobha	

2019-2020

సంఖ్య	హాల్ టెక్స్ నెం	విద్యార్థి పేరు	ప్రకటన అంశం పేరు (సంబంధ కవిత)	తరగతి	తరగతి అధ్యాపకులు	విద్యార్థి సంతకం	నితర విషయము
01	18011085352002	సి.హెచ్. వాణిశ్రీ	"	BA(EPSCA) 1 st yr	శ్రీకృష్ణ ప్రసాద్	Sakthya. Ch	
02	180110853552011	దు.పా. ఆనందా	"	BA(EPSCA) 1 st yr	"	m. Anandha	
03	18011085366015	దు.పా. గోపా	"	BA (H.E. PA) 1 st yr	"	m. Gouthami	
04		నామల	"				
05	18011085369007	సి.హెచ్. సుధా	"				
06	18011085366013	రవాలి	"	BA (H.E. PA) 1 st yr	"	m. Ravali	
07		ఎల్. భవానీ	"				
08	18011085129026	ఎస్. శ్రీ	"	BA (H.E. PA) 1 st yr	"	S. Keerthi	
09	18011085129008	బి. వాణిశ్రీ	"	BA [H.E.P.A.] 1 st yr	"	G. Sujanya	
10	18011085129003	సి.హెచ్. రమ్యశ్రీ	"	BA [హెచ్.ఎ.పి.ఎ.]	"	Ch. Ramyasree	
11	18011085366001	బి. వాణిశ్రీ	"	BA [H.E.P.A.]	"	B. Vanitha	
12	18011085366002	సి. హేమ	"	BA (H.E.P.A.)	"	D. Kalpana	
13	18011085129030	పై. జ్యోతి	"	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	P. Jyothi	
14	18011085555003	ఎస్. వాణిశ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	Pranitha	
15	18011085099007						
15	18011085099003	వి. సుధా	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	A. Soudip	
16	18011085111082	వి. శ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	V. Srija	
17	18011085555005	ఎస్. లక్ష్మి	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	N. Lakshmi	
18	18011085555007	పై. రమ్యశ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	P. Ramyasree	
19	180110850992006	ఎస్. వాణిశ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	"	
20	18011085129021	పి. హేమలత	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	P. Haimalatha	
21	18011085156019	పి. వాణిశ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	P. Vanitha	
22	18011085352019	బి. భవానీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	B. Bhavana	
		సి.హెచ్. సుధా	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	"	
		బి. వాణిశ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	"	
25	18011085111009	పై. జ్యోతి	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	P. Jyothi	
26	18011085111005	పై. జ్యోతి	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	"	
27	18011085111004	పి. శ్రీ	కవితలు	బి.ఎ. (హెచ్.ఎ.పి.ఎ.)	"	A. Srija	

Name	Roll No.	Topic	Group	Signature	Marks
Chappelli Saavani	17011085405005		B.Com(CA)		
Chindili Parathi	17011085405011	Accounts	"	Ch. Parathi	20/3
C. Mounika	17011085405012		"		"
Kondapally Keerthi	17011085405018		"		"
Kittadi Samatha	17011085405022	Income Tax	"	K. Samatha	"
Marthala Ikritha	17011085405023	SA - 50/98	"	M. Uthra	"
Melavath Rajitha	17011085405024		"		"
Rathu Mounika	17011085405032	Accounts	"	<u>P. Mounika</u>	"
Telugu Ranya	17011085405036		"		"
Ventapally Shrisisha	17011085405039		"		"
Avala Kishnapriya	17011085431001		B.Com(Tax)		"
Bandi Sandhya	1701108543003		"		"
Jinjeti Shiny	1701108543009	SA - 50/98	"		"
Lakshmi Boina Lakshmi	1701108543011	SA - 50/98	"	L. Sumanika	20/3
Menda Venel	1701108543012		"		"
Munagala Saumyashri	1701108543013	SA - 50/98	"	M. Sumanika	"
Muniganti Shrisisha	1701108543014		"		"
Naranyala Shrisisha	1701108543015		"		"
N. Pooja Rani	1701108543020		"		"
Vazeeb Meena	17011085433012		"		"
Kamble Vaishnavi	17011085433013		B.Com(Adv)		"
Kattava Asha	17011085433014	SA - 50/98	"	K. Asha	"
Modikonda Manika	17011085433020		"		"
Tax Kashika Prudhika	17011085433034		"		"
Velkotte Priyanka	17011085433035		"		"

Exam
 Result
 1.9.2020

2021-22

GOVT.DEGREE COLLEGE FOR WOMEN(AUTONOMOUS)

BEGUMPET, HYDERABAD

CHEMISTRY PROJECT MARKS LIST 2021- 2022

Sem: 6 Subject: CHEMISTRY PROJECT VI

S.No	Student Name	Group	Hall Ticket No	Project Title	Dessert
1	AILA POOJA	BZC	1085-19-445-003	Analysis of Honey	F
2	AKULA AKHILA	BZC	1085-19-445-004	Analysis of Honey	F
3	AMGOTHU SRAVANI	BZC	1085-19-445-005	Analysis of Honey	F
4	ANJANA BEHERA	BZC	1085-19-445-006	caffeine extraction from tea & coffee samples	F
5	APPANALA SRAVANI	BZC	1085-19-445-007	caffeine extraction from tea & coffee samples	F
6	ARSHIYA BEGUM	BZC	1085-19-445-008	Caffeine-extraction from tea & coffee samples	F
7	BADAVATH HEMALATHA	BZC	1085-19-445-009	Analysis of chocolate.	F
8	BAIRU MANASA	BZC	1085-19-445-010	Analysis of chocolate	F
9	BANDI SWAPNA	BZC	1085-19-445-013	caffeine-extraction from tea & coffee samples	F
10	BANOTH DEEPIKA	BZC	1085-19-445-014	Caffeine-Extraction from tea & coffee samples	F
11	BANOTH MOUNIKA	BZC	1085-19-445-015	ABSENT	
12	BHUKYA KALYANI	BZC	1085-19-445-017	Analysis of chocolate	
13	BODDU MADHURI	BZC	1085-19-445-019	Analysis of Honey	
14	B SWATHI	BZC	1085-19-445-020	Caffeine: Its products, overdose, Side effects	
15	B THRIVENI	BZC	1085-19-445-021	caffeine-extraction from tea & coffee samples	
16	CHEEKIRALA ANITHA	BZC	1085-19-445-022	Analysis of chocolates	
17	CHELIMELA NIKHITHA	BZC	1085-19-445-023	caffeine: extraction from tea & coffee samples	
18	CHEVVA ANUSHA	BZC	1085-19-445-024	Caffeine: extraction from tea & coffee samples	
19	CHITTIRAJULA SWAPNA	BZC	1085-19-445-025	Analysis of chocolate	
20	CHOWHAN VAISHNAVI	BZC	1085-19-445-026	Analysis of Honey.	
21	DAMERA VAISHNAVI	BZC	1085-19-445-027	Caffeine: Its products, overdose, Side effects	
22	DANTA DEEPTHI	BZC	1085-19-445-028	Analysis of honey	
23	DUBBALA SRINIDHI	BZC	1085-19-445-029	Analysis of chocolate	

2021-22

24	ESLAVATH SANDHYA	BZC	1085-19-445-030	Caffeine: Extraction from tea & Coffee Samples	70
25	GANAPURAM SRIVARSHINI	BZC	1085-19-445-032	CAFFEINE: extraction from tea & Coffee Samples	70
26	GANDAM MANISHA	BZC	1085-19-445-033	Extraction of caffeine from coff powder	70
27	G MANOGNA	BZC	1085-19-445-035	Analysis of caffeine	70
28	GORUGANTI AKHILA	BZC	1085-19-445-036	Analysis of Honey	70
29	GOVINDU BHUVANESWARI	BZC	1085-19-445-037	Analysis of Honey	70
30	JADA SHOBHA	BZC	1085-19-445-041	Analysis of Chocolates	70
31	KADARI SHIREESHA	BZC	1085-19-445-043	Analysis of Honey	70
32	KADOLLA HARIKA	BZC	1085-19-445-044	Analysis of chocolate	70
33	KANNEKANTI MAHESWARI	BZC	1085-19-445-046	Caffeine: Extraction from tea & Coffee Samples	70
34	KAREM AARTHI	BZC	1085-19-445-047	Caffeine: Extraction from tea & Coffee Samples	70
35	KARNATI SHAKEENA	BZC	1085-19-445-048	Caffeine: Extraction from tea & Coffee Samples	70
36	SUKEERTHI K RAMYA	BZC	1085-19-445-051	ARSENIC	70
37	KURRAPIDATHA NAGALAXMI	BZC	1085-19-445-052	Caffeine: Extraction from tea & coffee sample.	70
38	KUSUNUR PARVATHI	BZC	1085-19-445-053	Extraction of caffeine from tea & coffee samples	70
39	LAVUDYA SRAVYA	BZC	1085-19-445-054	Analysis of chocolate	70
40	MASPELLY RADHIKA	BZC	1085-19-445-056	Caffeine: Extraction from tea & coffee samples	70
41	POTHKANOORI TANISHCA	BTZC	1085-19-489-023	Hydrogen - The fuel of the future	70
42	RIDAA MARIYAM	BTZC	1085-19-489-024	Hydrogen - The fuel of the future	70
43	G.S.BHAVANA	BTZC	1085-19-489-009	Hydrogen - The fuel of the future	70
44	BATHULA MANISHA	BTZC	1085-19-489-005	Hydrogen - The fuel of the future	70


Dileepa
Signature of the Internal

Suresh
Signature of the External


This is to certify that following group of students from B.com C.A & MSCS final year students engaged in research based projects as part of the student study project under the guidance of teachers of department of Sanskrit for the academic year 2021-2022

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STUDENT STUDY PROJECT

2021-2022

PROJECT TITLE

"ANALYSIS OF HONEY"

SUBMITTED BY

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We thank **DR. G. Pranitha** Head of the Department of Chemistry, for her constant support and cooperation.

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ABSTRACT

Honey is an organic natural substance that is produced from the nectar of flowers by *Apis mellifera* and is a sweet, flavorful liquid. It is one of the most popular natural sweet substances. From a chemical point of view, it could be defined as a natural food mainly composed of sugars and water together with minor constituent such as Minerals, Vitamins, Amino acids, Flavonoids and other phenolic compounds and aromatic substances.

Honey is one of the oldest medicines known, its recorded use going back more than 4 millennia. It was used to treat wounds and ulcers, sunburn, and infections of the eyes, throat and gut. These uses have continued into present – day folk medicine and are increasingly becoming part of modern professional medicine.

Honey mainly consists of sugars and water. Apart from sugars, honey contains several vitamins, together with a lot of minerals such as Ca, Cu, Fe, Mg, P, K and Zn also present. The nutritional composition, minerals, antibacterial, and antioxidant properties of honey are analyzed in our laboratory.

For Analysis of Honey, we considered 3 different samples of Honey – DABUR, PATANJALI and LOCALLY PURCHASED HONEY (Natural Honey). By conducting all the tests - Test for Minerals, Test for Carbohydrates and Adulteration Test, we observed that Dabur and Patanjali are the best and non- adulterated one among the 3 samples.

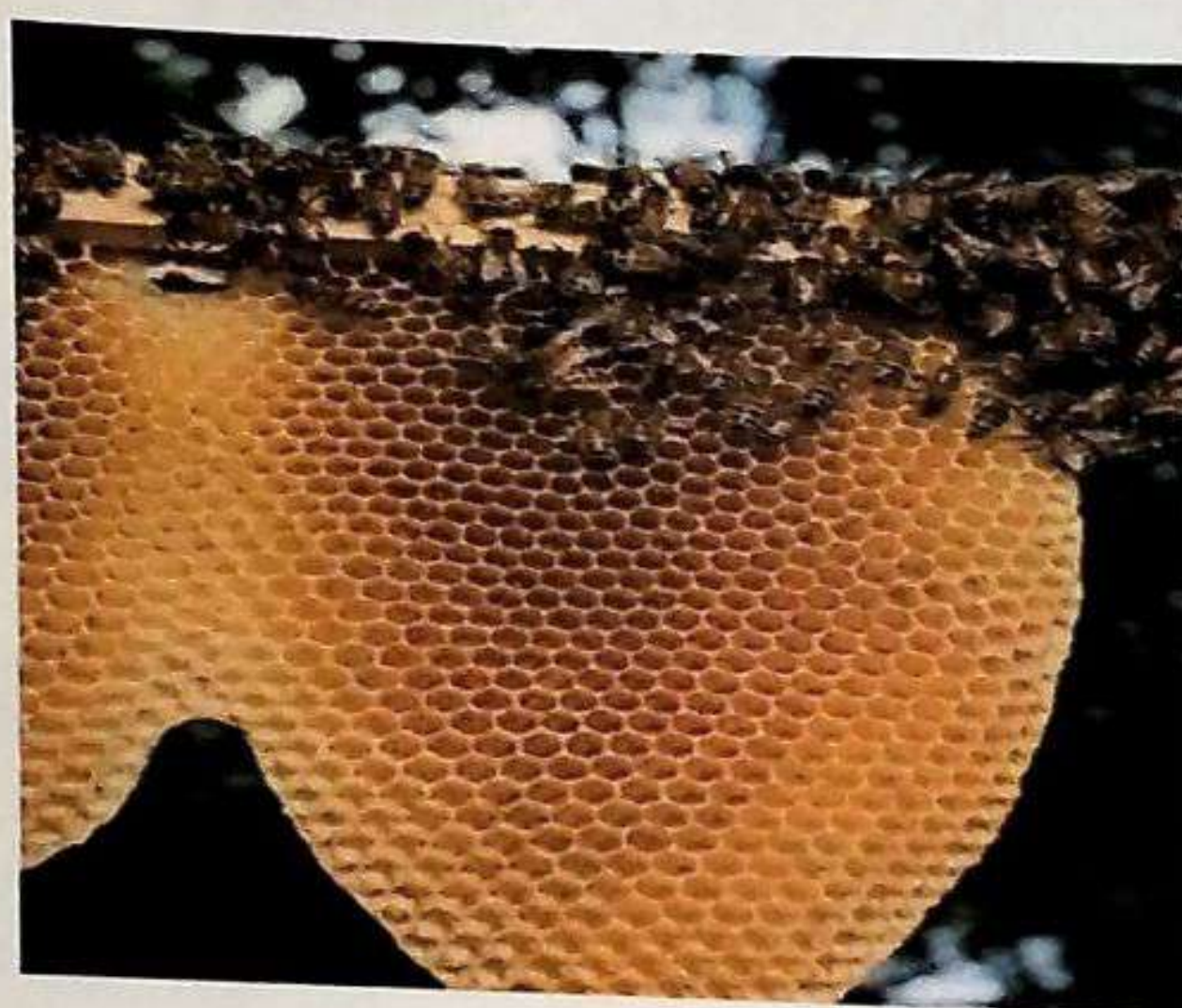
KEYWORDS: Honey, Chemical Compositions, Minerals, Carbohydrates, Uses

INDEX

<u>CHAPTERS</u>	<u>CONTENTS</u>	<u>PAGE NO.</u>
Chapter-1	1.1 Introduction	6-8
	1.2 Father of Indian Beekeeping	8
	1.3 Father of Modern Beekeeping	8
	1.4 Species of Honey Bees	9-11
	1.5 Castes of Honey Bees	11
	1.6 Bee Hive Products and their Uses	12-13
	1.7 Classifying Honey by its Floral Source	13-16
	1.8 Honey Harvest and Extraction	17-20
	<ul style="list-style-type: none">• Ancient Method of Honey Extraction• Modern Method of Honey Extraction	
1.9 Honey Brands	21-23	
<ul style="list-style-type: none">• Dabur• Patanjali		
Chapter-2	2.1 Chemical Analysis	24-29
	<ul style="list-style-type: none">• Aim• Materials• Chemicals• Methods	
	2.2 Observation Tables	30-35
Chapter-3	3.1 Results and Discussions	36-39
Chapter-4	4.1 Conclusion	40
Chapter-5	5.1 References	40

1.1 INTRODUCTION

Honey is a natural sweetening agent used by human beings since ancient period. Honey is defined by the European Union as “The natural sweet substance produced by *Apis mellifera* bees from the nectar of plants or from living parts of plants i.e., flowers or excretions of plant – sucking insects or the living parts of plants. Honey is an organic, natural sugar alternative. It is made by bees and stored in wax structures called Honey combs. The bees collect, transform by combining with specific compounds of their own, deposit, dehydrate, store and leave in Honey combs to ripen and mature.



Honey is a thick golden liquid that bees make from the nectar of flowering plants. Bees performs the important service of pollinating fruits, vegetables and legumes and other types of food producing plants in the course of their business of honey production. It is a used as a sweetening agent in food materials.

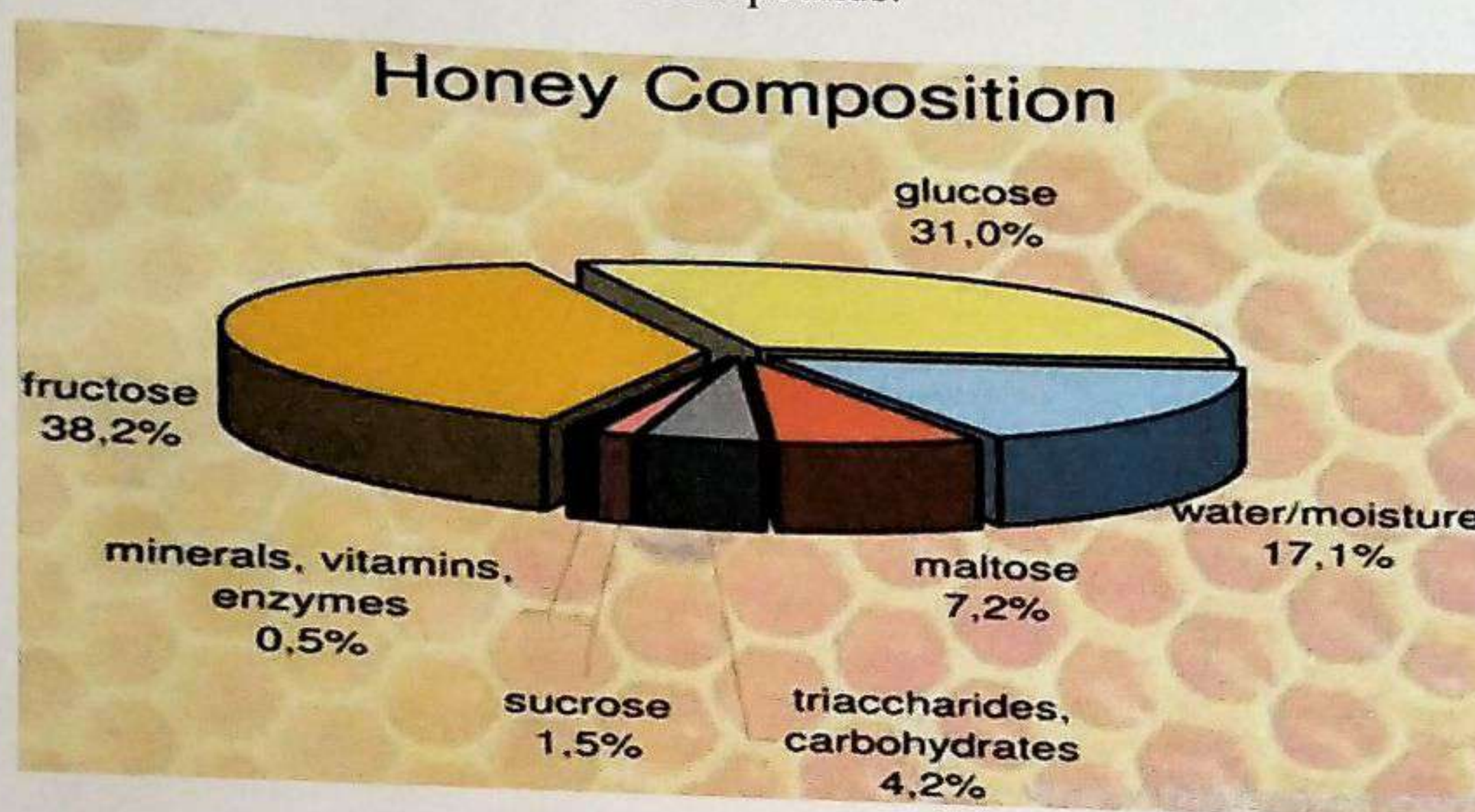
From a chemical point of view, it could be defined as a natural food mainly composed of sugars and water together with minor constituents such as minerals, vitamins, amino acids, organic acids, flavonoids and other phenolic compounds and aromatic substances.

Honey is used to feed bees during the winter. Its composition is particularly variable, depending on its botanical and geographical origins. For centuries, Honey has been used as food and as natural medicine for treating many varieties of illness.

Honey origin, it is categorized into Blossom, Honeydew, Mono floral and Multifloral Honeys.

The main composition of Honey is Sugars or Carbohydrates, which represent 95% of Honey dry weight. It is a complex mixture of concentrated sugar solution with Fructose and Glucose as main ingredients. The average ratio of Fructose and Glucose is 1:2:1. Sucrose is present in honey at about 1% of its dry weight. Honey also contains bio active compounds like organic acids, vitamins, proteins, minerals, aromatic /aroma compounds and polyphenols.

The protein content of Honey is normally less than 0.5% with a small fraction of enzymes. The quality of Honey such as taste, color and other physical properties are contributed by the non-volatile compounds like amino acids, sugars, minerals and phenolic compounds; aroma of honey is mainly contributed by the volatile compounds.



