DEPARTMENT OF NUTRITION HONOURS

LIST OF STUDENTS: 18

1. SWASTIKA HAZRA
2. MOULIKA CHAKROBORTY
3. ADRITA NANDI
4. MONIJA KHATUN
5. PRIYANKA KARAK
6. AKASH GHOSH
7. ESRAT JAHAN KHAN
8. SANTANU DEBSHARMA
9. SHUBHADIP PATHAK
10. MAHIMA DALUI
11. SUDESHNA SAHA
12. SAYAN BARI
13. SK KHAIRUL BASAR
14. SMRITI GHOSH
15. SNEHA CHATTERJEE
16. SUBHOJIT MONDAL
17. SURAJIT PANJA
18. DEEP CHATTARAJ

GUSHKARA MAHAVIDYALAYA

P.O.: Gushkara, Dist.: Purba Bardhaman, Pin - 713128 (W.B.)

E-mail : guskaramahavidyalaya@gmail.com

Ref. No. ..... Date .....

DEPARTMENT OF NUTRITION

List of the Students regarding Vaccinated

5th Semester Students

Sl. No.	Student Name	AGE	Date of 2nd Dose of Vaccination
1	MAHIMA DALUI	19	05-10-2021
2	SAYAN BARI	19	27-12-2021
3	SK KHAIRUL BASAR	19	20-12-2021
4	SMRITI GHOSH	21	22-01-2022
5	SNEHA CHATTERJEE	20	22-02-2022
6	SUBHOJIT MONDAL	21	07-02-2022
7	SUDESHNA BHATTACHARJEE	19	25-10-2021
8	SUDESHNA SAHA	20	01-11-2021
9	SURAJIT PANJA	21	22-02-2022

3rd Semester Students

10	AKASH GHOSH	19	19-04-2022
11	ESRAT JAHAN KHAN	19	27-12-2021
12	SANTANU DEBSHARMA	19	28-12-2021
13	SHUBHADIP PATHAK	18	21-05-2022
14	SHUBHADIP PATHAK	18	21-05-2022

Sabina Begum 25.08.2022

Teacher-in-Charge

Gushkara Mahavidyalaya

Teacher-in-charge

Gushkara Mahavidyalaya

TITLE OF THE PROJECT :

1. **REPORT OF DIET SURVEY**
2. **VISIT TO AN ICDS CENTRE AND REPORT PREPARATION ON NUTRITONAL STATUSAND HEALTH CONCERN**
3. **REPORT ON WORKSHOP THE DEPARTMENT OF HORTICULTURE, SIKKIM UNIVERSITY**

DURATION WITH DATE: **1. 02/09/2023 TO 04/09/2023**

2. 22/07/2023 (11AM TO 4PM)

3. 14/09/2022 (11AM TO 4PM)

PROJECT WORK COMPLETION CERTIFICATE

GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. Date:

CERTIFICATE

This is to certify that Sanjita Ghosh

Reg. No.- 201901004565 of 2019-20 &
Roll No.- 190811000050
of a Bonafede student of B.Sc. Semester- 4th in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled a review on relationship between different types of preservatives and human health

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/ Term Paper on the above topic for B. Sc. Practical Examination 2023
I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. Date:

CERTIFICATE

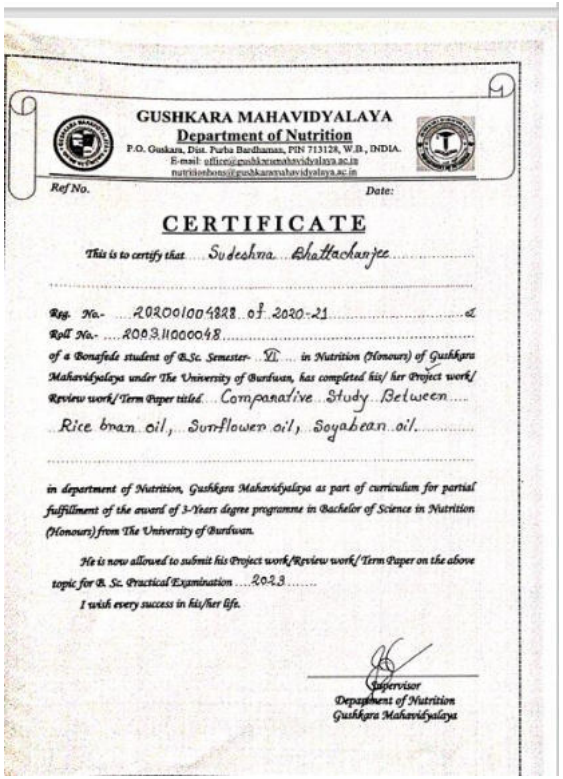
This is to certify that SNEHA CHATTERJEE