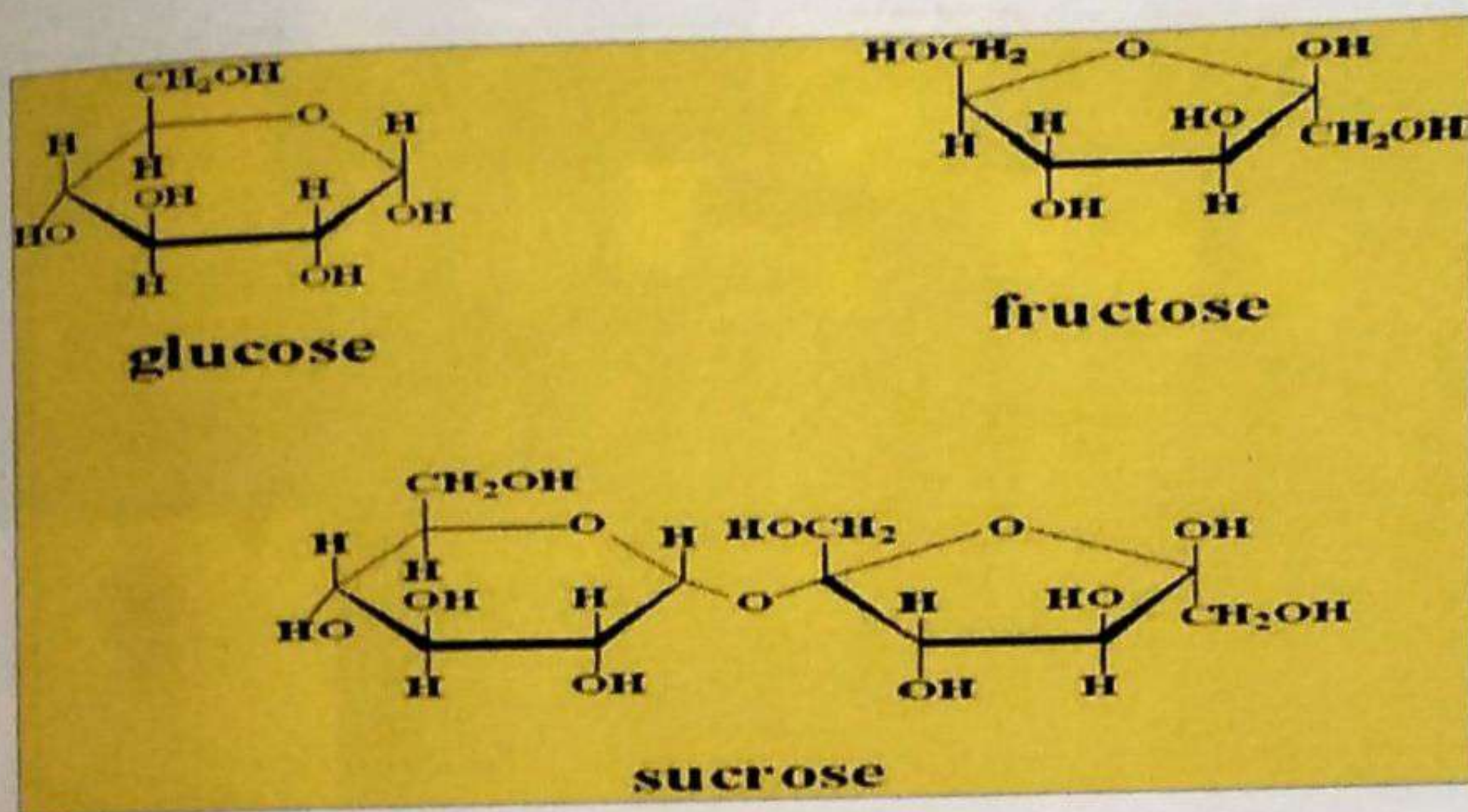
The compositional criteria prescribed in existing Honey directive requirements relating to concentrations of acidity, apparent Reducing Sugar which is calculated as invert sugar and apparent sucrose, 5-Hydroxy methyl furfural (HMF), mineral content, moisture and water insoluble solids.

Hydroxy Methyl Furfural (HMF) is formed from Reducing Sugars in Honey in acidic environment and often used to evaluate Honey quality as it is strongly correlated to ageing and overheating of Honey. Honey has various biological properties including anti-microbial, anti-viral, anti-inflammatory, wound and sunburn healing, anti-oxidant, anti-parasitic, anti-diabetic, anti-mutagenic and anti-tumoral activities.

Recent pharmacological studies have revealed that honeys have potential to reduce risk of gastric and cardio vascular diseases and have beneficial efforts on fertility and ameliorating hormones related to fertility with many beneficial properties. Honey is highly priced and also the major target of Adulteration.

2.1 CHEMICAL ANALYSIS

Honey is a complex mixture of concentrated sugar solution with main ingredients of Fructose and Glucose. The average ratio of Fructose to Glucose is 1:2:1. Sucrose is present in honey at about 1% of its dry weight. The extract proportion of Fructose to Glucose in any honey depends largely on the source of the nectar.



CHEMICAL COMPOSITION OF HONEY

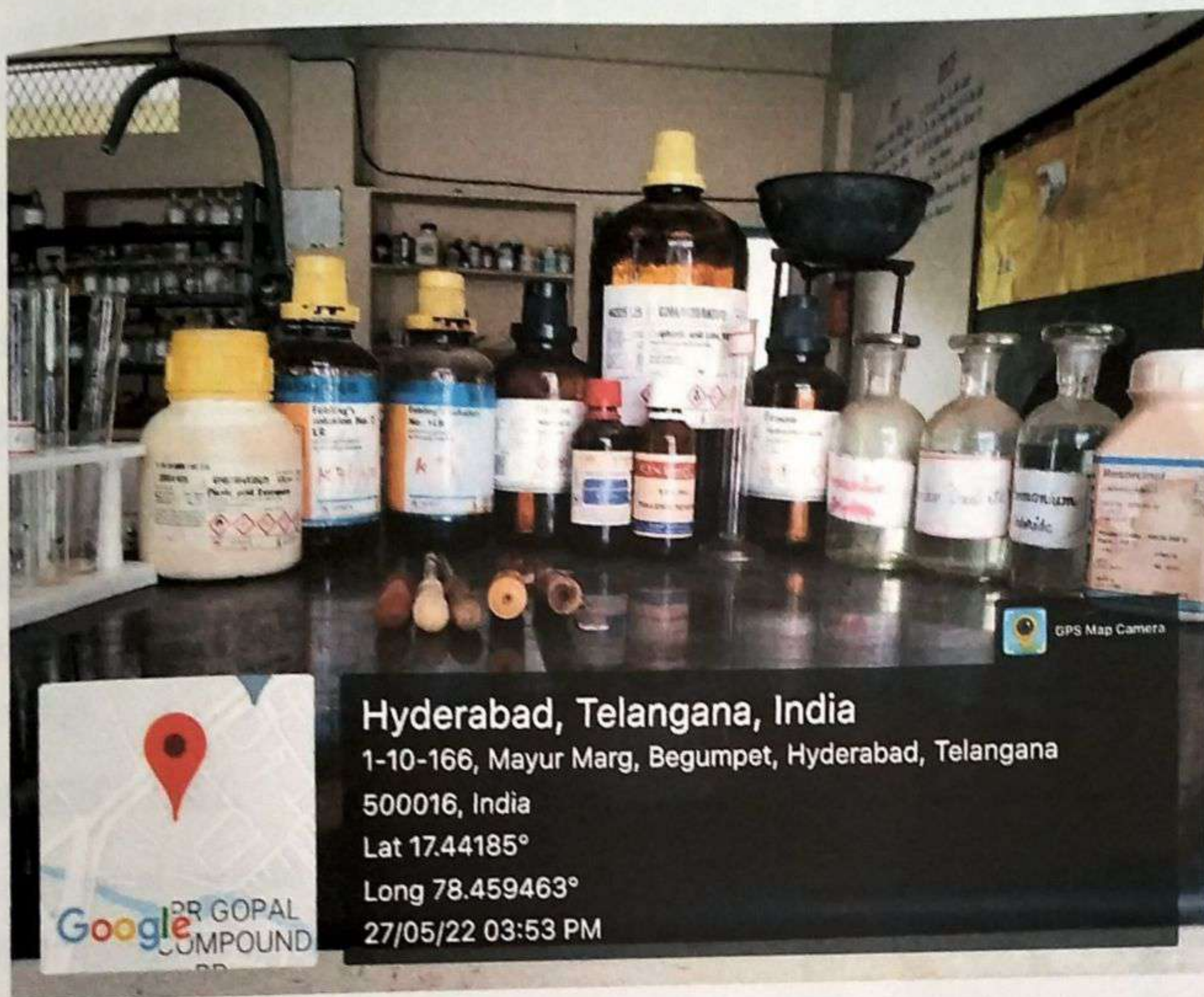
AIM:

To analyze the presence of different Minerals and Carbohydrates present in given HONEY SAMPLES – DABUR, PATANJALI AND LOCALLY PURCHASED HONEY (Natural Honey); and also, to verify the impurities present in Honey samples by performing Adulteration Test.

MATERIALS:

- ❖ Test tubes
- ❖ Test tube stand
- ❖ Burner
- ❖ Water bath
- ❖ Test tube holder
- ❖ Measuring jars
- ❖ China dishes

CHEMICALS:



- ❖ Fehling Solution A
- ❖ Fehling Solution B
- ❖ Ammonium Chloride Solution
- ❖ Ammonium Oxalate Solution
- ❖ Ammonium hydrochloric Solution
- ❖ Concentrated Nitric Acid
- ❖ Picric Acid
- ❖ Molisch's Reagent
- ❖ Resorcinol
- ❖ Sulfuric Acid
- ❖ Hydrochloric Acid
- ❖ Tollens Reagent
- ❖ Ether

FEHLING'S TEST:

It is a chemical test used to differentiate between Reducing and Non-Reducing Sugars. This test can also be used to distinguish Ketone functional group Carbohydrates and Water-soluble Carbohydrates.

TOLLENS TEST:

It is a very useful method to distinguish between Aldehydes and Ketones. This qualitative lab test is also referred to as Silver Mirror Test.

FIECHE'S TEST:

It is a chemical test used to detect the Adulteration of Honey with Inverted Sugars (Acid Hydrolyzed Sugar). It actually detects the presence of HMF (Hydroxy Methyl Furfural) content in honey invert sugar has highest HMF content whereas Honey has lesser HMF content (around 10 mg/kg).

MOLISCH'S TEST:

It is a chemical test used to detect the presence of Carbohydrates molecules. The principle of Molisch's test is the dehydration of Sulfuric acid into furfural.

REDUCING SUGAR TEST:

It is also known as Benedict's Test. It is a chemical test that can be used to check for the presence of Reducing Sugars.

TOLLENS REAGENT:

It is a chemical reagent used to distinguish between Aldehydes and Ketones along with some alpha – hydroxy Ketones which can tautomerize into Aldehydes. The reagent consists of a solution of Silver Nitrate, Ammonia and some Sodium hydroxide (to maintain a basic pH of the reagent solution).

MOLISCH'S REAGENT:

It is a chemical reagent with alpha naphthol dissolved in ethanol. It is used for detection of Carbohydrates.

METHODS:

TEST FOR MINERALS

1. TEST FOR POTASSIUM:

Take a 2 ml of Honey in a test tube and Picric acid solution is added. Yellow precipitate indicates the presence of Potassium.

2. TEST FOR CALCIUM:

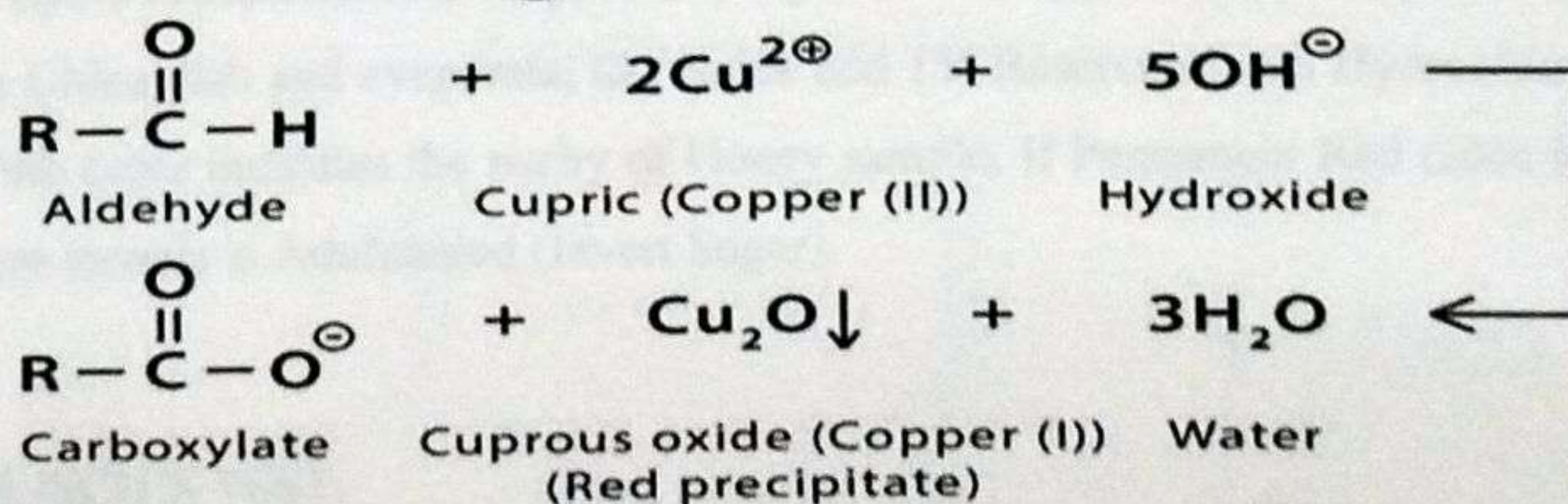
Take a 2 ml of Honey in a test tube and Ammonium Chloride solution along with Ammonium hydroxide solution are added to it. The solution is filtered and to the filtrate 2 ml of Ammonium oxalate solution is added. White precipitate or milkiness indicates the presence of Calcium.

TEST FOR CARBOHYDRATES

1. FEHLING'S TEST:

Take 2 ml of Honey in a test tube and 1 ml of each Fehling's solution A and Fehling's solution B are added to it and boiled. Red precipitate indicates the presence of Reducing Sugar.

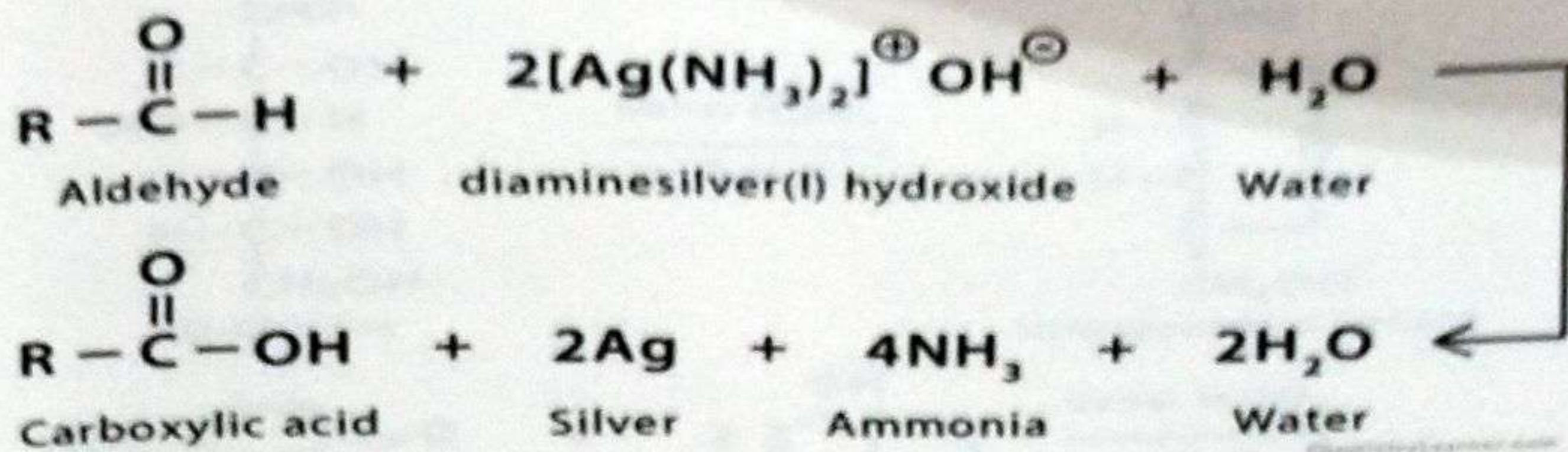
Fehling's Test Reaction



2. TOLLENS TEST:

Take 2-3 ml of aqueous solution of Honey in a test tube. 2-3 ml of Tollens reagent is added to it. The test tube is kept in boiling water bath for about 10 minutes. A Shining Silver Mirror indicates the presence of Reducing Carbohydrates.

Tollens' Test



ADULTERATION TESTS

Adulteration of food commonly defined as "the addition or subtraction of any substance to or from food, so that the natural composition and quality of food substance is effected".

"ADULTERANT" means any material which is or could be employed for making the food unsafe or sub-standard or containing extraneous matter.

To examine the impurities, present in the Honey. 3 types of tests have to perform such as Fische's test, Molisch's test and Reducing Sugar test.

TESTS FOR ADULTERATION:

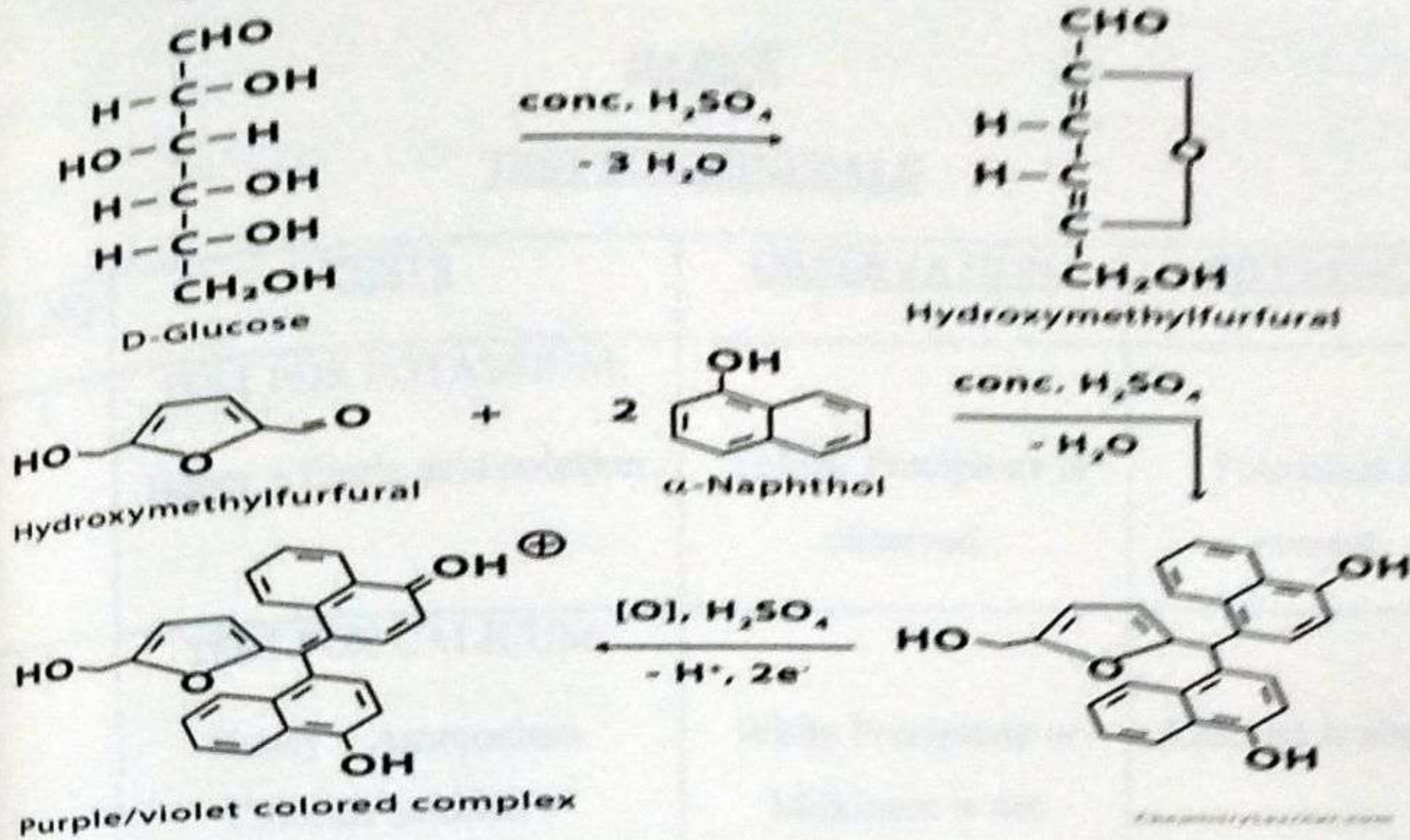
1. FIECHE'S TEST:

Take about 3 ml of Honey in a test tube and 2 ml of ether and shake thoroughly and allow the 2 layers to separate and evaporate to dryness. The upper etherical layer is separated and put in a China dish and evaporate, to residue add 1% Resorcinol and Hydrochloric acid. Transient Pink color indicates the purity of Honey sample. If Permanent Red color indicates then the taken sample is Adulterated (Invert Sugar).

2. MOLISCH'S TEST:

Take 2 ml of Honey in a test tube and add 1 ml of Molisch's reagent (alpha naphthol) and add concentrated Sulfuric acid. Purple color indicates the presence of the Carbohydrates.

Molisch's Test Reaction

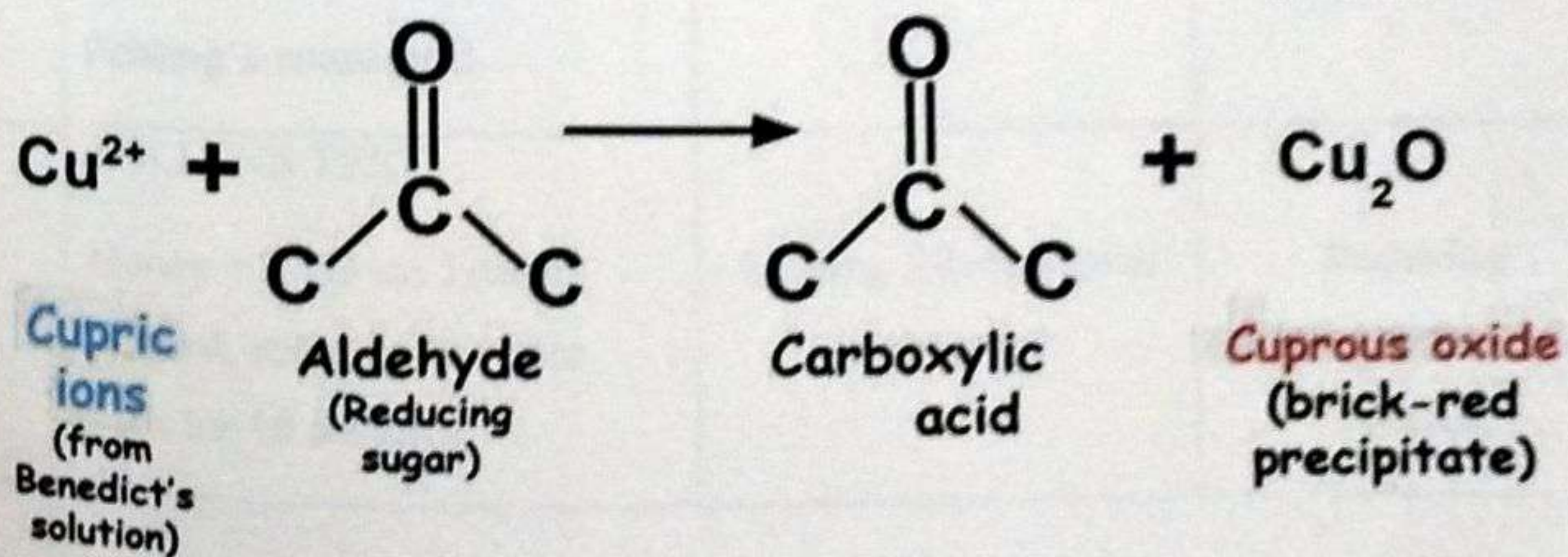


3. REDUCING SUGAR TEST:

Take 2 ml of Honey in a test tube and heat it in the water bath for 2-3 minutes, until the honey slightly gets heated. Then take the test tube from the water and add a drop of Fehling's solution A and Fehling's solution B in the test tube. Brick Red color indicates the presence of Monosaccharides.

Benedict's Test Reaction

DewWool.com



2.2 OBSERVATION TABLE

DABUR

TEST FOR MINERALS

<u>SL.NO</u>	<u>TESTS</u>	<u>OBSERVATION</u>	<u>INFERENCE</u>
1	TEST FOR POTASSIUM: Honey + Picric acid solution	Yellow Precipitate is observed.	Potassium is present.
2	TEST FOR CALICUM: Honey + Ammonium Chloride solution + Ammonium Hydroxide filtered + Ammonium Oxalate solution	White Precipitate or Milkiness is not observed.	Calcium is absent.

TEST FOR CARBOHYDRATES

<u>SL.NO</u>	<u>TESTS</u>	<u>OBSERVATION</u>	<u>INFERENCE</u>
1	FEHLING'S TEST: Honey + 1 ml of each Fehling's solution A and Fehling's solution B.	Red Precipitate is observed.	Reducing Sugar is present.
2	TOLLENS TEST: Honey + 2 – 3 ml Tollens reagent, test tube in water bath for 10 minutes.	Shining Silver Mirror is observed.	Reducing Carbohydrates is present.

ADULTERATION TEST

SL.NO	TESTS	OBSVERAVATION	INFERENCE
1	<p>FIENCHES'S TEST:</p> <p>3 ml of Honey + 2 ml of Ether + allow 2 layers to separate + the upper ethereal layer is separated and put in a China dish and evaporate, to the residue add 1% of Resorcinol and Hydrochloric acid.</p>	Transient Pink Color	Pure Honey
2	<p>MOLISCH'S TEST:</p> <p>Honey + alpha Naphthol + conc. Sulfuric acid.</p>	Purple Color	Carbohydrates are present.
3	<p>REDUCING SUGAR TEST:</p> <p>Honey + a drop of Fehling's solution A and Fehling's solution B.</p>	Brick Red Color	Monosaccharides are present.



TESTS FOR MINERALS

<u>SL.NO</u>	<u>TESTS</u>	<u>OBSERVATION</u>	<u>INFERENCE</u>
1	TEST FOR POTASSIUM: Honey + Picric acid solution	Yellow Precipitate is observed.	Potassium is present.
2	TEST FOR CALICUM: Honey + Ammonium Chloride solution + Ammonium Hydroxide filtered + Ammonium Oxalate solution	White Precipitate or Milkiness is not observed.	Calcium is absent.

TEST FOR CARBOHYDRATES

<u>SL.NO</u>	<u>TESTS</u>	<u>OBSERVATION</u>	<u>INFERENCE</u>
1	FEHLING'S TEST: Honey + 1 ml of each Fehling's solution A and Fehling's solution B.	Red Precipitate is observed.	Reducing Sugar is present.
2	TOLLENS TEST: Honey + 2 – 3 ml Tollens reagent, test tube in water bath for 10 minutes.	Shining Silver Mirror is observed.	Reducing Carbohydrates is present.

DILUTION TEST

SL.NO	TESTS	OBSVERAVATION	INFERENCE
1	<p>FIETCHES'S TEST:</p> <p>3 ml of Honey + 2 ml of Ether + allow 2 layers to separate + the upper etherical layer is separated and put in a China dish and evaporate, to the residue add 1% of Resorcinol and Hydrochloric acid.</p>	Transient Pink Color	Pure Honey
2	<p>MOLISCH'S TEST:</p> <p>Honey + alpha Naphthol + conc. Sulfuric acid.</p>	Purple Color	Carbohydrates are present.
3	<p>REDUCING SUGAR TEST:</p> <p>Honey + a drop of Fehling's solution A and Fehling's solution B.</p>	Brick Red Color	Monosaccharides are present.



LOCALLY PURCHASED HONEY (Natural Honey)

TESTS FOR MINERALS

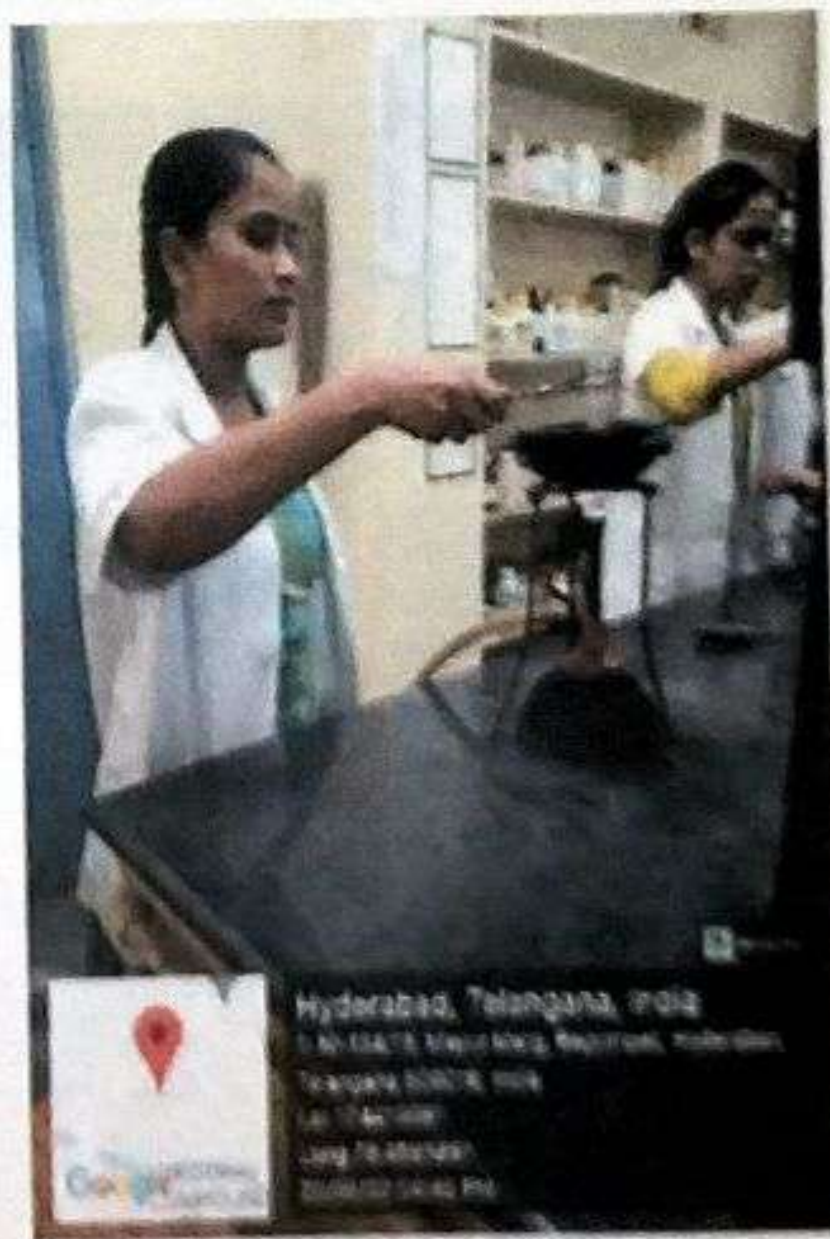
<u>SL.NO</u>	<u>TESTS</u>	<u>OBSERVATION</u>	<u>INFERENCE</u>
1	TEST FOR POTASSIUM: Honey + Picric acid solution	Yellow Precipitate is observed.	Potassium is present.
2	TEST FOR CALICUM: Honey + Ammonium Chloride solution + Ammonium Hydroxide filtered + Ammonium Oxalate solution	White Precipitate or Milkiness is not observed.	Calcium is absent.

TEST FOR CARBOHYDRATES

<u>SL.NO</u>	<u>TESTS</u>	<u>OBSERVATION</u>	<u>INFERENCE</u>
1	FEHLING'S TEST: Honey + 1 ml of each Fehling's solution A and Fehling's solution B.	Red Precipitate is observed.	Reducing Sugar is present.
2	TOLLENS TEST: Honey + 2 – 3 ml Tollens reagent, test tube in water bath for 10 minutes.	Shining Silver Mirror is observed.	Reducing Carbohydrates is present.

ADULTERATION TEST

<u>SL. NO</u>	<u>TESTS</u>	<u>OBSVERAVATION</u>	<u>INFERENCE</u>
1	<p>FIECHES'S TEST:</p> <p>3 ml of Honey + 2 ml of Ether + allow 2 layers to separate + the upper etherical layer is separated and put in a China dish and evaporate, to the residue add 1% of Resorcinol and Hydrochloric acid.</p>	Permanent Red Color	Adulterated Honey (Inverted Sugar)
2	<p>MOLISCH'S TEST:</p> <p>Honey + alpha Naphthol + conc. Sulfuric acid.</p>	Purple Color	Carbohydrates are present.
3	<p>REDUCING SUGAR TEST:</p> <p>Honey + a drop of Fehling's solution A and Fehling's solution B.</p>	Brick Red Color	Monosaccharides are present.



3.1 RESULT

DABUR

TEST FOR MINERALS:

- Potassium is present.
- Calcium is absent.

TEST FOR CARBOHYDRATES:

- Reducing Sugars is present.
- Reducing Carbohydrates is present.



TESTS FOR ADULTERATION:

- Pure Honey.
- Carbohydrates are present.
- Monosaccharides are present.



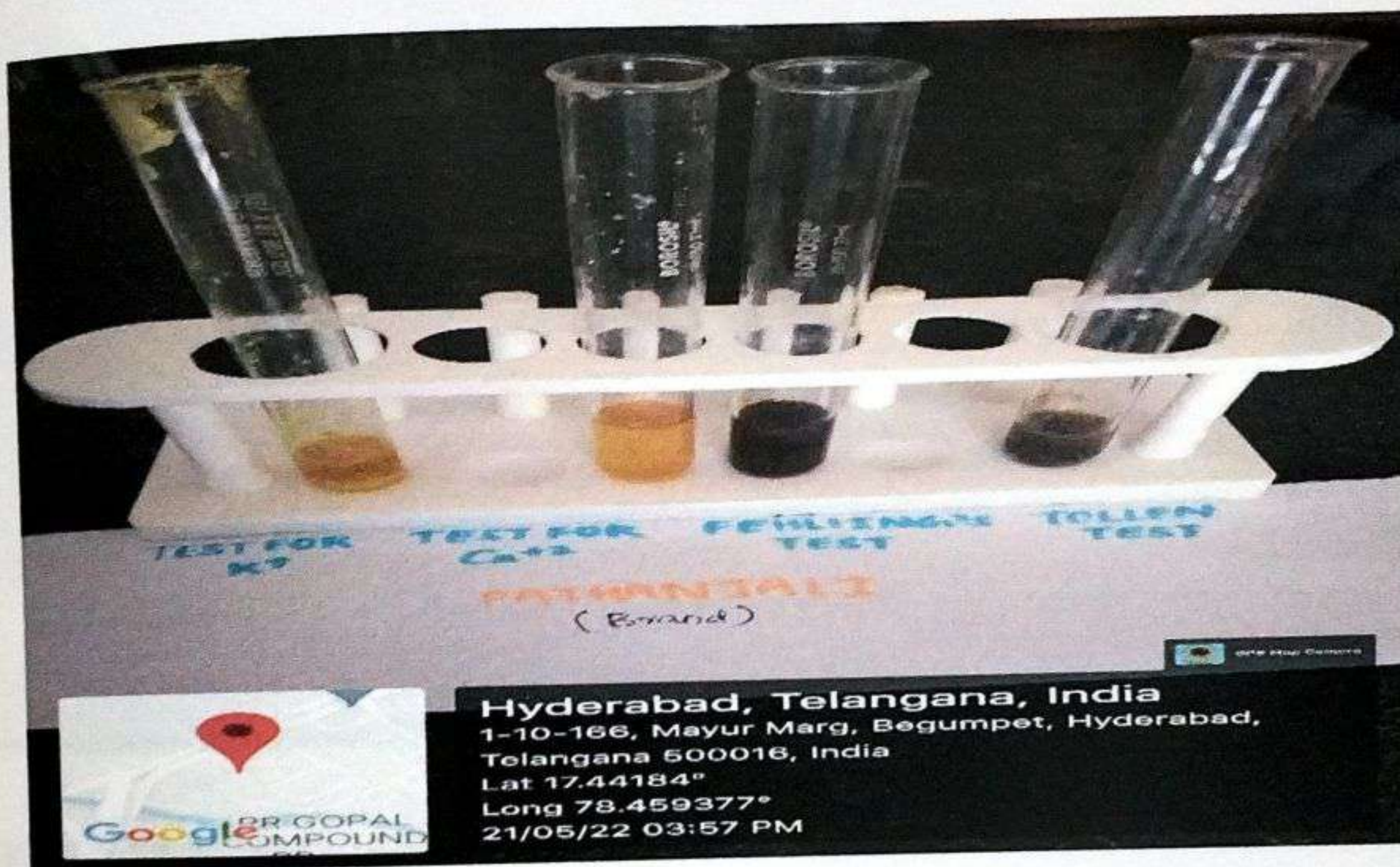
PATANJALI

TEST FOR MINERALS:

- Potassium is present.
- Calcium is absent.

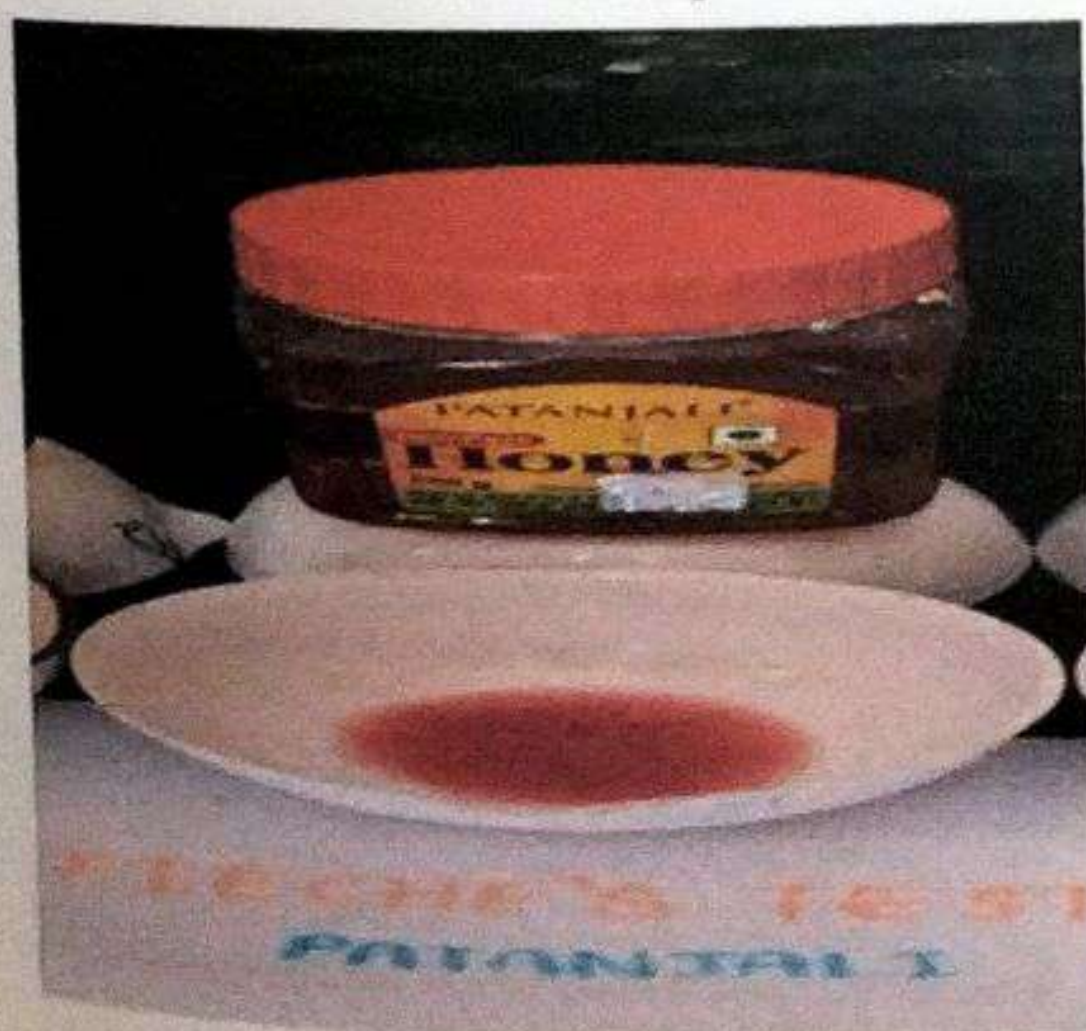
TEST FOR CARBOHYDRATES:

- Reducing Sugars is present.
- Reducing Carbohydrates is present.



TESTS FOR ADULTERATION:

- Pure Honey.
- Carbohydrates are present.
- Monosaccharides are present.



LOCALLY PURCHASED HONEY (Natural Honey)

TEST FOR MINERALS:

- Potassium is present.
- Calcium is absent.

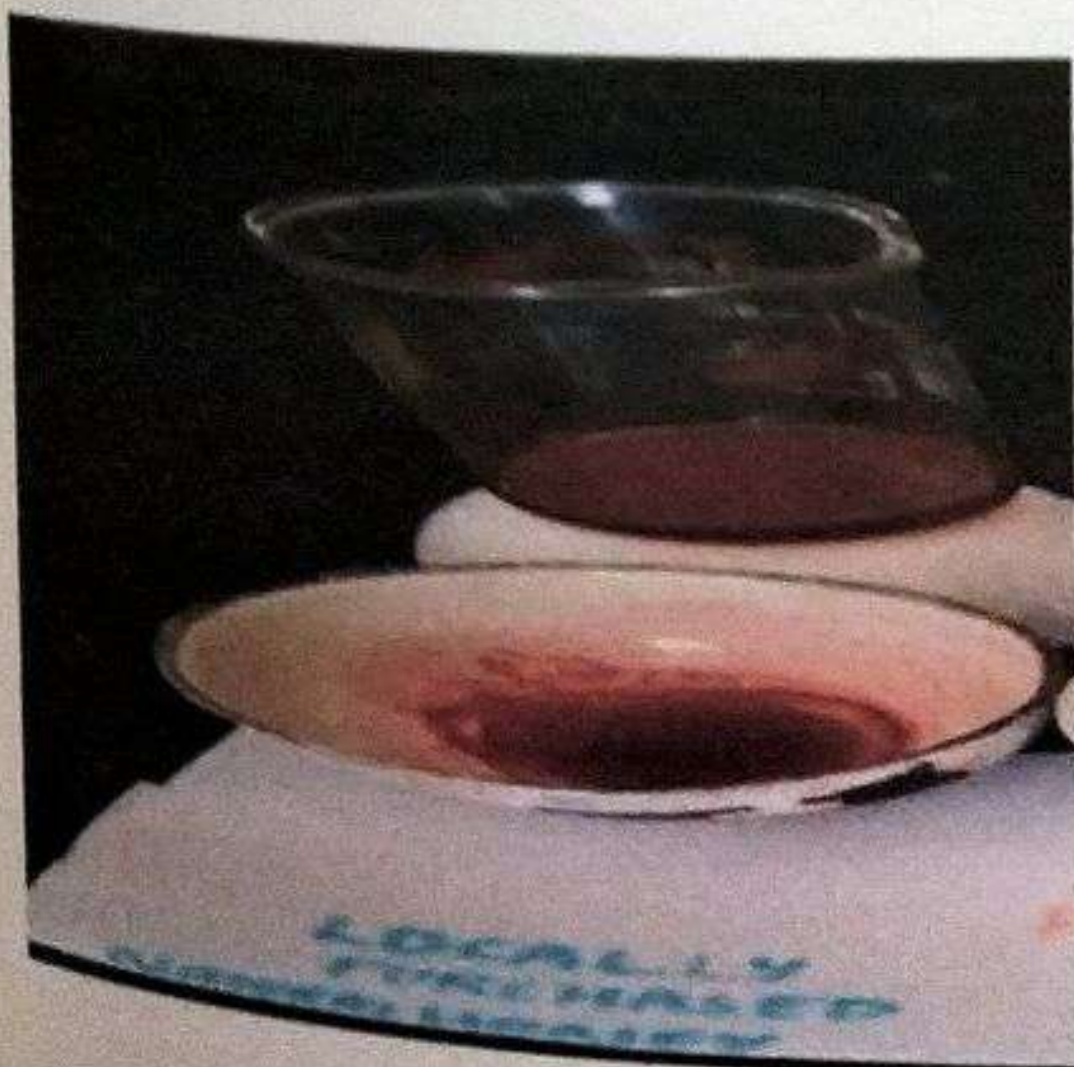
TEST FOR CARBOHYDRATES:

- Reducing Sugar is present.
- Reducing Carbohydrates is present.



TESTS FOR ADULTERATION:

- Permanent Red Color (Invert Sugars)
- Carbohydrates are present.
- Monosaccharides are present.



DISCUSSION

In this project report we discussed about Honey and its Chemical Composition and how is it useful in our daily lives. Honey has a number of potential health benefits and plays a role in many home remedies and alternative medicine treatment.

As per our study we identified that, "The best-known Honey bee is the Western Honey Bee (*Apis mellifera*), which was domesticated for Honey production and crop pollination".

The most important topic we discussed in this project is about the Test Analysis of Honey. We can identify whether the Honey contains impurities or not. For testing purposes, we considered 3 different samples of Honey i.e., Dabur, Patanjali and Locally Purchased Honey (Natural Honey).

In this report by conducting all the tests we observed that the color of the Honey samples ranges from amber to dark amber. The color of Honey depends on the various parameters such as the presence of Minerals, Carbohydrates, Calcium present in Honey.

While doing the tests, we observed that Locally Purchased Honey had given quick results when compared to Dabur and Patanjali. After the test of Chemical Analysis is done, we performed Adulteration test which is the important test in identifying whether the Honey is pure or not. While doing this test, we observed that Locally Purchased Honey had impurities in it and whereas Dabur and Patanjali had passed the Adulteration test, but when comparison is made between Dabur and Patanjali, Dabur had given quick result compared to Patanjali.

4.1 CONCLUSION

In this project report, the main aim is to find the purity of Honey samples available in local markets and for examining the purity of Honey, we considered 3 different types of Honey samples i.e., Dabur, Patanjali and Locally Purchased Honey (Natural Honey).

By conducting all the tests included in identifying of Minerals, Carbohydrates and the Adulteration test. The test results are observed as follows: While examining all the 3 honey samples, all the 3 of them had showed similar tests but there is a difference in time intervals.

The 3 samples had passed the tests for Minerals and Carbohydrates and when we performed the final test which is Adulteration test, Locally Purchased Honey turned out to be the adulterated sample whereas Patanjali and Dabur resulted as pure and non-adulterated samples. When comparison is made between Dabur and Patanjali, Dabur had given little quick results than Patanjali.

By our test's reports, we conclude that Dabur is the Best and Non-Adulterated among all the 3 samples and Dabur is the only company in India to have an NMR testing equipment in their own laboratory and the same is used to regularly test the Honey being sold in the Indian market. This ensures that **"Dabur Honey is the 100% Pure Honey without any Adulteration"**.