Reg. No.- 202001004818 of 2020-21 &
Roll No.- 200311000039
of a Bonafede student of B.Sc. Semester- in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled a review on relationship between different types of preservatives and human health

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/ Term Paper on the above topic for B. Sc. Practical Examination
I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya



GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. Date:

CERTIFICATE

This is to certify that Sudeshna Bhattacharjee

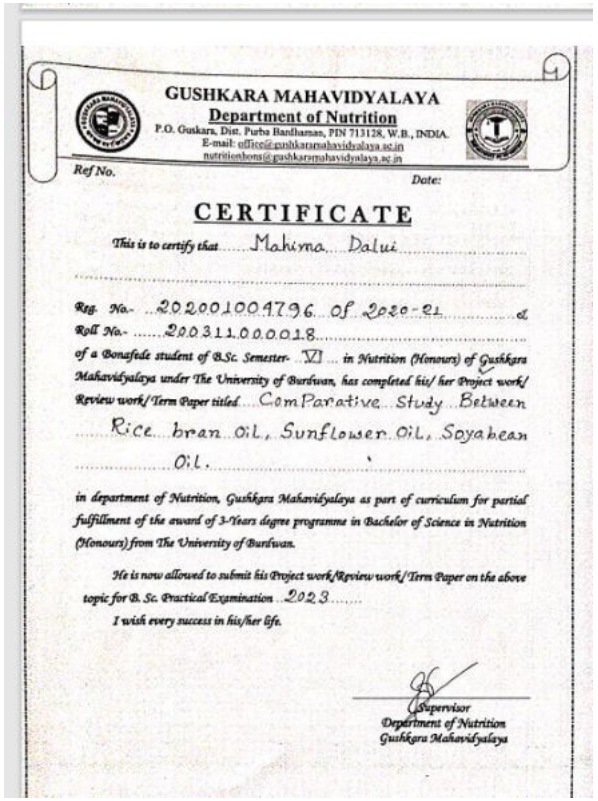
Reg. No.- 202001004828 of 2020-21 &
Roll No.- 20031100048
of a Bonafede student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Comparative Study Between Rice bran oil, Sunflower oil, Soyabean oil.

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/Term Paper on the above topic for B. Sc. Practical Examination 2023.

I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya



GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. Date:

CERTIFICATE

This is to certify that Mahima Dalui

Reg. No.- 202001004796 of 2020-21 &
Roll No.- 20031100018
of a Bonafede student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Comparative Study Between Rice bran oil, Sunflower oil, Soyabean oil.

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/Term Paper on the above topic for B. Sc. Practical Examination 2023.

I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Gushkara Dist. Purba Bardhaman, PIN-713134, W.B. INDIA
Email: [illegible]

Ref No.: Date:

CERTIFICATE

This is to certify that

Sneha Chatterjee

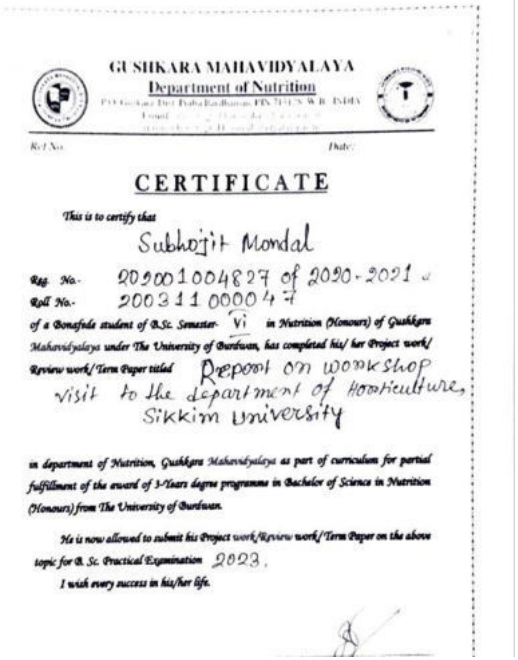
Reg. No.- 202001004818 of 2020-2021
Roll No.- 20031100039
of a Bonafide student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Report on Workshop visit to the department of Horticulture Sikkim University

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/Term Paper on the above topic for B. Sc. Practical Examination 2023.