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Government Degree College for Women (Autonomous)

Begumpet, Hyderabad-500016

Affiliated to Osmania University, Re-Accredited with 'B+' Grade by NAAC



TITLE OF THE PROJECT

“ANALYSIS OF CHOCOLATES”

SUBMITTED BY:

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CONTENTS

ABSTRACT

INTRODUCTION

- Archeological: Evidence cocoa in Mesoamerica 10
- Early history 10
- Production of chocolate 11
- Preparation of chocolate 11
- Procedure for making chocolates 12
- Chocolate consumption 13
- Differences 15
- Chocolate consumption in children's & Adult's 16
- Chemical test for chocolate 20

ANALYSIS OF METHODS

- Aim 21
- Apparatus 21
- Method 24

OBSERVATION

- Dairy milk 30
- Kit kat 30
- Five-star 31
- Perk 32

RESULT

CONCLUSION

REFERENCES

ABSTRACT

1. Chocolates have become one of the most popular flavors in the world today. They found the basic ingredients in very many pastries and cakes. Chocolates can also be used as hot and cold beverages. Manufacture combines secret formulas of the different varieties of cocoa beans to develop exclusive chocolates and try to make the exotic taste. Gifts of chocolates wrapped in different shapes have become traditional on certain festivals and occasions.
2. Chocolates are made from the seeds of cocoa trees. Spanish mythology considers these seeds the property of the goddess PACHA MAMA who believed that the chocolate drink was divine. The seeds that she brought from volcanoes living and producing for more than 200 years. Chocolates are made from the seeds of these trees. There are many varieties of chocolate which are used in many different ways.
3. Chocolate is a very popular food in our society. Chocolate is also known as the "love of God". It is produced from the seeds of the plant *Theobroma cacao*. It contains many nutrients like caffeine. A central nervous system stimulant. It is used in many different ways like sweets and drinks as well as gifts. In our study we found that the consumption of chocolates in children, we found that they like to eat chocolate containing food, while the adults like to eat chocolate containing food.
4. The consumption of chocolates in the USA is more. And in

ABSTRACT

- Chocolates have become one of the most popular flavors in the world today. They found the basic ingredient in many pastries and cakes. Chocolates can also be used as hot and cold beverages. manufacture combines secret formulas of the different varieties of cocoa sweets to develop exclusive chocolates and try to make the exotic treat. Gifts of chocolates molded to different shapes have become traditional on certain festivals and occasions.
- Chocolates are made from the seeds of cocoa trees. Spanish mythology considers these trees were grown in the garden of the **PARADISE** and believed that the chocolate drink was divine. the cocoa tree is a tropical plant sometimes living and producing for more than 200 years. Chocolates are made from the seeds of these trees. There are many varieties cultivated today and this farming is highly profitable.
- Chocolate is a unique flavored food used in our society. Chocolate is also known as the “food of Gods”. It is prepared from the seeds of the plant *Theobroma cocoa*. It contains many ingredients most important ingredient is **Caffeine**, A central nervous system stimulant. Chocolates are used in many recipes and drinks as well as gifts. According to our survey on the consumption of chocolates in children, we found that only 7.5% of children do not take chocolates, and chocolate containing food, while the other 92.5% of children take chocolates and chocolate containing food.
- According to a 2016 survey consumption of chocolates in the USA is more, And in China is less.

INTRODUCTION

The history of chocolates began in Mesoamerica fermented beverages made from chocolate date back to 450 BC. Mexico believe that cocoa seeds were the gift of Quetzalcoatl, the god of wisdom, and the seeds once had so much value that they were used as a form of currency.

Chocolate was a beverage, and sugar didn't have anything to do with it. Chocolates are the best-known food that nobody knows anything about; said Alexandra Leaf, a self-described "Chocolates educator" who runs a business called chocolate tours of New York City.

Chocolate the food of the gods has had a long and eventful history. Its story is expertly told here by the doyen of Maya studies, Michael Coe, and his late wife, Sophie. The history of chocolate begins 3000 years ago in the Mexican jungles and goes into details on aspects of archeology, botany, and socio-economics. Used as currency and traded by Aztecs, Chocolate arrived in Europe via the conquistadors and was soon a favorite drink of aristocrats. By the 19th century and in industrialization, chocolate became food for the masses until its revival in our own time as a luxury item.

It was believed to be an aphrodisiac and to give the drinker strength. Today such drinks are also known as "chocolate" and are made by locals in the south of Mexico and the northern triangle of Central America (El Salvador, Guatemala, and Honduras). After its arrival to Europe in the 16th century, sugar was added to it and it became popular throughout society, first among the ruling classes and then among the common people. In the 20th century, Chocolate was considered essential in the rations of United States soldiers during war.

Cultivation, consumption and cultural use of cocoa were extensive in Mesoamerica where the cocoa tree is native. When pollinated, the seed of their cocoa tree eventually forms a kind of sheath or ear, averaging 20 cm long, hanging from the tree trunk itself. Within the sheath are 30-40 brownish red almond-shaped beans embedded in a sweet viscous pulp.

While the beans themselves are bitter due to the alkaloids within them, sweet pulp may have been the first element consumed by humans.

Cocoa pods grow in a wide range of colors, from pale yellow to bright green, all the way to dark purple or crimson. The skin can also vary greatly some are sculpted with craters or warts, while others are completely smooth. This wide range in types of pods is unique to cocoas in that their color and texture do not necessarily determine the ripeness or taste of the beans inside.

Evidence against that it may have been fermented and served as alcoholic beverages as early as 1400 BC. Cultivation of cocoa was not an easy process. Part of this was because cocoa trees in their natural environment grow to 60 feet tall or more. When the trees were grown in a plantation; however, they grew to around 20 feet tall.

To researchers who do not agree on which Mesoamerican culture first domesticated the cocoa tree, the use of the fermented bean in a drink seems to have arisen in North America (Mesoamerica, Central America, and Mexico). Scientists have been able to confirm its presence in vessels around the world by evaluating the "chemical footprint" detectable in the micro samples of contents that remain in ceramic vessels with residues from the preparation of chocolate beverages have been found at archeological sites dating back to the early formative (1900 to 900 BC) period. For example, one search vessel found an Olmec archeological site on the gulf coast of Veracruz, Mexico dates chocolate preparation by pre-Olmec peoples as early as 1750 BC. On the pacific coast of Chiapas, Mexico, a Mokayanan archaeological site provides evidence of cocoa beverages dating from events earlier to 1900 BC.

A study, published online in nature ecology and evaluation, suggests that cocoa the plant from which the chocolates is made was domesticated or grown by people for food, around 1500 years earlier than previously thought. In addition, researchers found cocoa was originally domesticated in South America, rather than in Central America. 'This new study shows us the people in the upper reaches of the Amazon basin, extending up into the foothills of the Andes in southeastern Ecuador were harvesting and consuming cocoa that appears to be a close relative of the type of cocoa later used in Mexico and they were doing these 1500 years earlier, said Michael Blake, study co-author and professor in the University of British Columbia.

Department of Anthropology the researchers used three lines of evidence to show that the mayo-chin chip culture used cocoa between 5300 and 2100 years ago. The presence of starch grains specific to the cocoa tree inside ceramic vessels and broken pieces of pottery; residues of theobromine, a bitter alkaloid found in the cocoa tree but not its wild relatives; and fragments of ancient DNA with sequences unique to the cocoa tree.

Pueblo, people, who lived in an area that is known as the US southeast, imported cocoa from Mesoamerican cultures in southern Mexico between 900 and 1400. They are used in a common beverage consumed by many people within their society.

➤ **Archeological; evidence cocoa in Mesoamerica**

Nature ecology and evolution reported that is believed to be the earliest cocoa use from approximately 5300 years ago recovered from the Santa ana (La Florida) atheist in southeast Ecuador. Another find of chemically traced cocoa was in 1984 when a theme of archeologists in Guatemala explores the Mayan site of Rio Azul. They discovered 15 vessels surrounding male skeletons in the royal tomb. One of these vessels was beautifully decorated and covered in various mayanglyphs. One of these glyphs translated to "Kakaw" also known as cocoa. The inside of the vessel was lined with a dark-colored powder, which was scraped off for further testing. When the archeologist took this powder to the Hersey center for help and nutrition to be tested, they found a trash amount of theobromine in the powder, a major indicator of cocoa. This cocoa was dated to sometime between 460 and 480AD.

Cocoa powder was also found in decorated bowls and jars, known as teammates, in the city of Puerto Escondido. Once thought to have been a very rare commodity, cocoa was found in many more teammates than once thought. However, since this powder was only found in bowls of higher quality, it led archeologists to believe that only whether people could afford such bowls, and therefore the cocoa. The coca tecomate's are believed to have been a centerpiece to social gatherings between people of high social status.

➤ **Early History**

Until the 16th century, the cocoa tree was wholly unknown to Europeans.

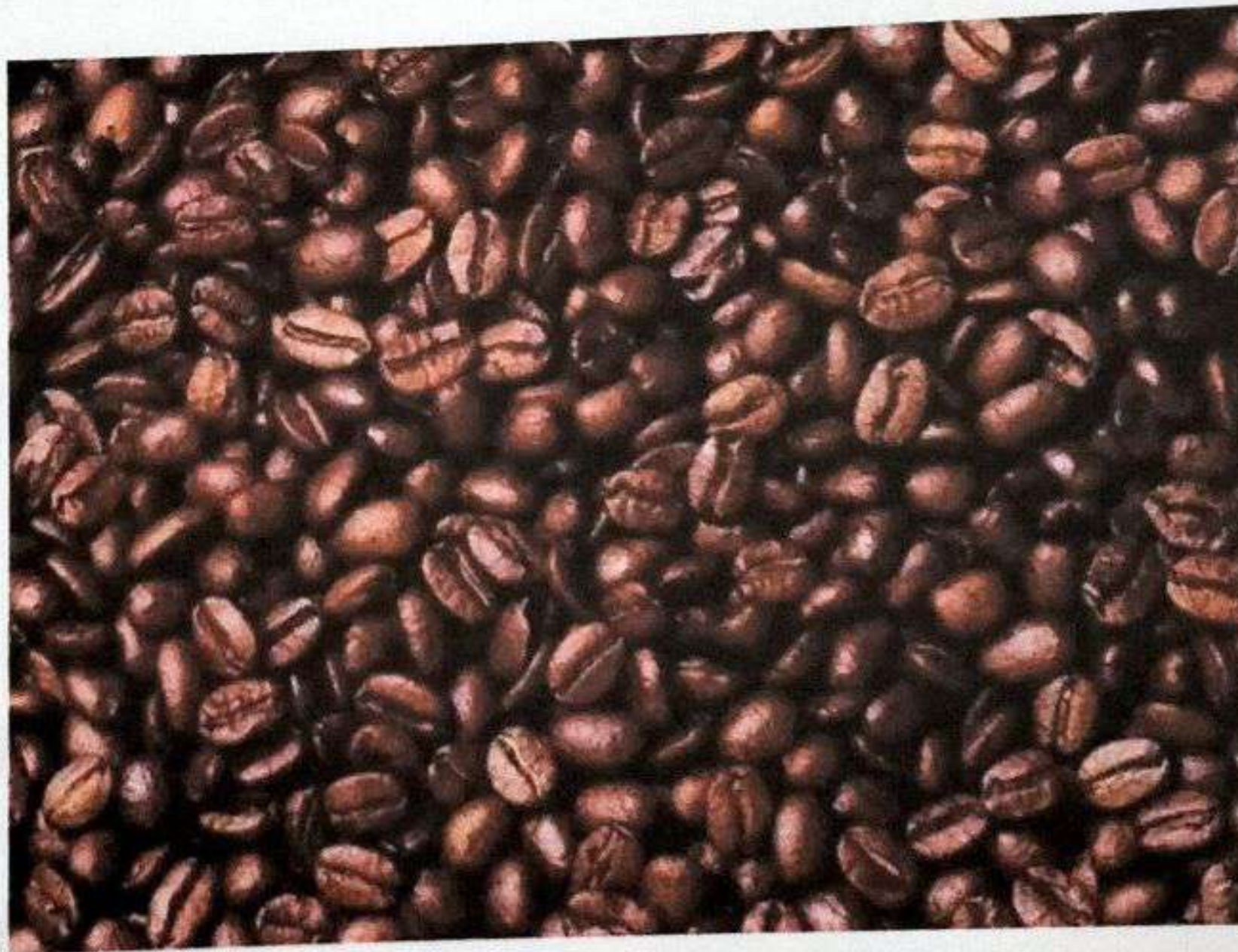
Christopher Columbus encountered the cocoa bean on his fourth mission to the Americans on August 15th. 1502, when he and his crew seized a large native canoe that proved to contain among other goods for trade, cocoa beans, his son Ferdinand commented that the natives greatly valued the beans, which the termed almonds, "for when they were brought on board ship together with their goods, observed that when any of these almonds, fell, they all stopped to pick it up as if an eye had fallen. But while Columbus took cocoa beans with him back to Spain, it made no impact until Spanish friars introduced chocolate to the Spanish court.

Spanish conquistador Hernan Cortes may have been the first European to encounter chocolate when he observed it in the court of Montezuma in 1519. In 1568, Bernal Diaz accompanied the coasts in the conquest of Mexico.

➤ Production Of Chocolates

Chocolates is a key ingredient in many foods such as milkshakes, candy bars, cookies, and cereals. It is ranked as one of the most favorite flavors in North America and Europe (Swift, 1998). Despite its popularity, most people do not know the unique origin of this popular treat. Chocolates is a product that requires complex procedures to produce. The process involves harvesting cocoa, refining the cocoa-to-cocoa beans, and shipping the cocoa beans to the manufacturing factory for cleaning, coaching, and grinding. These cocoa beans will then be imported or exported to other countries and be transformed into different types of chocolate products.

➤ Preparation Of Chocolate



Ingredients involved are

cocoa seeds

1. cocoa beans
2. cocoa butter
3. sugar
4. milk
5. powder or alternative milk (if it's milk chocolate), and
6. sometimes the addition of an emulsifies

1. Cocoa beans:

The cocoa bean (technically cocoa used) or simply cocoa, also called the cocoa bean dried and the fully fermented seed of *Theobroma cacao*. From which cocoa solids (a mixer of nontaste substances) and cocoa butter can be extracted. Cocoa beans are the basis of chocolate, and Mesoamerican food including Tejati, an indigenous Mexican drink that also includes maize.

2. Cocoa butter: -

Cocoa butter, also called the Obama, oil, is a bail yellow, edible fat extracted from the cocoa bean. It is used to make chocolate, as well as some ointments, toiletries, pharmaceuticals cocoa butter as a cocoa flavor and aroma. Its melting point is just below human body temperature.

3. Sugar:

Sucrose, a disaccharide, is a sugar composed of glucose and lactose subunits. It is produced naturally by plants and is the main constituent of white sugar. It is the molecular formula of $C_{12}H_{22}O_{11}$.

4. MILK:

Milk is a nutrient-rich liquid food produced by the mammary glands of mammals. Is a primary source of nutrition for young mammals (including breastfeeding human infants) before they are able to digest solid food.

> CHOCOLATE CONSUMPTION

> PROCEDURE FOR MAKING CHOCOLATES:

Cocoa beans are stored in soils or warehouses in their original sacks imported saw cocoa is subject to strict quality control. Laboratory technicians ensure that the beans are healthy, perfectly terminated and dried, and have suffered no damage during transport soils, measuring from 40 – 120 feet in height up to 1000 tons or more. The raw cocoa is sucked up by powerful vacuums and fed into the soils.

The storage area must be isolated from the building to protect the sensitive beans from strong odors that might be absorbed. Good air circulation and a cool temperature are important and the humidity is regularly checked. You must be able to identify the beans *a/c* to their particular type and origin in order to control the flavors by blending beans for roasting.

The process of making chocolate starts with the cocoa beans passed through a machine that removes the dried cocoa pulp, pieces of the pod, and other extraneous material, after cleaning cocoa beans they are roasted, and the roasting of beans brings out the characteristic chocolate aroma, roasting of beans may take 30min to 2Hrs at a temperature of 250^o degree Fahrenheit, as the beans turn over and over, the color changes to a rich brown proper roasting is one of the keys to good flavor. The cocoa beans are cooled quickly and their thin shells, which have become brittle by roasting, are removed by a gained winnowing machine that possesses the beans between secreted coins so they cracked rather than crash. In the process, a series of mechanical sieves separate the broken pieces into large and small grains wild fans blow away the thin, light shell from the meat or nibs, here's where the first secrets of the chocolate manufacture come the nibs are blended, combining as many as 8 – 10 varieties. Up to this point, the manufacture of cocoa and chocolate is identical. To make cocoa powder chocolate liquor is pumped into a hydraulic presser weighing up to 25 tones, and when the pressure is applied 80% cocoa butter is removed, the nibs which contain about 53% cocoa butter pass through refining mills and are ground between large grinding stones heavy steel disc creating a cocoa paste. After the process, other ingredients are added to the chocolate liquor, milk, sugar, cocoa butter, and other ingredients to the bitter chocolate liquor. The ingredients go into a mixer with rotating, kneading arms until the result is a homogeneous, paste-like mixture with a pleasant taste, but it still feels great to the palate.

➤ CHOCOLATE CONSUMPTION:

BAD EFFECTS:

- Chocolate consumption has long been associated with conditions such as diabetes, coronary heart disease, and hypertension.
- Chocolate is believed to contain high levels of antioxidants.
- Some studies have suggested chocolate could lower cholesterol levels and prevent memory decline.

- Chocolate contains a large number of calories.
- People who are seeking to lose or maintain or weight should eat chocolate only in moderation.

5. THINGS CHOCOLATES DOES TO YOUR TEETH:

- Delivers high doses of sugars into the mouth which supports bacteria growth, plaque, and contributes to gum disease
- Bacteria in the mouth turn sugar into acids, which eat away at the surface of teeth.
- This causes tooth decay and calories.
- Sugar in chocolate exacerbates the effect of weakened enamel.
- Chocolates can stain teeth.

GOOD EFFECTS;

- Dark chocolate is loaded with nutrition that can positively affect your health.

Made from the seed of the cocoa tree, it's one of the best sources of antioxidants you can find

➤ **Very Nutritious:**

If you buy quality dark chocolate with high cocoa content, then it's quite nutritious. It contains an amount of soluble fiber and is loaded with minerals.

A 100-gram bar of dark chocolate with 70-85% cocoa contains

*11 grams of fiber.

*67% of the iron

*58% Magnesium

*89% of Copper

*98% the Manganese,

In addition, it has plenty of potassium, Phosphorous, Zinc, and Selenium.

➤ **A powerful source of Antioxidants:**

ORAC stands for oxygen radical absorbance capacity. It's a measure of the antioxidant activity of food. Basically, researchers set a bunch of free radicals (bad) against a sample of the food and see how well the

antioxidants in the food can disarm the free radicals. cocoa and dark chocolate have a wide variety of powerful antioxidants.

➤ **May improve blood flow and lower blood Pressure:**

The flavanols in dark chocolate can stimulate the endothelium, the lining of arteries, to produce nitric oxide (NO). One of the functions of NO is to send signals to the arteries to relax, which lowers the resistance to blood flow and therefore reduces blood pressure.

➤ **May Reduce heart disease risk:**

The compounds in dark chocolates appear to be highly protective against the oxidation of LDL. In a study of 470 older men, cocoa was found to reduce the risk of death from heart disease by 50% over 1.5 years. Observational studies show a drastic reduction in heart disease risk among those who consumes the most chocolate.

➤ **Could improve brain function:**

Dark chocolates may improve the function of your brain, one study of healthy volunteers showed that eating high flavanol cocoa for 5 days improved blood flow to the brain. Cocoa and dark chocolate may improve brain function by increasing blood flow. It also contains stimulants like caffeine and theobromine.

➤ **Differences:**

<u>Couverture chocolate</u>	<u>Compound chocolate</u>
* Pure healthy cocoa butter good for the heart.	* Unhealthy, cheap oils used-Bad for the heart.
* Highest quality smooth and fresh	* Cheap quality oily and Greasy after taste
* Tempering gives shine and snap to couverture	* No tempering not so good shine and snap
* Applications: Used in pralines Enrobing Dipping	* Applications: Used in high Temp baking

Filling etc...	
----------------	--

➤ **Chocolate consumption in children and Adults:**

In children, In the first age group, that is 0-5 years, a total of 7 children are questioned about their chocolate consumption on habits 6 children answered that they eat 1-3 chocolates daily while 1 child answered that they eat 1-3 chocolates daily while 1 child answered that he takes more than 10 chocolates daily, in second age group, that is 5-10 years, total 145 children are questioned about their chocolate consumption habit. 12 of them answered that they eat 1-3 chocolates daily, 25 children answered that they take 4 to 6 chocolates daily and in the third age group, that is 10-15, a total of 48 children are questioned about chocolate consumption, 3 of them answered they do not take chocolates due to its bitter taste. 24 children answered that they eat 1-3 chocolates.

Children & Adults:

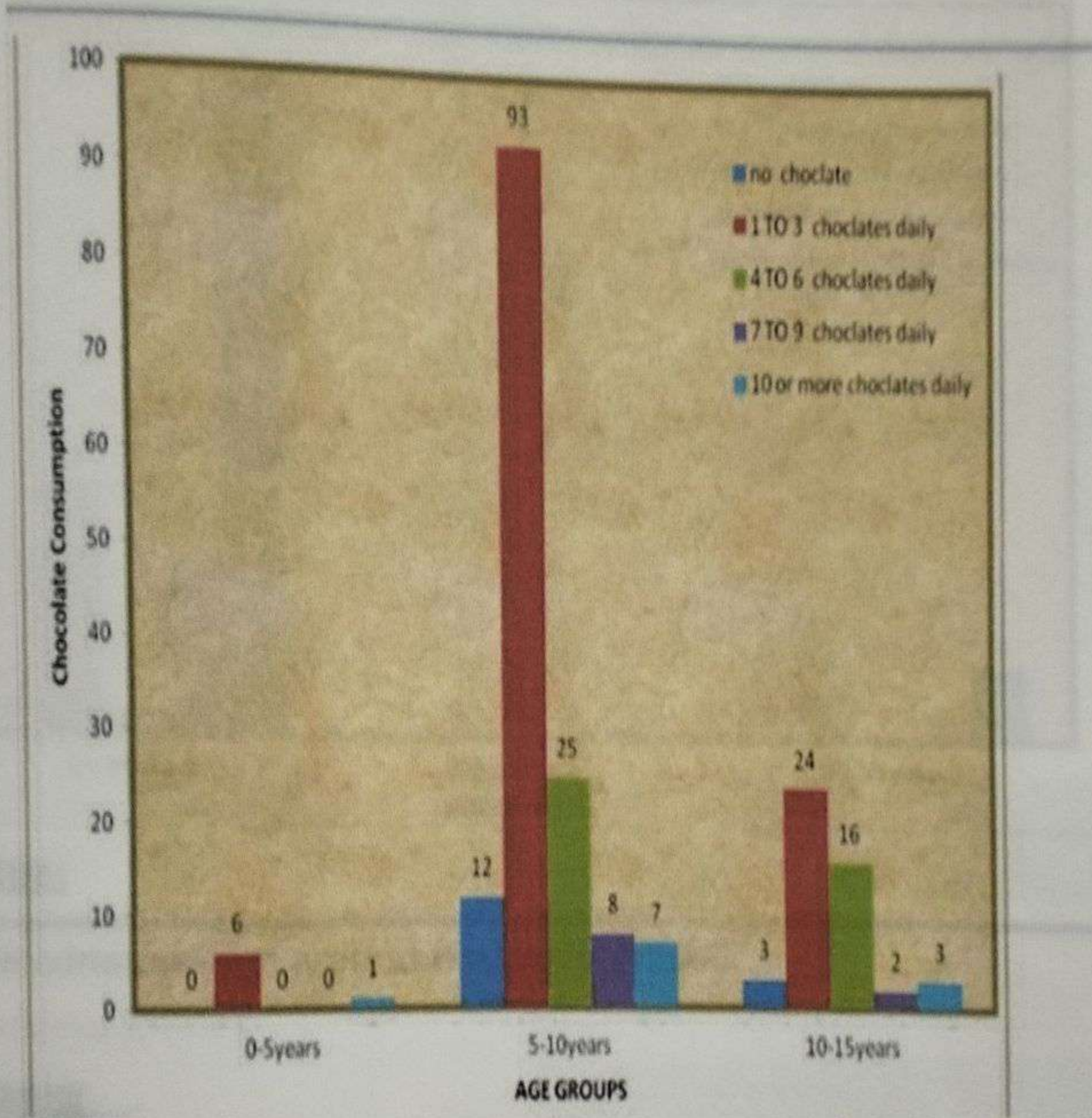
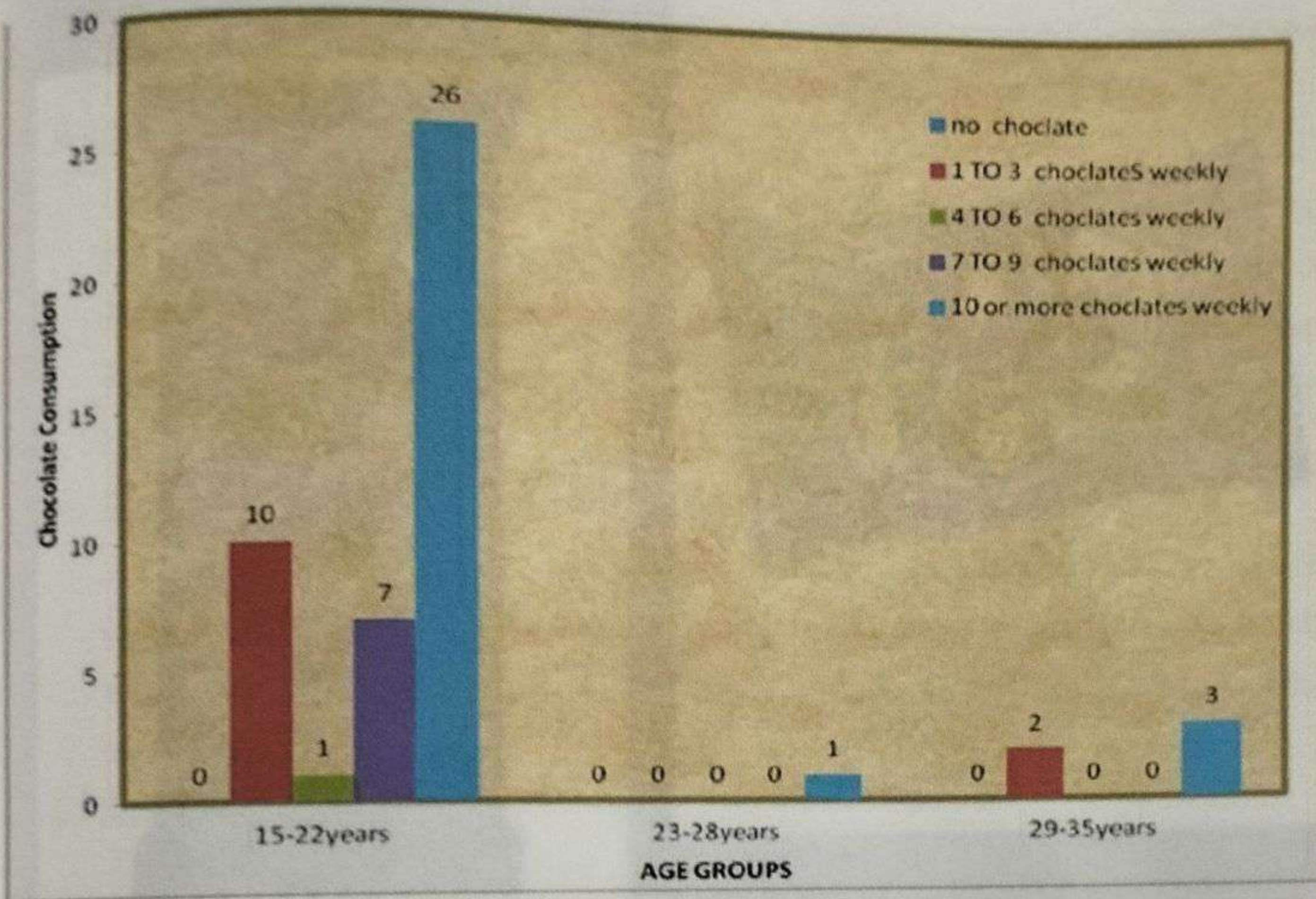


Figure 1: Daily consumption of chocolate in children

Professional Adults:



WORLD WIDE:

Chocolate consumption around the world in 2016

1,500 thousand tonnes



ATLAS | Data Monitor (Data indicates volume sales)

Types of chocolates:



➤ Chemical Test for chocolates

● About Cadbury Dairy milk:

Cadbury dairy milk is a British brand of milk chocolate manufactured by Cadbury. It was introduced in the United Kingdom in 1950 and now consists of a number of products. Every product in the dairy milk line is made with exclusively milk chocolate. In 2014, Dairy milk was ranked the bestselling chocolate bar in the U.K.

● About Kit Kat:

Kit Kat (stylized as kit kat in various countries) is a chocolate covered wafer bar. Confection created by Rowntree's of York, United Kingdom, and is now produced globally by Nestlé (which acquired Rowntree's in 1988) except in the United States, where it is made under license by the H.B. Reese Candy Company, a division of the Hershey Company.

● About Five Star Chocolate:

Five Star is a chocolate bar produced by Cadbury's and sold in India, Indonesia, Malaysia, Brazil, South Africa, the Philippines, and Egypt. It is described as a caramel and "nougat" mix covered with "smooth milk chocolate" and is sold in a golden wrapper decorated with stars.

● About Perk Chocolate:

Perk is a combination of the crisp wafer and delicious Cadbury chocolate that enlivens the mood and sparks the lighter side of life. It is a fine, crunchy wafer enveloped in luscious chocolate. Relish the rich chocolate experience in every bite of the Perk chocolate.

Consumption of chocolates:

Dairy milk – 56%

Kit Kat - 40%

Five star - 18%

Perk - 6%

Analysis of Procedure

➤ AIM

To find out the presence of

- Proteins
 - Fats
 - Sugars
 - Calcium
 - Iron
 - Magnesium
 - Nickel
- In chocolates.

➤ APPARATUS



1. Sodium hydroxide
2. Copper Sulphate (CuSO_4)
3. Moliscli's reagent ($\text{C}_{10}\text{H}_7\text{OH}$)
4. Fehling's solution A and B
5. Sulphuric acid (H_2SO_4)
6. Tollens reagent
7. Ammonium chloride (NH_4Cl)
8. Ammonium hydroxide (NH_4OH)

9. Sodium Phosphate (Na_3PO_4)

1. Sodium hydroxide:

Sodium hydroxide also known as lye and caustic soda, is an organic compound with the formula NaOH . It is a white solid ionic compound consisting of cations Na^+ and hydroxide anions OH^- .

IUPAC names

Sodium hydroxide

Common Names

Caustic soda

Lye

Ascarite

White caustic

Sodium hydrate

2. Copper sulphate:

Copper sulphate is also known as copper sulfate, is an inorganic compound with the chemical formula CuSO_4 . It forms hydrates $\text{CuSO}_4 \cdot n\text{H}_2\text{O}$, which can range from 1 to 7. The pentahydrate is the most common hydrate of copper sulphate. Older names for the Pentahydrate include blue vitriol, blue stone, vitriol of copper, and roman vitriol.

IUPAC name

Copper sulphate

(or)

Copper sulfate

3. Molisch's test:

22 Molisch's test is a sensitive chemical test, named after Austrian botanist Hans Mauthner, for the presence of carbohydrates, based on the dehydration of the carbohydrate by sulphuric acid (or) hydrochloric acid to produce an aldehyde, which condenses with two molecules of a phenol such as resorcinol and thymol also give colored products, resulting in a violet ring.

4. Fehling's solution A and B:

Fehling's solution is a chemical reagent used to differentiate between water-soluble carbohydrates and ketone functional groups, and as a test for reducing sugars and non-reducing sugars, supplementary to the Tollen's reagent test. The test was developed by German chemist Herman von Fehling's in 1849. Fehling's A is a blue-colored aqueous solution of copper sulfate (CuSO_4). Fehling's B is a colorless aqueous solution of Potassium sodium tartrate

5. Sulphuric acid:

Sulphuric acid (American spelling and the preferred IUPAC name) known in antiquity as oil of vitriol, is a mineral acid composed of the elements Sulphur, oxygen, and hydrogen, with the formula H_2SO_4 . It is a colorless, odorless, and viscous liquid that is miscible with water.

6. Tollen's reagent:

Tollen's reagent (chemical formula $\text{Ag}(\text{NH}_3)_2\text{OH}$) is a chemical reagent used to distinguish between aldehydes and ketones which can tautomerize into aldehydes. The reagent consists of a solution of Silver nitrate, ammonia, and some sodium hydroxide (to maintain a basic pH of the reagent solution).

7. Ammonium chloride:

Ammonium chloride is an inorganic compound with the formula NH_4Cl and a white crystalline salt that is highly soluble in water. The solution of ammonium chloride is in mild acidic. In its naturally occurring mineralogic form, it is known as sal

ammoniac. The mineral is commonly formed in burning coal dumps from the condensation of coal-derived gasses. It is also found around some types of volcanic vents.

8. Ammonium hydroxide:

Ammonium hydroxide, also called ammonia solution, ammonia water, aqueous ammonia, (or) aqua ammonia solution of ammonia gas in water, a common commercial form of ammonia. It is a colourless liquid with a strong characteristic odour in concentrated form, ammonium hydroxide in cause burns on contact with the skin.

9. Sodium phosphate: Sodium phosphate is a generic term for a variety of salts of sodium and phosphate. Phosphate also forms families (or) condensed anions including di-, tri-, tetra-, and polyphosphates. Most of these salts are known in both anhydrous (water-free) and hydrated forms. The hydrated is more common than the anhydrous forms.

➤ METHODS:

Test for protein

<u>Sl. No</u>	<u>Experiment</u>	<u>Observation</u>	<u>Inference</u>
<u>1</u>	Take a test tube, into that add a bit of chocolate, and add 5 ml of each sample If chocolate is taken in different Test tubes, Add 1 pellet of NaOH to each and add 1-2 drops of CuSo4 solution to each.	We can observe the appearance of violet coloration the solution.	We can conclude that presence of protein in the given sample.

Test for Fat

<u>Sl. No</u>	<u>Experiment</u>	<u>Observation</u>	<u>Inference</u>
<u>1</u>	Take a small sample of each chocolate on different pieces of filter paper. Fold and unfold the paper to crush the sample over the flame.	We can observe the appearance of translucent spot around the sample which became larger on heating was observed.	We can conclude the presence of fat in the sample.



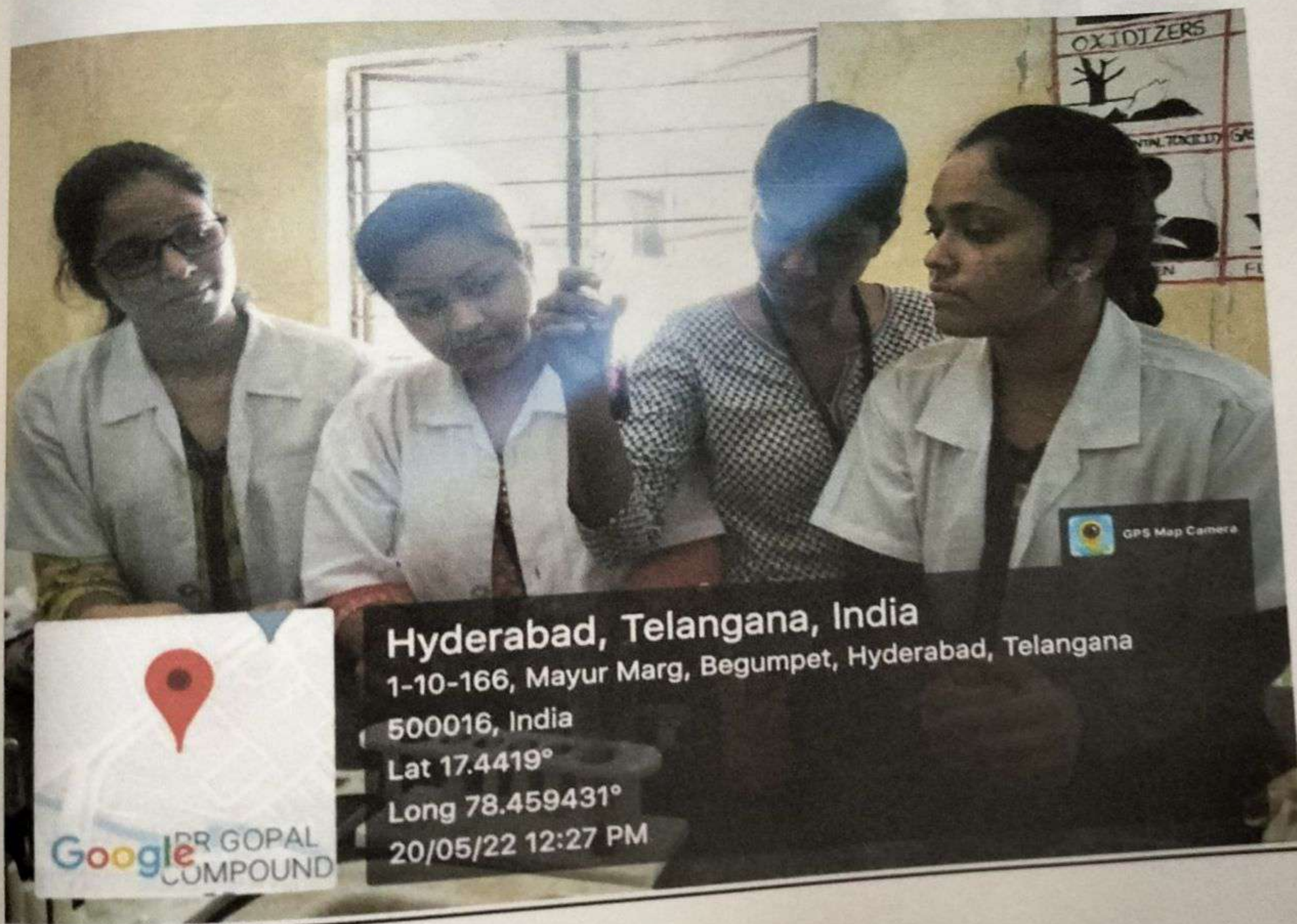
1	<p>Take a test tube, into that add a bit of chocolate and Add the amount of 5 ml of each sample to test tube, and had 1 ml of water to each then add few drops of Moriscos reagent(Alpha naphthol in alcohol) and then add concentrated H₂So₄ drops along inner edges of the test tube.</p>	<p>We can observe the appearance of violet coloration in the solution.</p>	<p>We can conclude that presence of protein in the given sample.</p>
2	<p>Take a test tube into that add a mix of 2 ml of Fehling's A & B in different test tubes, and add a pinch of chocolate into each test tube and then take the solution of test tube into the water bath.</p>	<p>We can observe that a Red-brown precipitate was formed.</p>	<p>We can conclude the presence of sugar in the sample.</p>
3	<p>Take two different test tubes, add 2 ml of Tollen's reagent was taken, and add a pinch of chocolate into each test tube. Then the solution in the water bath.</p>	<p>We can observe a silver mirror surface is formed.</p>	<p>We can conclude the presence of sugar in the test tube.</p>

Test for Sugar

<u>Sl. No</u>	<u>Experiment</u>	<u>Observation</u>	<u>Inference</u>
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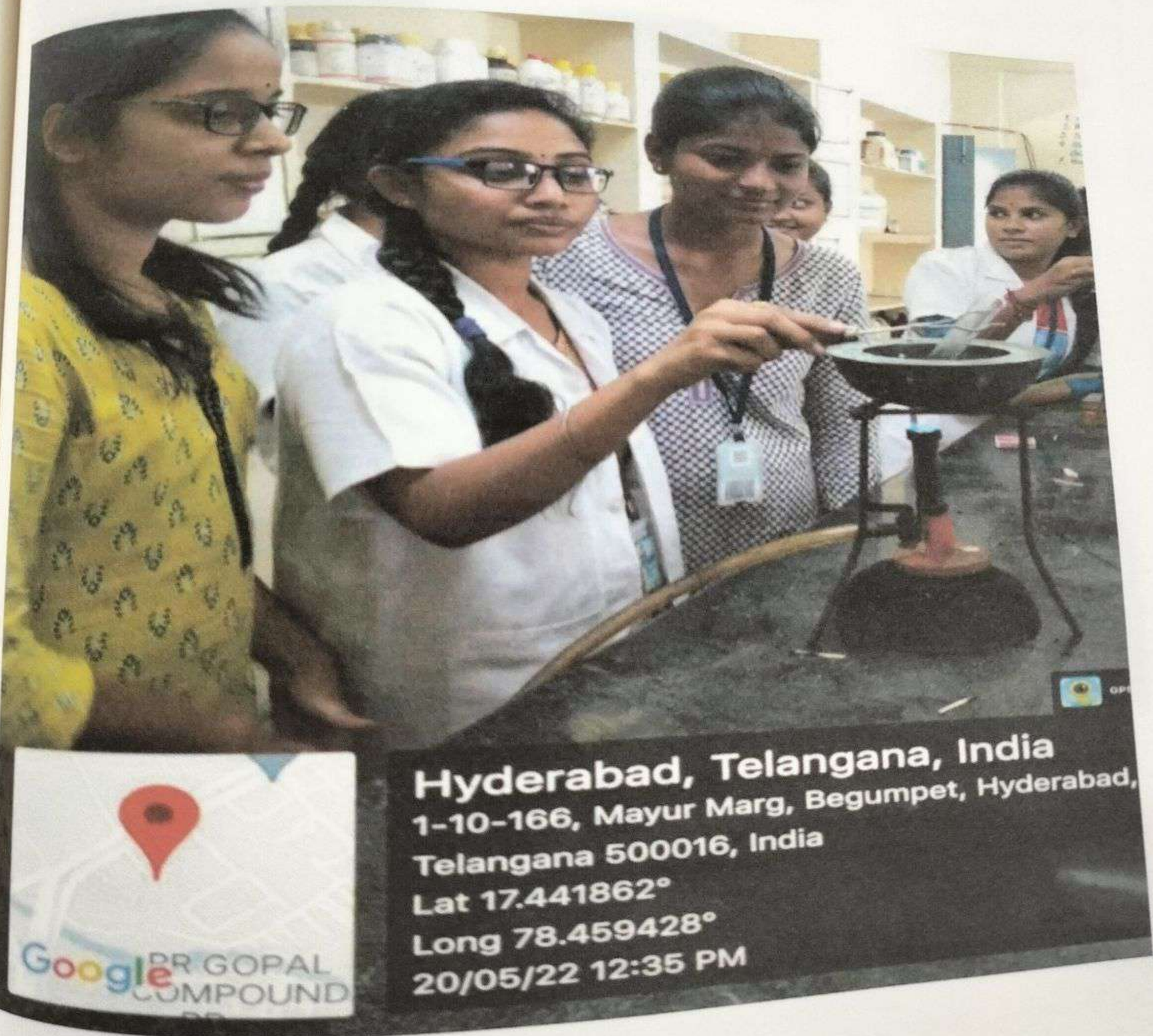
Test for Calcium

<u>Sl. No</u>	<u>Experiment</u>	<u>Observation</u>	<u>Inference</u>
1	Take a Test tube that adds a pinch of chocolate and add a mixture of NH_4Cl , NH_4OH , and $(\text{NH}_4)_2\text{CO}_3$	We can observe a white precipitate was obtained.	We can conclude the presence of calcium in the sample.
2	Take two watch glasses, into that add a pinch of chocolate with the help of glass rod and add a drop of concentrated HCl and a paste is made on each sample. This paste from each sample is taken on the tip of the new glass rod and shown to the blue flame of spirit Lamp.	We can observe a Brick red color flame was obtained.	We conclude the presence of calcium in the sample.



Test for Iron

Sl. No	Experiment	Observation	Inference
1	Take two different test tubes into that add a mixture of NH_4Cl and NH_4OH is made, and observe the solution in the test tube	We can observe No brown precipitate is obtained	We can conclude that Absence of iron in the sample.



Test for Magnesium

<u>Sl. No</u>	<u>Experiment</u>	<u>Observation</u>	<u>Inference</u>
1	Take two different test tubes, into that add a mixture of NH_4Cl , NH_4OH and Na_3PO_4 to the test tube.	We can observe that No white precipitate was obtained.	We can conclude the absence of magnesium in the sample.



OBSERVATION

The analysis of chocolates of different varieties has done. The chocolates taken are Five star, Perk, Kit kat & Dairy milk, The observation of chocolates are in below table.