I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya



GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Gushkara Dist. Purba Bardhaman, PIN-713134, W.B. INDIA
Email: [illegible]

Ref No.: Date:

CERTIFICATE

This is to certify that

Subhojit Mondal

Reg. No.- 20200100482 7 of 2020-2021
Roll No.- 20031100004 7
of a Bonafide student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Report on Workshop visit to the department of Horticulture, Sikkim University

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/Term Paper on the above topic for B. Sc. Practical Examination 2023.

I wish every success in his/her life.

GUSHKARA MAHAVIDYALAYA
Department of Nutrition
P.O. Gushkara Dist. Purba Bardhaman, PIN-713134, W.B. INDIA
Email: [illegible]

Ref No.: Date:

CERTIFICATE

This is to certify that

Sk. Kaiful Bazar

Reg. No.- 202001004815 of 2020-2021
Roll No.- 20031100036
of a Bonafide student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Report on Workshop visit to The department of Horticulture Sikkim University.

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/Term Paper on the above topic for B. Sc. Practical Examination 2023.

I wish every success in his/her life.

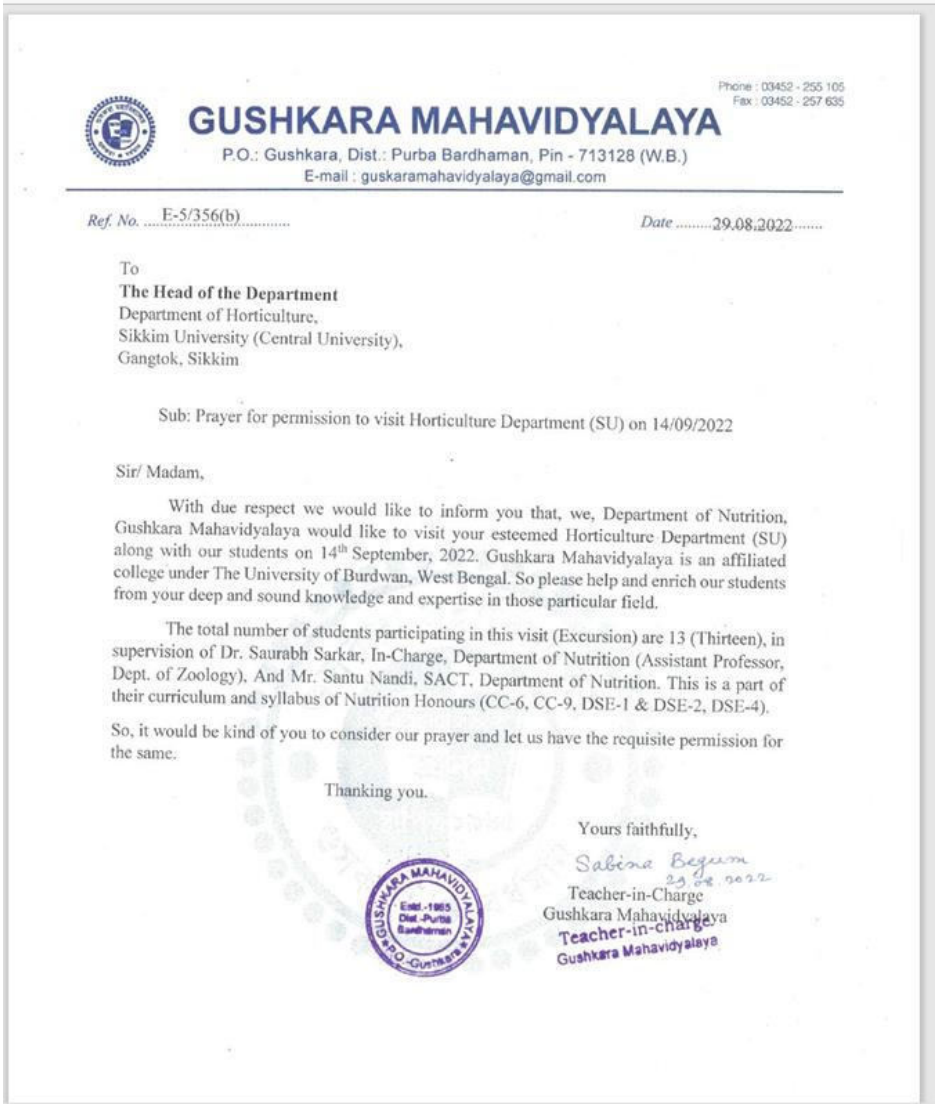
Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