➤ Dairy milk:

<u>Sl.No</u>	<u>Test</u>	<u>Observation</u>	<u>Inference</u>
1	Test for Protein	Violet color appears	Presence of Proteins
2	Test for fat	Appearance of translucent spot around the sample on heating.	Presence of fat
3	Test for sugar Molisch's test Fehling's test Tollen's test	Purple ring is formed. Red-brown precipitate formed. Silver mirror surface.	Presence of sugar Presence of sugar Presence of sugar
4	Test for calcium	Brick red color is formed	Presence of calcium
5	Test for magnesium	No precipitate is formed	Absence of magnesium
6	Test for iron	No brown precipitate is obtained	Absence of iron

➤ kit kat:

<u>Sl.No</u>	<u>Test</u>	<u>Observation</u>	<u>Inference</u>
1	Test for Protein	Violet color appears	Presence of Proteins
2	Test for fat	Appearance of translucent spot around the sample on heating.	Presence of fat

3	Test for sugar Molisch's test Fehling's test Tollen's test	Purple ring is formed. Red-brown precipitate formed. Silver mirror surface.	Presence of sugar Presence of sugar Presence of sugar
4	Test for calcium	Brick red color is formed	Presence of calcium
5	Test for magnesium	No precipitate is formed	Absence of magnesium
6	Test for iron	No brown precipitate is obtained	Absence of iron

➤ **Five star:**

<u>Sl.No</u>	<u>Test</u>	<u>Observation</u>	<u>Inference</u>
1	Test for Protein	Violet color is appeared	Presence of Proteins
2	Test for fat	Appearance of translucent spot around the sample on heating.	Presence of fat
3	Test for sugar Molisch's test Fehling's test Tollen's test	Purple ring is formed. Red brown precipitate formed. Silver mirror surface.	Presence of sugar Presence of sugar Presence of sugar
4	Test for calcium	Brick red color is formed	Presence of calcium
5	Test for magnesium	No precipitate is formed	Absence of magnesium

6	Test for iron	No brown precipitate is obtained	Absence of iron
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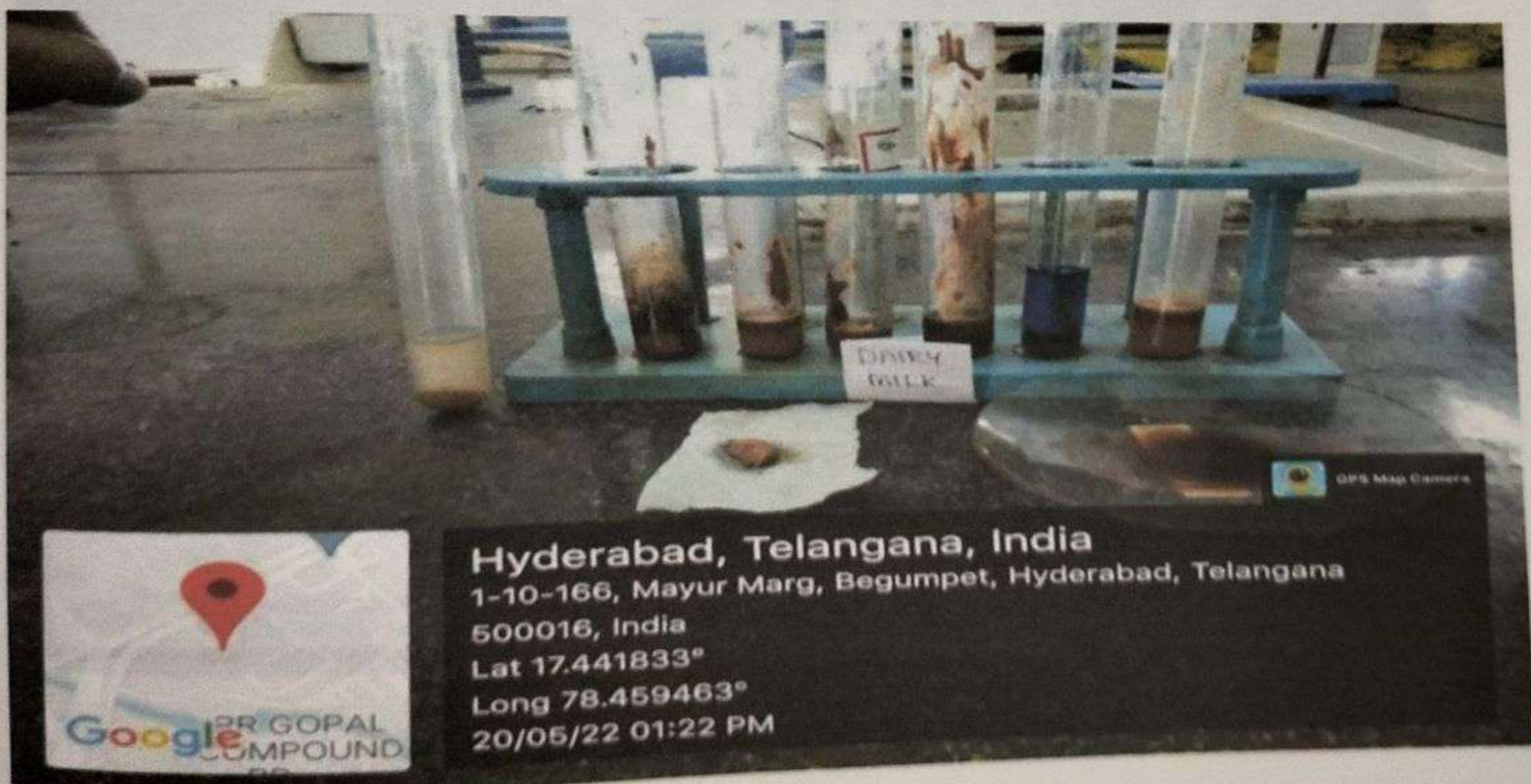
➤ Perk:

<u>Sl.No</u>	<u>Test</u>	<u>Observation</u>	<u>Inference</u>
1	Test for Protein	Violet color appears	Presence of Proteins
2	Test for fat	Appearance of translucent spot around the sample on heating.	Presence of fat
3	Test for sugar Molisch's test Fehling's test Tollen's test	Purple ring is formed. Red-brown precipitate formed. Silver mirror surface.	Presence of sugar Presence of sugar Presence of sugar
4	Test for calcium	Brick red color is formed	Presence of calcium
5	Test for magnesium	No precipitate is formed	Absence of magnesium
6	Test for iron	No brown precipitate is obtained	Absence of iron

RESULT:

The chocolates which we are taken, Kit kat, Dairy milk, Five stars & Perk for a chemical test, Among them Kit kat showed that more amount of protein, fat, sugar & calcium, And the absence of magnesium & iron in the chocolate.

Sl No.	Substance	Present/Absent
1	Proteins	Present
2	Fats	Present
3	Sugars	Present
4	Calcium	Present
5	Iron	Absent
6	Magnesium	Absent

Dairy milk

Perk



Five star



Kit kat



Hyderabad, Telangana, India

1-10-166, Mayur Marg, Begumpet, Hyderabad, Telangana

500016, India

Lat 17.441834°

Long 78.459466°

20/05/22 01:24 PM



CONCLUSION:

REFERENCES:

The present systematic analysis of the literature aimed to understand the analysis of chocolates. The chocolate analysis was done on different varieties of chocolates. The types of chocolates contain proteins, fats, sugar, and calcium, and they don't contain Magnesium, or iron. Dairy milk chocolates are taken more because of their flavor and taste. As all take dark chocolates they provide many health benefits, especially protective against the cardiovascular system. Kit kat chocolates are also taken because of the crunchiness. The result tells that kit kat chocolates are given quick results rather than the other 3 varieties. And also got some results of the presence of Protein, Fat, Sugar & calcium in four varieties of chocolates.

36

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2. <https://www.magnumcream.com>

3. Encyclopedia

4. Chocolates connoisseur

5. Raising the bar of chocolates

**GOVT.DEGREE COLLEGE FOR WOMEN (AUTONOMOUS) BEGUMPET
HYDERABAD**

Dept of Chemistry

Students Project List for the Academic Year 2021-22

S.NO	STUDENT NAME	GROUP	HALL TICKET NO	PROJECT NAME
1	ALIA POOJA	BZC	108519445003	ANALYSIS OF HONEY
2	AKULA AKHILA	BZC	108519445004	ANALYSIS OF HONEY
3	AMGOTH SRAVANI	BZC	108519445005	ANALYSIS OF HONEY
4	ANJANA BEHERA	BZC	108519445006	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
5	APPANALA SRAVANI	BZC	108519445007	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
6	ARSHIYA BEGUM	BZC	108519445008	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
7	HEMA LATHA	BZC	108519445009	ANALYSIS OF CHOCOLATE
8	MANASA	BZC	108519445010	CAFFINE EXTRETIION TEA AND COFFIE SAMPLE
9	SWAPNA	BZC	108519445011	CAFFINE EXTRETIION TEA AND COFFIE SAMPLE
10	B.DEEPIKA	BZC	108519445013	ANALYSIS OF CHOCOLATE
11	B.MOUNIKA	BZC	108519445014	ANALYSIS OF CHOCOLATE
12	B.KALYANI	BZC	108519445015	ANALYSIS OF CHOCOLATE
13	B.MADHURI	BZC	108519445017	ANLYSS OF HONEY
14	B.SWATHI	BZC	108519445019	CAFFINE ITS PRODUCTES
15	B.THRIVENI	BZC	108519445020	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
16	CH.ANITHA	BZC	108519445021	ANALYSIS OF CHOCOLATE
17	CH.NIKITHA	BZC	108519445022	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
18	CH ANUSHA	BZC	108519445023	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
19	CH. SWAPNA	BZC	108519445024	ANALYSIS OF CHOCOLATE
20	CH.VAISHNAVI	BZC	108519445025	ANALYSIS OF HONEY

21	D.VAISHNAVI	BZC	108519445026	CAFFEIN ITS PRODUCTETS OVERDOSE SIDE EFFETS
22	D.DEEPTHI	BZC	108519445027	ANALYSIS OF HONEY
23	D.SRINIDHI	BZC	108519445028	ANALYSIS OF CHOCOLATE
24	E.SANDHYA	BZC	108519445029	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
25	G.SRIVARSHINI	BZC	108519445030	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
26	G.MANISHA	BZC	108519445031	EXTRACTION OF CAFFEINE FROM COFFE POWDER
27	G.MANOOGNA	BZC	108519445034	ANALYSIS OF CHOCOLATE
28	G.AKHILA	BZC	108519445035	ANALYSIS OF HONEY
29	G.BHUVANESWARI	BZC	108519445036	ANAL ANALYSIS OF CHOCOLATE YSIS OF HONEY
30	K.SHIREESHA	BZC	108519445037	ANALYSIS OF HONEY
31	K.HARIKA	BZC	108519445041	ANAL ANALYSIS OF CHOCOLATE YSIS OF HONEY
32	J.SHOBHA	BZC	108519445043	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
33	K.MAHESWARI	BZC	108519445044	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
34	K.AARTHI	BZC	108519445046	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
35	K.SUKEERTHI	BZC	108519445047	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
36	K.RAMYA	BZC	108519445048	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
37	K.NAGALAXMI	BZC	108519445049	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
38	K.PRAVATHI	BZC	108519445051	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
39	L.SRAVYA	BZC	108519445052	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE

40	M.RADIKA	BZC	108519445053	CAFFEIN EXTRACTION FROM TEA,COFFEE SAMPLE
41	P.TANISHCA	BZC	108519489023	Hydrogen-The fuel of the future
42	R. MARIYAM	BZC	108519489024	Hydrogen-The fuel of the future Hydrogen-The fuel of the future
43	G.S BHAVANA	BZC	108519489009	Hydrogen-The fuel of the future
44	B.MANISHA	BZC	108519489005	Hydrogen-The fuel of the future



Government Degree College for Women (Autonomous)

Begumpet, Hyderabad-500016

Affiliated to Osmania University, Re-Accredited with 'B+' Grade by NAAC



JIGNASA - STUDENT STUDY PROJECT

2021-2022

PROJECT TITLE

“ HYDROGEN - THE FUEL OF THE FUTURE ”

SUBMITTED BY

1. **B. Manisha** BSc. BtZC 3rd Year H.No. – 108519489005
2. **G.S. Bhavana** BSc. BtZC 3rd Year H.No. – 108519489009
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INTRODUCTION

Fossil fuel is the most popular source of energy in the world. When fossil fuels are burned, they release large amounts of greenhouse gases, into the air. Greenhouse gases trap heat in our atmosphere, causing global warming. The average global temperature has increased by 1°C which can lead to rise in the sea level, extreme weather, biodiversity loss and species extinction, as well as food scarcity, worsening health and poverty for millions of people worldwide.

GENERAL TYPES OF CHEMICAL FUELS

	Primary (Natural)	Secondary(Artificial)
Solid fuels	Wood, coal, peat, dung, etc.	Coke, charcoal
Liquid fuels	Petroleum	Diesel, gasoline, kerosene, LPG, coal tar, naphtha, ethanol
Gaseous fuels	Natural gas	Hydrogen, propane, methane, coal gas, water gas, CNG

Natural gas, petroleum, and coal account for 80% of the whole power consumption. Although they have many disadvantages, we still utilize them because they are effective, cheap, and reliable. These non-renewable energy resources are estimated to deplete in the near future. According to certain estimates, we have just 100 years of coal generation left, 50 years of natural gas, and 50 years of crude oil. That is why we need to search for suitable alternatives.

Fossil fuels are responsible for causing extreme water pollution. Oil spill disasters causes loss of marine life. Crude oil kills almost everything it contacts and can be catastrophic to local wildlife. Water table can be contaminated during an extraction method called fracking. Burning of fossil fuels is a major cause of air pollution, photochemical smog and acid rains. Emissions of greenhouse gasses and other toxic components resulting from fossil fuel burning can cause important health complications, including chronic asthma, low lung performance, chronic bronchitis, and cardiovascular disorders.

The combustion of gasoline and diesel fuel in vehicle engines produces emissions of several potentially harmful substances. These emissions are not solely the result of the

combustion process, nor do they come only from the tailpipe of the vehicle; rather, they result from a combination of the engine design and the fuel characteristics. Also apparent is that evaporative emissions from refuelling, spills onto heated engine parts, and so on can equal emissions from the tailpipe.



POLLUTION SHOULD NEVER BE THE PRICE FOR PROSPERITY

Our college had organized a field trip to RenewX exhibition at Hitech city. From this excursion we got to know about latest technological innovations in renewable energy sector and gained profound insights into current trends in renewable energy industries.



The renewable energy sector in India is developing rapidly. India is the 4th most desired renewable energy market across the world and the installed capacity of renewable energy exceeds 100 gigawatts.

"Green hydrogen will provide India a quantum rise in reaching its weather targets," PM Modi declared, unveiling his strategies to transform India into a globally renowned green hydrogen generation and trading hub.

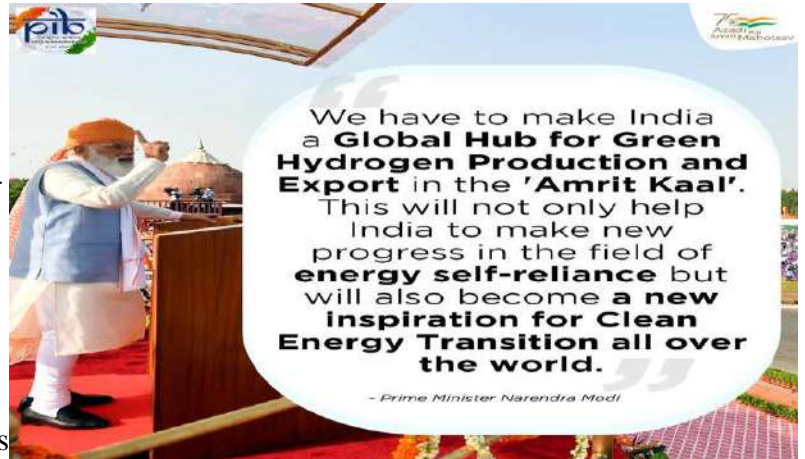


In 2015, the world's governments signed up to the Paris Agreement committing to reduce carbon emissions. In his Independence Day speech, the Prime Minister announced the setting up of the National Hydrogen Mission. Hydrogen has the promise of transforming India from an energy-deficient to an energy-rich country. Hydrogen is considered one of the most sustainable fuels of the future.

Green energy is not only about solar and wind, but about biomass too. Biomass today is an important fuel in many countries, especially for cooking and heating in developing countries and over the years its use as fuel for transportation and electricity generation has been increasing.

PM Modi proposed *Panchamrit*, a five-point agenda to take action against global warming and make India a climate-conscious country.

1. India will reach its non-fossil energy capacity to 500 GW by 2030.
2. India will meet 50 per cent of its energy requirements from renewable energy by 2030.
3. India will reduce the total projected carbon emissions by one billion tonne from now onwards till 2030.
4. By 2030, India will reduce the carbon intensity of its economy by less than 45 per cent.
5. By the year 2070, India will achieve the target of Net Zero.



Though the government has been taking steps to make it an important part of India's energy basket, the latest being a move to mandatorily push for biomass co-firing in the thermal power plants as a means to reduce carbon dioxide emissions from fossil fuel, concerns remain on how successful this effort will be.

What is Hydrogen fuel?

Hydrogen fuel is a zero carbon fuel burned with oxygen provided it is created in a zero carbon way. Although it is the most abundant element on earth, Hydrogen does not generally exist in the free-state rather it occurs in compounds like water, natural gas and coal or biomass.

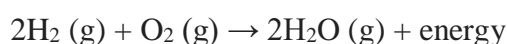


Hydrogen is a clean fuel and energy carrier that can be used to store more and deliver energy produced from other resources. Hydrogen can be produced from a variety of domestic

resources such as natural gas, nuclear power, biomass and renewable power like solar and wind. These qualities make it an attractive fuel option for transportation and electricity generation applications. It can be used in cars, in houses, for portable power and in many more applications.

Hydrogen is useful as an energy source/fuel because it has a high energy content per unit of weight. Hydrogen is not widely used as a fuel now, but it has the potential for greater use in the future. Hydrogen has a very high energy density of 142 megajoule/kg.

Hydrogen is found in the first group and the first period in the periodic table, i.e. it is the lightest and first element of all. Since the weight of hydrogen is less than air, it rises in the atmosphere and is therefore rarely found in its pure form, H₂. In a flame of pure hydrogen gas, hydrogen (H₂) reacts with oxygen (O₂) to form water (H₂O) and releases energy.



Natural occurrence of hydrogen cannot satisfy the present need of hydrogen. It produces a wide gap between current hydrogen requirement and amount of hydrogen present in earth. To counter this problem, hydrogen is produced commercially in industries through various methods.

STATEMENT OF THE PROBLEM

The conventional fossil fuels are the major contributors towards green house effect and global warming. Finding viable and sustainable alternative fuels is the need of the hour. Hydrogen fuel has the potential to reduce our dependence on fossil fuels. Hence we worked on this problem to find best method of producing renewable hydrogen.

AIM

To study various methods of hydrogen generation and find a suitable method to produce hydrogen fuel from natural gas.

OBJECTIVE

- ✓ To reduce our dependence on fossil fuels, which are the major contributors to the greenhouse effect and global warming.
- ✓ Finding viable and sustainable alternative fuel i.e Hydrogen.
- ✓ Hence, we worked on this problem to find the best methods of producing renewable hydrogen.

REVIEW OF LITERATURE

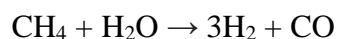
METHODS OF HYDROGEN EXTRACTION

Hydrogen is locked up in enormous quantities in water, hydrocarbons, and other organic matter. One of the challenges of using hydrogen as a fuel comes from being able to extract hydrogen efficiently from these compounds.

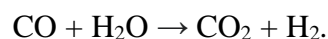
The currently employed methods for production of hydrogen include **steam-methane reforming, pyrolysis, auto thermal reforming and electrolysis of water.**

STEAM METHANE REFORMING:

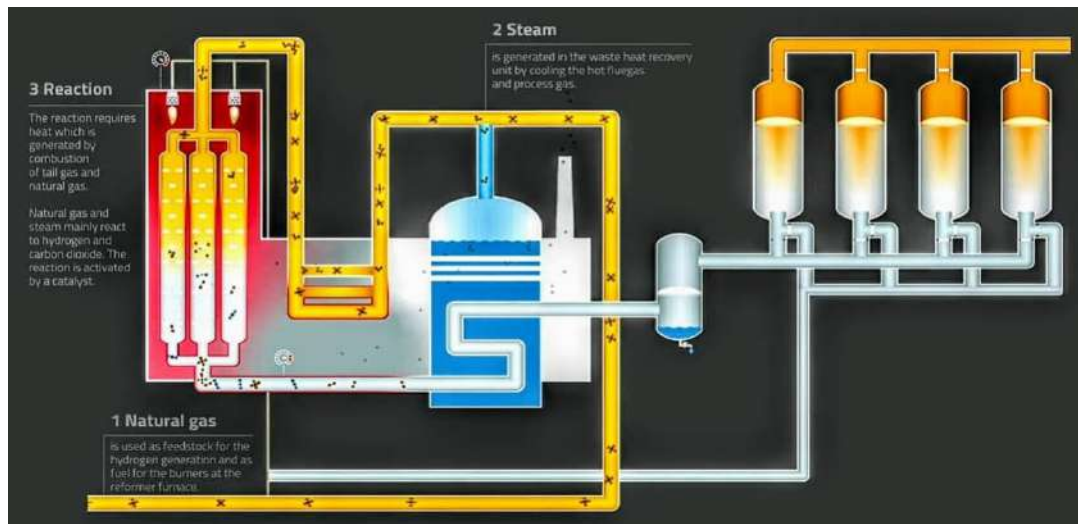
The steam (H₂O) produced is added to the de-sulphurised methane gas and led into the reformer. The heat and catalytic properties of the reformer cause the following reaction:



The remaining carbon monoxide is then converted in the water gas shift (WGS) assembly to produce more hydrogen:



The gases then enter the Pressure Swing Adsorption (PSA) where the hydrogen is separated from other gaseous species under elevated pressure using differences in adsorption properties. The cleaned hydrogen is then stored in the buffer vessel and can be used as an industrial gas or energy source.



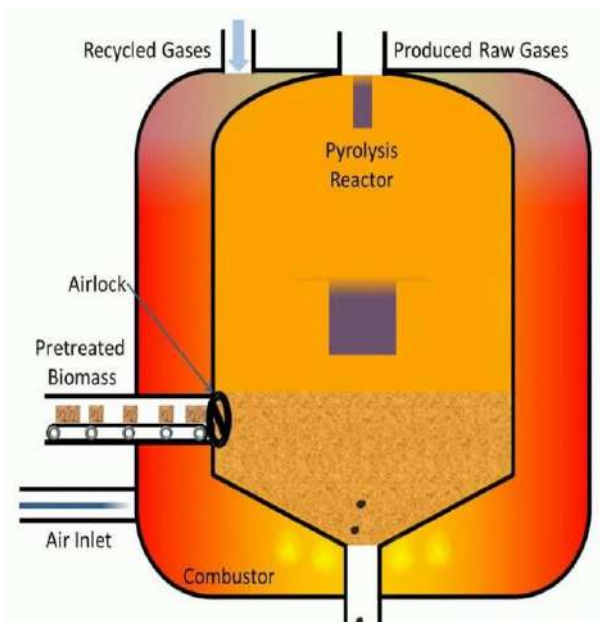
Steam reforming, which combines high-temperature steam with natural gas, accounts for the majority of the hydrogen produced. This method of hydrogen production occurs at temperatures between 700-1100 °C, and has a resultant efficiency of between 60-75%. [1]

AUTOTHERMAL REFORMING:

Autothermal reforming (ATR) combines the steam reforming reaction and fuel oxidation into a single unit, the exothermic oxidation providing the heat for the endothermic reforming process. ATR is popular for smaller scale hydrogen generation and affords higher H₂ production than Partial Oxidation method, and faster start-up and response times than steam reforming. Independent control of the steam-to-carbon and air-to-fuel ratios means that effective heat management can be achieved.



PYROLYSIS:



Methane pyrolysis is a fundamentally new process technology that splits natural gas or biomethane directly into the components hydrogen and solid carbon. This process requires relatively little energy. And if it uses electricity from renewable sources, there are actually no greenhouse gas emissions. This is an idea that has existed since the 1960s, but has always failed due to technical implementation.

PLASMA PYROLYSIS :

- ❖ This is the most mature form of methane pyrolysis, it utilizes a plasma torch where methane gas pyrolyzes at temperatures between 1,000 °C (cold plasma) and 2,000 °C (hot plasma).