REPORT OF THE FIELD WORK: (PDF OF THE REPORT OF THE STUDENT)

1. **PDF OF MONIJA KHATUN**
2. **PDF OF SANTANU DEBSHARMA**
3. **GENERAL PDF FOR ALL STUDENTS**

SAMPLE PHOTOGRAPH OF THE FIELD WORK:

PERMISSION LETTER FOR FIELD WORK FROM COMPETENT AUTHORITY



GUSHKARA MAHAVIDYALAYA
P.O.: Gushkara, Dist.: Purba Bardhaman, Pin - 713128 (W.B.)
E-mail : guskaramahavidyalaya@gmail.com
Phone : 03452 - 255 105
Fax : 03452 - 257 635

Ref. No. E-5/356(b) *Date* 29.08.2022

To
The Head of the Department
Department of Horticulture,
Sikkim University (Central University),
Gangtok, Sikkim

Sub: Prayer for permission to visit Horticulture Department (SU) on 14/09/2022

Sir/ Madam,

With due respect we would like to inform you that, we, Department of Nutrition, Gushkara Mahavidyalaya would like to visit your esteemed Horticulture Department (SU) along with our students on 14th September, 2022. Gushkara Mahavidyalaya is an affiliated college under The University of Burdwan, West Bengal. So please help and enrich our students from your deep and sound knowledge and expertise in those particular field.

The total number of students participating in this visit (Excursion) are 13 (Thirteen), in supervision of Dr. Saurabh Sarkar, In-Charge, Department of Nutrition (Assistant Professor, Dept. of Zoology), And Mr. Santu Nandi, SACT, Department of Nutrition. This is a part of their curriculum and syllabus of Nutrition Honours (CC-6, CC-9, DSE-1 & DSE-2, DSE-4).

So, it would be kind of you to consider our prayer and let us have the requisite permission for the same.

Thanking you.

Yours faithfully,

Sabina Begum
29.08.2022
Teacher-in-Charge
Gushkara Mahavidyalaya
Teacher-in-charge
Gushkara Mahavidyalaya

THE UNIVERSITY OF BURDWAN

B.Sc HONOURS

2ST SEMESTER

NAME- MONIJA KHATUN

SUBJECT- NUTRITION

COURSE- CORE COURSE 4 (CC-4)

REGISTRATION- 202201004490

ROLL NO - 22031100018

YEAR - 2022-23

Sl.No	Title	Page No.	Date	Signature
1.	General Introduction (i) Diet Survey (ii) objective (iii) Factors Consideration Conducting Diet Survey (iv) Procedure of Survey (v) Does and doesnot (vi) Precaution of Diet Survey (vii) Advantage and Disadvantage (viii) Adult Conjumption unit [ACU] (ix) RDA Table	1 – 5	17.5.2023	
2	Methodology (i) organisation (ii) Methodology (iii) Implimentation (iv) Equipment	~~6~~ 6–7	17.5.2023	
3	Diet Survey Report (i) General data (A) Table-1 (B) Table-2 (C) Table-3 (D) Table-4 (E) Table-5 ~~(ii) 3 days Menu Table~~ ~~(iii) 3 day food Consumption Table~~ ~~(iv) 3 day food Consumption Average Table~~ ~~(v) Micro and Micro food Consumption Table~~ ~~(vi) Meal Break up Guest Table~~	8 – 10 ~~18~~	19.6.2023	

EXAMINED
Department of Nutrition
Gauhati Mahavidyalaya

29/08/2023

GENERAL INTRODUCTION

Diet Survey : Diet Survey is a process by which we can calculate food habits and food Consumption of a family individual.

objective

(i) The main objective of diet survey is assess the nutritional status of the people.
(ii) By this survey, we can calculate the food habits and food portion size.
(iii) Source the food of a family is also regulated by diet survey.
(iv) By this survey we can also known the limited nutrients of the food.