THERMAL PYROLYSIS :

- ❖ In thermal pyrolysis, methane dissociates into hydrogen and carbon at temperatures between 1,000 °C and 1,500 °C. Differentiation revolves around the type of reactor used in the process.

CATALYTIC PYROLYSIS :

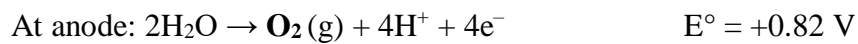
- ❖ In catalytic pyrolysis, methane breaks down into hydrogen and carbon over a metal catalyst, which is typically nickel- or iron-based, at temperatures of less than 1,000 °C.

ELECTROLYSIS:

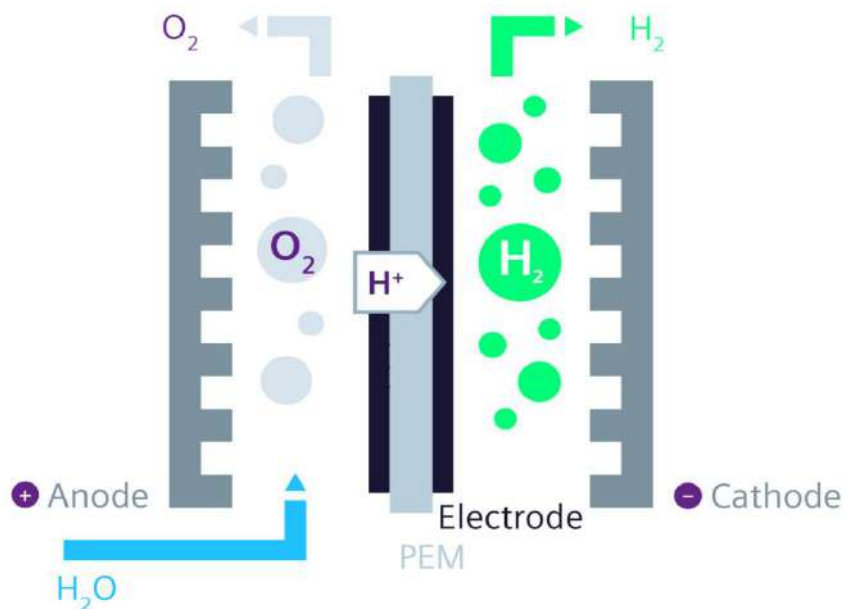
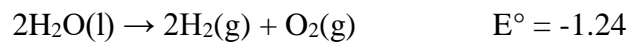
Hydrogen can also be produced from water through electrolysis, which is less carbon-intensive if the electricity used to drive the reaction does not come from fossil-fuel power plants, but rather renewable or nuclear energy instead. The efficiency of water electrolysis is between about 70-80%, with a goal set to reach 82-86% efficiency by 2030 using proton exchange membrane (PEM) electrolyzers.

Electrolysis of water is the process by which water is decomposed into oxygen and hydrogen gas, when electric current is passed through it. Water molecule is decomposed into H^+ and OH^- ions, when electric current is passed through it.

Two electrodes or plates that are made from an inert metal such as platinum or iridium are placed in the water. A DC electrical power source is connected to these plates. At the cathode (where electrons enter the water), Hydrogen is formed. At the anode, oxygen is produced. Hydrogen produced will be twice the amount of oxygen. It is very important to choose the right electrolyte for water electrolysis. Half reactions in the electrolysis of pure water at pH=7, and at 25°C are :



The net reaction of electrolysis of water is given as :

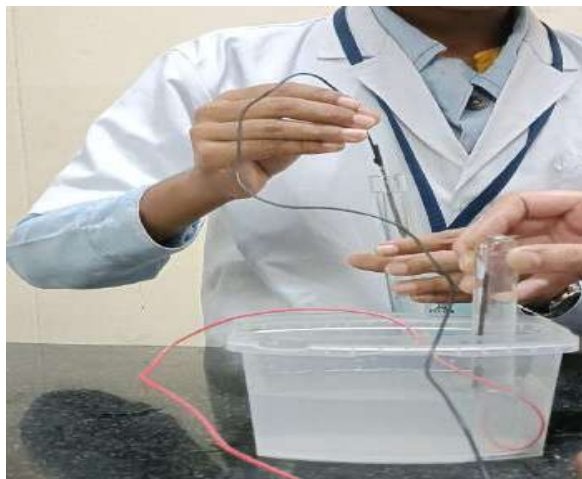


RESEARCH METHODOLOGY

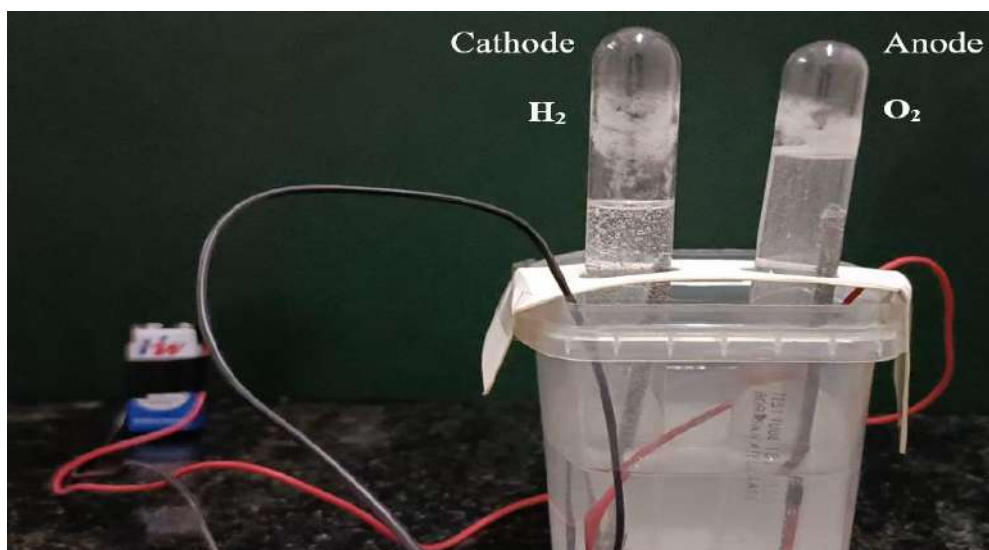
➤ ELECTROLYSIS OF WATER:

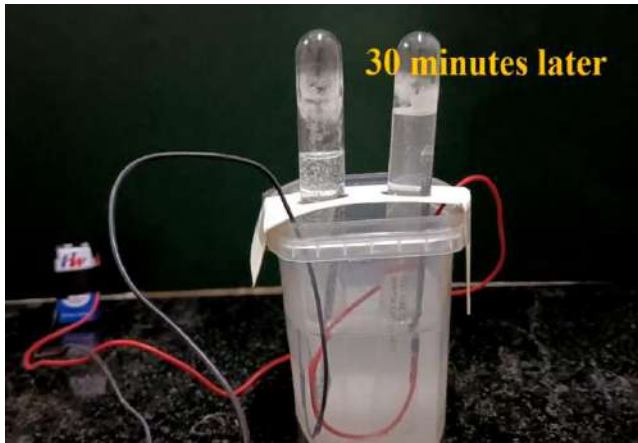
Electrode: Graphite (pencil lead)

Electrolyte: Water + KOH salt



The current is passed through the set-up using a 9-volt battery connected to the carbon electrodes. Hydrogen gas produced at the cathode displaces the water in the inverted test tube. The presence of hydrogen is confirmed by lighting a splint near the mouth of the test tube, which ignites with a squeaky pop sound.





➤ **FORMATION OF BIOGAS :**



Biogas is a mixture of colorless, flammable gases obtained by the anaerobic digestion of plant-based organic waste materials. Biogas is typically made up of methane (50-70%) carbon dioxide (30-40%) and other trace gases. It is generally accepted that fuel consumption of a nation is an index of its development and standard of living.

The use of wastes from organic matter, though important, has been relegated to the background. There are abundant agricultural residues and municipal solid wastes, whose potentials are yet to be fully tapped for energy generation.

So, we thought to make use of this organic waste which has been neglected and dumped as waste. But it can be a potential source of energy, and can be used to produce biogas which in turn used to generate precious hydrogen fuel.



Biogas technology has advantages which include the following: generation of storable energy sources, production of a stabilized residue that can be used as a fertilizer, an energy-efficient means of manufacturing nitrogen containing fertilizer, a process having the potential for sterilization which can reduce public health hazards from fecal pathogens, and if applied to agricultural residues, a reduction in the transfer of fungal and plant pathogens from one year's crop to the next. Energy generated from waste is therefore needful as it will serve the dual

purpose of cleaning the environment and providing a source for generating hydrogen fuel which is green.

MATERIALS AND METHODS

SAMPLE COLLECTION:

Organic waste (vegetable and fruit waste) from households and cow dung from cow market were collected. A clean container with cover was used for collection of the waste. The cow dung was dried under the sun for four days and then pulverized using a pestle and mortar. The pulverized dung was sieved and dried again for a day.

SLURRY PREPARATION:

Organic waste and cow dung are mixed with water. The mixture was thoroughly stirred with a wooden stick to achieve homogeneity.



ANAEROBIC DIGESTION:

The mixture is then transferred into a container to half and sealed tightly after vacuumed. Anaerobic digestion is process through which bacteria breaks down the organic matter in the absence of oxygen.

Multiple organic materials can be combined in one digester, a practice called co-digestion. Co-digested materials include manure; food waste (i.e., processing, distribution and consumer generated materials). Co-digestion can increase biogas production from low-yielding or difficult-to-digest organic waste.

The container with slurry is connected by a rubber delivery tube which helps to detect or know the methane gas produced after the anaerobic digestion.

The connecting point of tube and container was sealed with adhesive glue. The contents were allowed to undergo digestion for a retention period of four weeks with weekly measurements of gas yields.



Biogas

Biogas is composed of methane (CH_4), which is the primary component of natural gas, at a relatively high percentage (50 to 75 percent), carbon dioxide (CO_2). The energy in biogas can be used like natural gas to provide heat, generate electricity, and power cooling systems, among other uses. . Biogas can also be purified by removing the inert or low-value constituents (CO_2 , water, H_2S , etc.) to generate renewable natural gas (RNG) and also hydrogen fuel.

Bio-gas is produced through a bio-chemical process in which certain types of bacteria convert the biological wastes into useful bio-gas. Since the useful gas originates from biological process, it has been termed as bio-gas.

METHANE GAS IS THE MAIN CONSTITUENT OF BIOGAS.

➤ HYDROGEN PRODUCTION UNIT



THE MODEL WE DESIGNED IS BASED ON THE PRINCIPLE OF SURFACE CATALYST REACTION, WHERE THE HYDROGEN GAS CAN BE EXTRACTED FROM METHANE, AMMONIUM OR WATER.

INSTRUMENTATION:

Reactor 1, Reactor 2, Catalyst chamber, Collection Unit

INLET -

The Methane gas inlet opens into the Reactor 1, whose pressure is regulated.



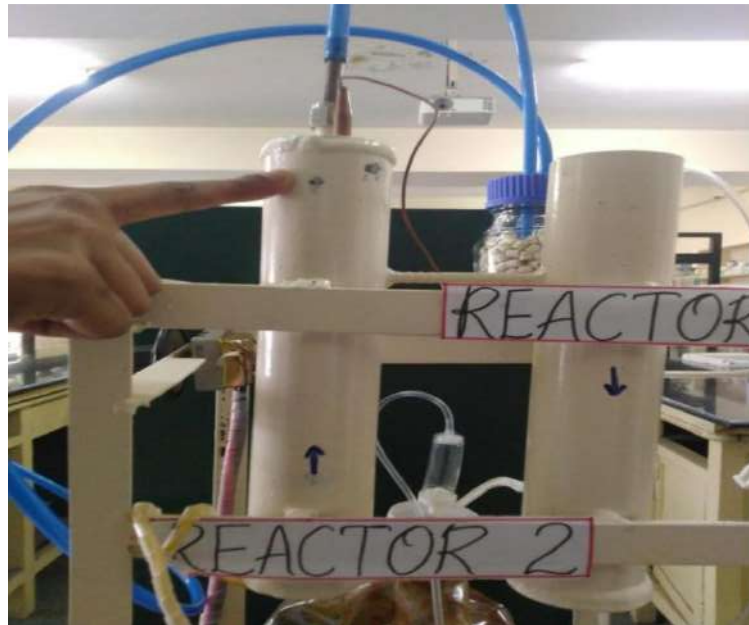
REACTOR 1 -

This is the first component of our model, Hydrogen Production Unit (HPU). It is provided with an inlet from anaerobic digester. The biogas from the inlet is purified here.



REACTOR 2 -

Reactor 1 opens into Reactor 2 where the purified methane is heated to more than 1000 °C. From here, the heated gas is passed on to the Catalyst Chamber.



CATALYST CHAMBER -

The heated gas undergoes a reaction in the presence of catalyst where, Hydrogen is the end-product.



CATALYST USED:

Nickel based catalyst

PROCEDURE:

- In an industrial set-up, Reactor 1 has an in-let for the biogas produced in an Anaerobic Digester. Here, other gases like H_2S and CO_2 are removed. H_2S is toxic to the Nickel-based catalyst used in the process.
- Methane is heated to $1000\text{ }^\circ\text{C}$ in Reactor 2. Methane pyrolysis is a fundamentally new process technology that splits biomethane directly into the components hydrogen and solid carbon.
- The mechanism involves heating of the provided source to high temperatures, where their covalent bonds break and when this mixture of gases is sent to the next unit, this reacts with Nickel-based catalyst in the Hydrogen Generation Reactor and a Catalyst Surface Reaction occurs.
- The hydrogen produced here is collected in the Collection Unit.

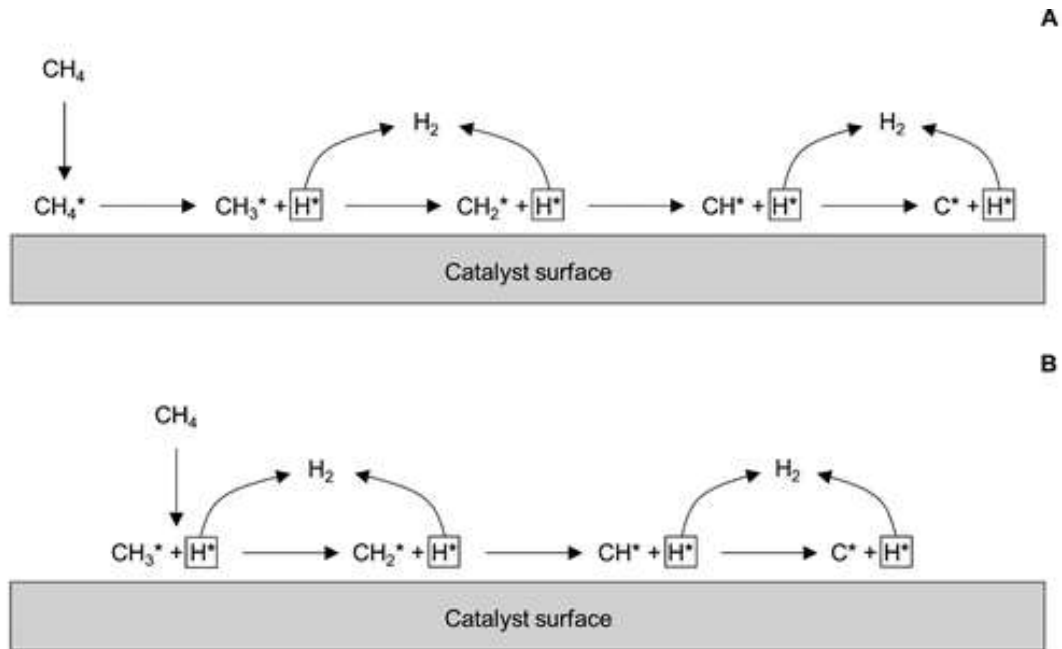


Reaction on the catalyst surface:

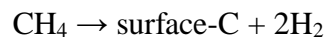
In the molecular adsorption mechanism, Methane is first adsorbed on the catalyst surface and then dissociates following a series of stepwise dehydrogenation reactions.

The methane adsorbed on the catalyst surface forms an adsorbed methyl group, giving the first hydrogen atom. The second hydrogen atom is released from the adsorbed methyl fragment.

Here, the hydrocarbon adsorbed on the surface of the catalyst dissociates into elemental carbon. Then, carbon is taken into solution, diffuses through the bulk of the metal particle and precipitates at the backside of the catalyst particle. [2]



CH₄ decomposition on the catalyst surface leading to surface carbon and hydrogen :



ANALYSIS OF DATA

Efficiency of various methods of Hydrogen production :

TECHNOLOGY	EFFICIENCY (approx.)
<i>Steam methane Reforming</i>	65%
<i>Autothermal Reforming</i>	60%
<i>Electrolysis</i>	70%
<i>Plasma Pyrolysis</i>	65%
<i>Thermal Pyrolysis</i>	62%
<i>Methane Catalytic Decomposition</i>	75%

Energy Density of various types of fuels :

FUEL TYPE	ENERGY DENSITY (MJ/kg) ^[3]
<i>Coal</i>	24
<i>Ethanol</i>	26.8
<i>Biodiesel</i>	38
<i>Diesel</i>	45
<i>Petrol</i>	46
<i>Natural gas</i>	55
<i>Hydrogen</i>	142

Catalyst :

Transition metals, mainly nickel, iron, and cobalt, have been widely investigated as active species for methane pyrolysis. Their partially filled 3d orbitals can accept electrons from the C–H bonds of methane, which facilitates its decomposition. In addition, transition metals offer relatively high solubility and capacity for carbon diffusion through their crystalline structure. Another advantage of metal catalysts is the possibility of obtaining valuable carbon nanotubes as coproduct. Nickel, iron, and cobalt are very active under moderate operating temperatures. In particular, their activity exhibits the following trend :

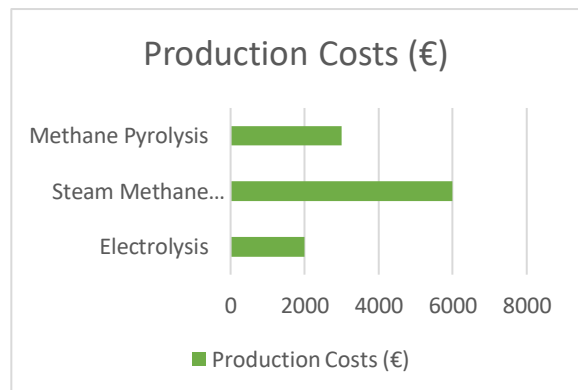
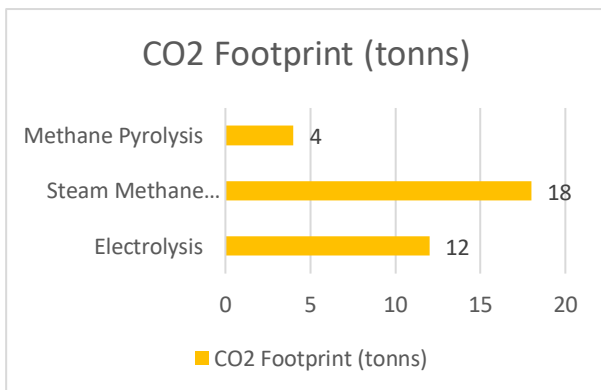
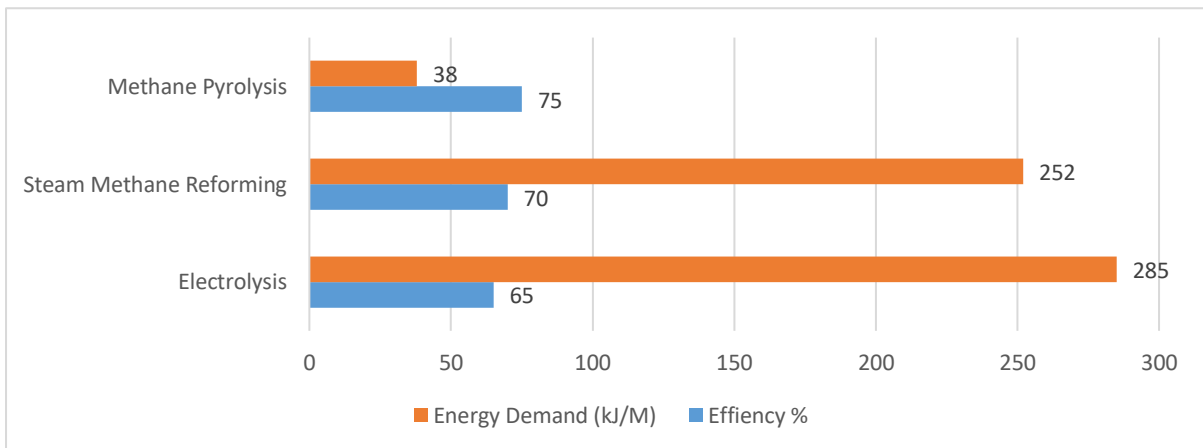
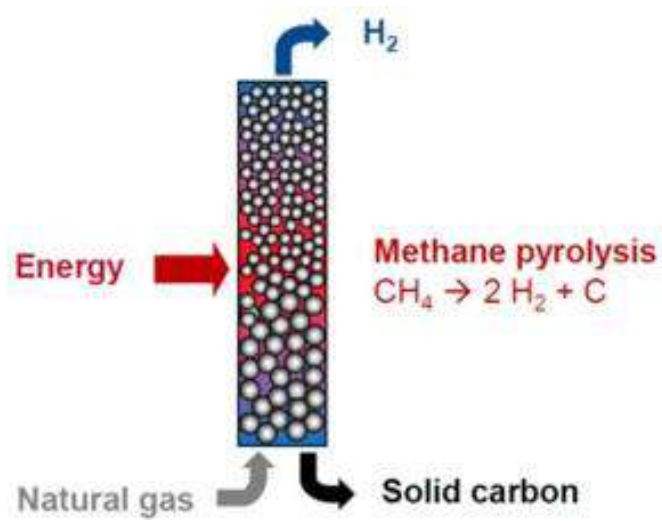


Nickel is preferred due its lower price and lesser toxicity when compared to other metals. Cobalt is commonly used in small amounts as a promoter of different metal-based catalysts. The carbide formation only occurs during the carbon nanotube growth over iron catalysts, while nickel carbide is not detected.

Energy Demand:

The combustion of hydrogen originates more energy on a mass basis than conventional fossil fuels. The minimum energy required for methane pyrolysis (38 KJ/mole H₂), is much less than the energy required for water splitting via Electrolysis (285 KJ/mol H₂) and steam methane reforming (252 KJ/mol H₂).^[4]

SUMMARY :



FINDINGS

- The only by-product of combustion of hydrogen is water.
- During electrolysis using graphite electrode, Hydrogen gas is produced at the cathode and Oxygen at the anode.
- Hydrogen produced will be twice the amount of oxygen.



- Hydrogen can be produced from the decomposition of methane.
- Methane is produced by decomposition of household and animal waste.
- After incubating it for 6-weeks, we observed the formation of biogas.
- Methane decomposition (also called methane pyrolysis or methane cracking) is a chemical process splitting methane, or in general hydrocarbons, into its elemental components hydrogen and solid carbon.
- This methane can then converted be into its elements hydrogen and solid carbon in the Hydrogen Production Unit.