Factoras Consideration Conducting Diet Survey :—

The factors to be taken into Consideration in Conducting diet Surveys are —

A. Trained Personnel
B. Population Sampling
C. Methods available for Conducting diet Surveys.
D. Calculation of the nutritive value of the diets in terms of adult. Consumption unit and interpretation of the results.

TRAINED PERSONNEL

a. Dietition → one
b. Field assistance (women) → Three
C. Local assistants (women) → Two

POPULATION SAMPLING AND DURATION OF SURVEY

The Population Sampling will have to be carried out with the help of a statistician. The choice of Sampling method to be used in a Population Selected for study will depend on the information available

There are 5 types :— (i) Systematic random Sampling
(ii) Unrestricted random Sampling
(iii) Stratified random Sampling.

(iv) The Sample size
(v) Duration of the survey.

(i) Systematic random Sampling :— The households are numbered consecutively in the order in which they appear in the census schedules or in any other list of all the households in the community.

(ii) Unrestricted random Sampling:- all the household of a community or area on census schedules or other listings are numbered consecutively. Numbers are drawn by cottery until the required number of households is obtained.

(iii) Stratified random Sampling : — This method different from unrestricted random Sampling in that the households are first grouped into homogeneous classes or strated on the basis of some known characteristic such as, income level numbers of members of the family, occupation etc.

(iv) The Sample Size :— The desirable samples size depends on various factors. Ideally, the Sample should be of a size which offers the minimum error with the facilities available.

(v) Duration of Survey :— Most of the Surveys in Indian and other Countries have been carried out for 7 to 10 days. A period of less than 7 days maybe, regarded as inadequate. Statistical analysis of diet survey data collected over a period of 7 to 10 days in the some families have shown that extention of the period of surveys from 7 to 10 days does not imerease the occuracy of the data or reduce the error.

Procedure of Survey ⇒

Diet Survey

old method

(i) Food Calculation method
(ii) Food list method

New method

(i) Questionnaire method
(ii) Interview method
(iii) Log book method
(iv) Analysis of cook food.

Old method :

(i) Food calculation method :—

Food Calculation is a simple process. By this process we can calculate the rate of a food items. This method also shows as that how much a family spend the money for each food items this method also shows as that how much a family spend the money for each food items As the end of a week we can calculate the total budget of a family.

(ii) Food list method :—

This method use for collecting information on the quantities of various food consume in household during periods of Survey. The investigator has a question continuing a list Consume by the family.

New method :

(i) Questionnaire method :—

This method mainly Consists of sample of question bunch which is relate to diet Survey. Question are made about the nature and quantity of food items eaten during the previous 24 Hours Sometimes this book is kept to the house holder of a family. After a week the investigator took the question answer sheet from the householder. It is most reliable method if properly carried out.

(ii) Interview method :— This is most important method of diet Survey. The Survey workers are directly join with the head of a family or housewife. The investigator collect information regarding the nature and quantities of the food during past 24 hrs. or 48 hrs. by the interview and making necessary entries in the schedule.

(iii) Log book method :—

This method widely used in European and western Countries. in this method, the investigator Calculate the actual quantity of purchase food of that family and record with on the log book which is maintain by the head of the family. In this method, the head of the family should be literate.

(iv) Weightment method :

In this method, food either raw or cooked is actually weight using an accurate balance It is ideal to Conduct the survey for 7 days to know the throughth picture of diet. Every day food is weight in the morning and evening. only the edible portion of raw food is weight.

The family members age, sex, physiological stats should be noted. Consumption of foods by the guest and aditional Consumption of the family members should be noted. Servey should not done of fast or festival days.

(v) Analysis of cook food :-

This methods involved actual analysis of Cook food consume by family by members. This method involves sampling of each items surrounding breakfast, tea time and dinner

DOES AND DOESNOT

DOES

(i) Everyday make at least 2 visit. one in a morning and other in the evening, before actual Cooking is given by housewife.

(ii) weight only in the edible portion of the raw foods.

(iii) Make note of Correct age, sex, Physiological status and activeties of each members in the household.

(iv) Accountes for guesten visitors, Pets and the absent in the Consumption, Collect additional information and Socio-economy way the food in cooked, Preserved and consumped.