- The carbon is not combusted within this process; i.e. the Green house gases (GHG) and CO_2 is not produced.
- As there is no involvement of Oxygen in this process, there is no need of an additional CO or CO_2 separation for upgrading product gas. Therefore, this process is less complex than conventional hydrogen production technologies e.g. the classical steam methane reforming (SMR) process.

APPLICATIONS

Hydrogen is truly a versatile fuel. It can be used for automobiles, aeroplanes, helicopters, buses, cars and scooters. Liquid hydrogen is considered to be an ideal fuel for subsonic and supersonic aircrafts. Industry has safely used hydrogen for decades in the following applications:

- Hydrogen Vehicles
- Electricity for lighting and for operating domestic appliances.
- Residential cooking supply, by changing the design of the burner, including the hole size and air supply system.
- Petroleum refining
- Glass purification
- Semiconductor manufacturing
- Aerospace applications since the overall weight of the fuel and the storage tank is much lower than ordinary jet fuel.
- Fertilizer production
- Welding, annealing and heat-treating metals
- Pharmaceuticals
- As a coolant in power plant generators
- For hydrogenation of unsaturated fatty acids in vegetable oil

CONCLUSION

Hydrogen fuel is generated using renewable energy instead of fossil fuels. It has the potential to provide clean power for manufacturing, transportation, and more — and its only by-product is water. Through this project we tried to address the environmental pollution by providing the idea of hydrogen generation from biodegradable waste. This idea can also be used to cope up with depleting fossil fuel reserves.

After doing the electrolysis experiment and reviewing the literature, we found that our Hydrogen Production Unit, which is based on the principle of Catalytic Pyrolysis of Methane is the best method of producing Hydrogen. This method also combats the problem of carbon sequestering associated with other methods like Steam Methane Reforming etc. The energy demand, CO₂ footprint and production cost is lesser for this method. Its efficiency is the highest among the other methods.

Hydrogen energy has the potential for enormous supply of energy, and clean conversion to electricity. Addressing the needs for lower cost and better performing hydrogen energy infrastructure is crucial towards Hydrogen economy. Hence, we tried to give a solution for this problem with our project.

SUGGESTIONS

- ✓ Switching to renewable energy like Hydrogen fuel.
- ✓ Using solar and wind energy for the production of Hydrogen.
- ✓ Setting up of Hydrogen production plants should be supported by the Government.
- ✓ Creating awareness among people to make use of non-polluting sources of energy.
- ✓ Encouraging Research and Development of Hydrogen Technologies.

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- [1] https://www.e3s-conferences.org/articles/e3sconf/pdf/2018/26/e3sconf_icacer2018_03003.pdf
- [2] <https://pubs.acs.org/doi/10.1021/acs.iecr.1c01679#>
- [3] https://energyeducation.ca/encyclopedia/Energy_density
- [4] <https://www.ammoniaenergy.org/articles/methane-splitting-and-turquoise-ammonia/>

IT'S BEEN HAILED AS FUEL OF THE FUTURE.

HYDROGEN IS CLEAN, FLEXIBLE AND ENERGY EFFICIENT.



THANK

YOU

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22	108519468022	CH.KAVERI	
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33	108519468033	G.BHAVANI LAXMI	
34	108519468034	G.KALYANI	
35	108519468035	G.MANISHA	PLANT MOISTURE MONITERING SYSTEM
36	108519468036	G.TARAMAHALAX	
37	108519468037	P.GOUTHAMI	
38	108519468038	G.NAGA SWETHA	
40	108519468040	G.PRIYANKA	
41	108519468041	G.SHIRISHA	TEMPERATURE BASED FAN SPEED CONTROLLER
43	108519468043	J.TEJASHWINI	
44	108519468044	J.RAMYA SREE	
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46	108519468046	J.ARCHANA	
47	108519468047	K.MANASA	
48	108519468048	K.SEEMA	
49	108519468049	K.KOMALATHA	

51	108519468051	K.UMA	METAL DETECTOR
52	108519468052	K.ASHWINI	
53	108519468053	K.SANDHYA BAI	
54	108519468054	K.DHANALAXMI	LASER SECURITY ALARM SYSTEM
55	108519468055	K.SWAPNA	
56	108519468056	K.JHANSI	
59	108519468059	K.SANJANA	
60	108519468060	K.TERESA	

STUDY PROJECTS

DECLARATION

We hereby declare that the Project titled **FIRE DIRECTOR with AUTOMATIC WATER SPRINKLER to AVOID FIRE ACCIDENTS** is a bonafide record of research work carried out by us under the guidance of mentor **Dr. Ch. Kanchana Latha**, (Assistant Professor of Physics & Faculty of Physics Department), Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad – 1 by the students **A.Kavya(108519441001),B.Sindhuja(108519441005),P.Ravali(108519441026),P.Neeraja(108519441027),P.Keerthana(108519441028)** during the academic year 2021 – 22.

Signature of the Mentor & Faculty

Dr. Ch. Kanchana Latha

Signature of the Students

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B.Sindhuja(108519441005) B.Sindhuja

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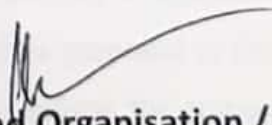
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GOVERNMENT DEGREE COLLEGE BEGUMPET,

HYDERABAD – 500 016 TELANGANA

CERTIFICATE

This is to certify that the project titled **FIRE DIRECTOR with AUTOMATIC WATER SPRINKLER to AVOID FIRE ACCIDENTS** submitted to Commissioner of collegiate Education, Telangana, Hyderabad by the students **A.Kavya(108519441001), B.Sindhja.(108519441005), P.Ravali(108519441026), P.Neeraja(108519441027), P.Keerthana(108519441028)** during the academic year 2021-22 under the guidance of mentor **Dr. Ch. Kanchana Latha,(Assistant Professor of Physics Department), Government Degree College, Begumpet, Hyderabad.**



Signature of Head Organisation / Institution

Name and Designation:-

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HYDERABAD – 500 016, TELANGANA

DECLARATION

We hereby declare that the Project titled TEMPERATURE BASED FAN SPEED CONTROLLER is a bonafied record of research work carried out by us under the guidance of mentor Dr. Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad – 1 by the students TEJAVATH PRIYANKA (108519441039), P RAMA (108519441029), M MOUNIKA (108519441025) and Y ASHWIKA (108519441042) during the academic year 2021 – 22.


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DECLARATION

We hereby declare that the Project titled PASSWORD DOOR SYSTEM is a bonafied record of research work carried out by us under the guidance of mentor Dr. Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad – 1 by the students G. SUVARNA LAXMI (108519441011), G.MANISHA (108519441010), CH. DIVYA (108519441008), K.YAMINI (108519441021), M.V. SUSMITHA (108519441022) during the academic year 2021 – 22.


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Verified
Suvarna

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This is to certify that the project titled PASSWORD DOOR LOCK SYSTEM submitted to Commissioner of collegiate Education, Telangana, Hyderabad by the students G. SUVARNA LAXMI (108519441011), G.MANISHA (108519441010), CH. DIVYA (108519441008), K.YAMINI (108519441021), M.V. SUSMITHA (108519441022) during the academic year 2021-22 under the guidance of mentor Dr. Ch. Kanchana Latha, Assistant Professor of Physics Department, Government Degree College, Begumpet, Hyderabad.


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DECLARATION

We hereby declare that Students Study Project titled **BURGLAR ALARM** is a bonofide record of research work carried out by us under the guidance of mentor Dr.Ch.Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad-1 by the students **CH. PRAVALIKA (108519474002), C. SHILPA (108519474003), G. SOUMYA (108519474004), K. SUSMITHA(108519474006), Md. IQBAL SANA (108519474008)**, during the academic year 2021-22


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This is to certify that students project titled "BURGLAR ALARAM" submitted to
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STUDENTS FINAL REPORT OF RESEARCH PROJECT IN PHYSICS

A Study Research Project IR Based Automatic Hand sanitizer Dispenser

Submitted to



Commissioner of Collegiate Education Hyderabad – 500 016, Telangana State,
India July 2022

Submitted By

KONDA INDU	-	(108519468061)
VARALA MEGHANA	-	(108519468116)
VALLURI ANJALI	-	(108519468115)
REDAPANGU MADHAVI	-	(108519468102)
SANAPALA SOWMYA SREE	-	(108519468105)

Under the Guidance

CH. KANCHANA LATHA


Principal Mentor & Assistant Prof of Physics

GOVERNMENT DEGREE COLLEGE FOR WOMEN, BEGUMPET
TELANGANA STATE

**GOVERNMENT DEGREE COLLEGE FOR WOMEN, BEGUMPET
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CERTIFICATE

This is to certify that the project titled **IR Based Automatic Hand Sanitizer Dispenser** submitted to Commissioner of Collegiate Education, Telangana, Hyderabad by the students **KONDA INDU (108519468115), VARALA MEGHANA (108519468116), VALLURI ANJALI (108519474009), REDAPANGU MADHAVI (108519468102) and SANAPALA SOWMYA SREE (108519468105)** during the academic year 2021-22 under the guidance of mentor **Dr.CH.KANCHANA LATHA**, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad.


Signature of Head Organization/Institution

Dr. CH.KANCHANA LATHA

Principal Mentor & Assistant Prof of Physics

DECLARATION

We hereby declare that the project title is **IR BASED AUTOMATIC HAND SANITIZER DISPENSER** is bonafied record of research work carried out by us under the guidance of mentor **Dr.CH. KANCHANA LATHA**, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad- 1 by the students

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STUDENTS FINAL REPORT OF RESEARCH PROJECT IN PHYSICS

A Study Research Project

SOLAR MOBILE CHARGERS BASED ON MULTIPLIER

Submitted By

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AND

CH. KANCHANA LATHA

PRINCIPAL MENTOR &ASST.PROF OF PHYSICS

GOVERNMENT DEGREE COLLEGE, BEGUMPET TELANGANA



Submitted to

**COMMISSIONER OF COLLEGIATE
EDUCATION HYDERABAD – 500 016, TELANGANA,**

INDIA

July 2022

Verified

DECLARATION

We hereby declare that the Project titled **SOLAR MOBILE CHARGERS BASED ON MULTIPLIER** is a bonafied record of research work carried out by us under the guidance of mentor Dr.Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad-1 by the students

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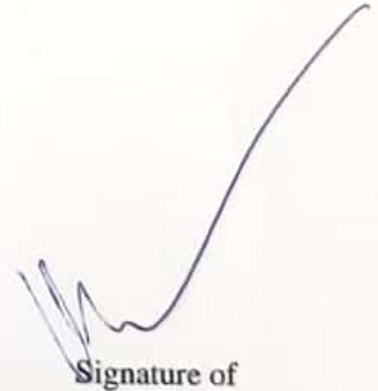
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HYDERABAD-500016 TELANGANA

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SWACHCH ANTARIKSH

By

**GAYATRI MOKASHI, TRIPTI TIWARI, SHAIK ASRA,
DUMPALI DHARANI, B. SIRISHA**



**Submitted to the Department of Physics
GOVERNMENT DEGREE COLLEGE FOR WOMEN(A),
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SECUNDERABAD 500-015.

**In Partial Fulfillment of the Requirements for the Degree of
Bachelor of Science**

Supervised by Dr. Ch. KANCHANA LATHA

HOD, Physics Department,

GOVERNMENT DEGREE COLLEGE FOR WOMEN(A), BEGUMPET

GOVERNMENT DEGREE COLLEGE BEGUMPET,

HYDERABAD-500 016, TELANGANA

DECLARATION

We hereby declare that the Project titled Swachchh Antariksh is a bonafide record of research work carried out by us under the guidance of mentor Dr. Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad - 16 by the students GAYATRI MOKASHI (108519441012), TRIPTI TIWARI (108519441041), SHAIK ASRA (108519441034), DUMPALI DHARANI (108519441009), B. SIRISHA (108519441006) during the academic year 2021-22.

Signature of the Mentor & Faculty

Dr. Ch. Kanchana Latha

Place: Hyderabad

Date:

Signature of the Students

GAYATRI MOKASHI (108519441012)

Gayatri

TRIPTI TIWARI (108519441041)

Tripti Tiwari

SHAIK ASRA (108519441034)

Sh. Asra

DUMPALI DHARANI (108519441009)

D. Dharani

B. SIRISHA (108519441006)

B. Sirisha

GOVERNMENT DEGREE COLLEGE BEGUMPET,
HYDERABAD-500 016 TELANGANA

CERTIFICATE

This is to certify that the project titled **SWACHCH ANTARIKSH** submitted to Commissioner of collegiate Education, Telangana, Hyderabad by the students **GAYATRI MOKASHI(108519441012), TRIPTI TIWARI(108519441041), SHAIK ASRA(108519441034), DUMPALI DHARANI(108519441009), B. SIRISHA(108519441006)** during the academic year 2021-22 under the guidance of mentor **Dr. Ch. Kanchana Latha**, Assistant Professor of Physics Department, Government Degree College, Begumpet, Hyderabad.


Signature of Head Organization / Institution

Name and Designation:

**STUDENTS FINAL REPORT OF RESEARCH PROJECT IN
ELECTRONICS**

A Study Research Project on

METAL DETECTOR

*Submitted in the partial fulfillment of the requirement for the award of the
degree of*

Bachelor of Science Degree (BSc)

By

S.SANJU	(108519441033)
S.POOJITHA	(108519441036)
R.SUHASINI	(108519441030)
B.GRACE	(108519441003)
B.SONIYA	(108519441007)
S.NAGALAXMI	(108519441035)

Under the esteemed guidance of

CH.KANCHANA LATHA

(Principal Mentor & Assistant.Prof of Physics)



GOVERNMENT DEGREE COLLEGE FOR WOMEN,BEGUMPET.

Submitted to

COMMISIONER OF COLLEGIATE EDUCATION,HYDERABAD-500016,

TELANGANA,INDIA.

JULY-2022

ACKNOWLEDGEMENT

we acknowledge the contributions of everyone who has played any part whatsoever in successful completion of project. We would like to thank our Principle Madam for giving us this opportunity. We are grateful to our guide DR. KANCHANA LATHA madam our Electronics faculty, for their continued guidance and an endless supply of support and letting us use the resources from the laboratories for the project. Lastly, we would like to thank our families and friends for unequivocal and loving support.

Verified
Gurinder

GOVERNMENT DEGREE COLLEGE BEGUMPET,

HYDERABAD-500016, TELANGANA

DECLARATION

We here by declare that the Project titled **METAL DETECTOR** is a bonafied record of research work carried out by us under the guidance of mentor Dr.Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad-1 by the students

S. SANJU (108519441033),

S. POOJITHA (108519441036), R. SUHASINI(108519441030),


B. SONIYA (108519441007), B. GRACE (108519441003),

S. NAGALAXMI (108519441035)

During the academic year 2021-22

Place: Hyderabad

Date:


Signature of the mentor & faculty
Dr Kanchana Latha, Madam

Signature of the Students

S. Sanju	(108519441033)	S. Sanju
S. POOJITHA	(108519441036)	S. poojitha
R. SUHASINI	(108519441030)	R. suhasini
B. SONIYA	(108519441007)	B. soniya
B. GRACE	(108519441003)	B. grace
S. NAGALAXMI	(108519441035)	S. nagalaxmi

GOVERNMENT DEGREE COLLEGE BEGUMPET,

HYDERABAD-500016 TELANGANA

CERTIFICATE

This is to certify that the project titled **METAL DETECTOR** submitted to Commissioner of Collegiate Education, Telangana, Hyderabad by the students,

S. POOJITHA (108519441036)


R. SUHASINI (108519441030)

B. SONIYA (108519441007)

B. GRACE (108519441003)

S. NAGALAXMI (108519441035)

During the academic year 2021-22 under the guidance of mentor Dr. Ch. Kanchana Latha mam, Assistant Professor of Physics & Faculty of Physics Department, **Government Degree College, Begumpet, Hyderabad.**


Signature of Head Organization/Institution

Name and signature

STUDENTS FINAL REPORT OF RESEARCH PROJECT IN ELECTRONICS

A Study Research Project

WATER LEVEL INDICATOR ALARM USING TRANSISTORS

Submitted By

T.JAHNAVI (108519441014)

J.MOUNIKA (108519441015)

M.SANGEETHA (108519441023)

R.UMA BHARATHI (108519441031)

T.SWATHI (108519441037)

AND

CH. KANCHANA LATHA

PRINCIPAL MENTOR &ASST.PROF OF PHYSICS

GOVERNMENT DEGREE COLLEGE, BEGUMPET TELANGANA



Submitted to

COMMISSIONER OF COLLEGIATE EDUCATION

HYDERABAD – 500 016, TELANGANA, INDIA

July 2022

GOVERNMENT DEGREE COLLEGE BEGUMPET,
HYDERABAD-500016, TELANGANA

DECLARATION

We hereby declare that the Project titled WATER LEVEL INDICATOR ALARM USING TRANSISTORS is a bonafide record of research work carried out by us under the guidance of mentor Dr.Ch.Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to commissioner of collegiate Education, Telangana Hyderabad -1 by the students

T.JAHNAVI(108519441014),J.MOUNIKA(108519441015),M.SANGEETHA(108519441023),R.UMABHARATHI(108519441031), T.SWATHI(108519441037) during the academic year 2021-22.

Signature of the Mentor & Faculty

Dr. Ch.Kanchana Latha

Place : Hyderabad

Signature of the Students

Date :

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J.MOUNIKA (108519441015) J. Mounika

M.SANGEETHA (108519441023) M. Sangeetha

R.UMA BHARATHI (108519441031) R. Umabhathathi

T.SWATHI (108519441037) T. Swathi

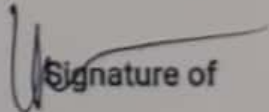
GOVERNMENT DEGREE COLLEGE BEGUMPET

HYDERABAD-500016 TELANGANA

CERTIFICATE

This is to certify that the project titled WATER LEVEL INDICATOR ALARM USING TRANSISTORS submitted to Commissioner of Collegiate Education, Telangana, Hyderabad

by the students T.JAHNAVI(108519441014), J.MOUNIKA(108519441015), M.SANG EETHA(108519441023), R.UMABHARATHI(108519441031), T.SWATHI(108519441037) during the academic year 2021-22 under the guidance of mentor Dr.Ch.Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad.

 Signature of

Head Organization/Institution

Name and Designation:—

STUDENTS FINAL REPORT OF RESEARCH PROJECT IN PHYSICS

A Study Research Project

PLANT MOISTURE MONITORING SYSTEM

Submitted By

Amukanti Swathi - (108519468004)

Meharunnisa-(108519468074)

M Faridha-(108519468075)

M Shilpa-(108519468070)

Shaik Afroz Sameena- (108519468108)

AND

CH. KANCHANA LATHA

PRINCIPAL MENTOR &ASST.PROF OF PHYSICS

GOVERNMENT DEGREE COLLEGE, BEGUMPET TELANGANA



Submitted to

COMMISSIONER OF COLLEGIATE EDUCATION

HYDERABAD- 500016,TELANGANA, INDIA

JULY 2022

GOVERNMENT DEGREE COLLEGE BEGUMPET,
HYDERABAD-500016, TELANGANA.

Declaration

We hereby declare that the Project title PLANT MOISTURE MONITORING SYSTEM is a bonafied record of research work carried out by us under the guidance of mentor Dr.Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad-1 by the students Amukanti Swathi - (108519468004)

Meharunnisa-(108519468074)

M Faridha-(108519468075)

M Shilpa-(108519468070)

Shaik Afroz Sameena- (108519468108) the
academic year 2021-22


Signature of the Mentor & Faculty

Dr. Ch. Kanchana Latha Place :

Signature of the Students Date:

Hyderabad

Amukanti Swathi -(10851946804) - Amukanti Swathi
Meharunnisa-(108519468074) - Meharunnisa
M Faridha-(108519468075) - M. Faridha
M Shilpa-(108519468070) - M. Shilpa
Shaik Afroz Sameena- (108519468108) - Shaik Afroz Sameena

GOVERNMENT DEGREE COLLEGE BEGUMPET,
HYDERABAD-500016 TELANGANA

CERTIFICATE

This is to certify that the project titled submitted to

Commissioner of Collegiate Education, Telangana,

Hyderabad by the students Amukanti Swathi - (108519468004), Meharunnisa-(108519468074), M Faridha-(108519468075), M Shilpa-(108519468070), Shaik Afroz Sameena- (108519468108)

during the academic year 2021-22 under the guidance of mentor Dr. Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad.

Signature of

Head Organization/Institution

Name and Designation:--

STUDENTS FINAL REPORT OF RESEARCH PROJECT IN ELECTRONICS

A Study Research Project

LASER BEAM SECURITY SYSTEM

Submitted By

A. DIVYA SRI SAIKA(108519474001),

K. SHIRISHA (108519474007),

M. NEMAVATHI (108519474009),

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N. GAYATHRI (108519474011)

AND

CH. KANCHANA LATHA

PRINCIPAL MENTOR &ASST.PROF OF PHYSICS

GOVERNMENT DEGREE COLLEGE, BEGUMPET TELANGANA



Submitted to

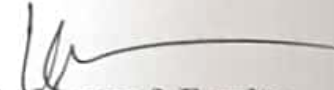
**COMMISSIONER OF COLLEGIATE
EDUCATION HYDERABAD – 500 016,
TELANGANA, INDIA**

July 2022

**GOVERNMENT DEGREE COLLEGE BEGUMPET,
HYDERABAD-500016, TELANGANA**

DECLARATION

We hereby declare that the Project titled **LASER BEAM SECURITY SYSTEM** is a bonafied record of research work carried out by us under the guidance of mentor Dr.Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad and submitted to Commissioner of Collegiate Education, Telangana, Hyderabad-1 by the students A. DIVYA SRI SAIKA (108519474001), K. SHIRISHA (108519474007), M. NEMAVATHI (108591474009), M.MEGHANA (108519474010), N. GAYATHRI (108519474011) during the academic year 2021-22


Signature of the Mentor & Faculty

Dr. Ch. Kanchana Latha

Place : Hyderabad

Signature of the Students

Date :

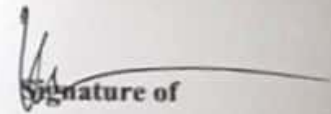
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Sri Saika
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thi
M. MEGHANA (108519474010), - M. Meghana
N. GAYATHRI (108519474011), - N. Gayathri

GOVERNMENT DEGREE COLLEGE BEGUMPET,

HYDERABAD-500016 TELANGANA

CERTIFICATE

This is to certify that the project titled **LASER BEAM SECURITY SYSTEM** submitted to Commissioner of Collegiate Education, Telangana, Hyderabad by the students **A. DIVYA SRI SAIKA (10851474001), K. SHIRISHA (108519474007), M. NEMAVATHI 108519474009), M. MEGHANA (108519474010), N. GAYATHRI (108519474011)** during the academic year 2021-22 under the guidance of mentor **Dr. Ch. Kanchana Latha, Assistant Professor of Physics & Faculty of Physics Department, Government Degree College, Begumpet, Hyderabad.**


Signature of

Head Organization/Institution

Name and Designation:-