DOES NOT

(i) Avoid fast and festivals days.

(ii) Don't may false promise of incentives or raise hope to obtained co-operative from the household or Community.

PRECAUTION OF DIET SURVEY

i) The Calculation of damaged food items should be noted due to Survey times.
ii) If the guest come due to Survey time we must Cancel their food portion from the Survey.
iii) Due to Survey if some family member can not take good food items then it should noted clearing in Survey note book.

Advantages of diet Survey:—

(i) Diet Survey Can help assess the nutritional status of the people.
(ii) By this survey we can calculate the food habits the food status.
(iii) This method give a vivid picture of food culture of a family.

Disadvantages of diet Survey:—

(i) The food culture and food myth are also a problem in the diet Survey.
(ii) Diet Survey is a long lenthy process.
(iii) Economical condition and workers in necessary for this Survey.
(iv) If the question is largen, than the family lost their interest

ADULT CONSUMPTION UNIT

The Consumption in a family deepends on the size of family. Again a family Consists of Sex physical activity, type and physiological status like (pregnency and lactation) of a person of different age groups. Therefore per head food Consumption will not yelid accurate data, in order to oven come this difficult it is usual to asses the consmptic of women children in terms of average man (body weight-kg; age-year; activity) applying appropiate co-efficiant, to different age and Sex groups these are called Adult Consumption unit (ACU) or Consumption unit (CU). Acu for a person of varing ages, have been Suggested for practical nutrition work. In Indian clasification activity based on decupation is also given in side table. The Acu is applycable to energy depend nutrition.

Coefficient for Computing Calorie requirement of different groups

Group	CU
Adult male (Sedentary worker)	1.0
Adult male (Moderate worker)	1.0
Adult female (Sedentary worker)	0.8
Adult male (Heavy worker)	1.6
Adult female (moderate worker)	0.9
Adult female (Heavy worker)	1.2
Adolescents (12-21) years	1.0
children (9-12) years	0.8
children (7-9) years	0.7
children (5-7) years	0.6
children (3-5) years	0.5
Children (1-3) years	0.4

Age Group	Category of work	Body wt (kg)	energy (kcal/d)	Fats/oil (in g)	protein (g/d)	CHO (g/d)	Calcium (mg/d)	Magnesium (mg/d)	Iron (mg/d)	Zinc (mg/d)	Iodine (µg/d)	Thiamine (mg/d)	Riboflavin (mg/d)	Niacin (mg/d)	vit B6 (mg/d)	Folate (µg/d)	vit B12 (µg/d)	vit C (mg/d)	vit A (µg/d)	vit D (IU/d)
	Sedentary		2110	25								1·2	1·6	12	1·6					
Men	Moderate	65	2710	30	42·9	100	800	320	11	14·0	95	1·5	2·1	15	2·1	250	2	65	460	400
	Heavy		3470	40								1·9	2·7	19	2·6					
	Sedentary		1660	20								1·1	1·6	9	1·6					
women	Moderate	55	2130	25	36·3	100	800	270	15	11·0	95	1·4	2·0	12	1·6	180	2	55	390	400
	Heavy		2720	30								1·8	2·6	15	2·1					
	Pregnant woman	55 + 10	+350	30	+7·6 (2nd trimester) +11·6 (3rd trimester)	135	800	320	22	12·0	180	1·6	2·3	+2	1·9	480	+0·2	+10	406	400
	Lactation		+600		+13·6	155						1·7	2·5	+4	+0·72	280				
	0 – 6 m			30			1000	270	16	12·0	200						+0·8	+40	720	400
	7 – 12 m		+520		+10·6	155						1·7	2·4	+4	+0·16	280				
Infants	0 – 6 m	5-8	550	–	6·7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	6 – 12 m	8·5	670	25	8·8	–	–	–	2	2·0	130	–	–	–	0·5	71	1		170	–
	1 – 3 y	11·7	1010	25	9·2	100	400	111	6	2·5	65	0·6	0·8	6	0·8	90	1	22	180	
Children	4 – 6 y	18·3	1360	25	12·8	100	450	131	8	3·7	80	0·8	1·1	8	1·0	111	1	27	240	400
Girls	7 – 9 y	25·3	1700	30	19·0	100	500	178	10	4·9	80	1·0	1·3	10	1·3	142	2	36	290	
Boys	10 – 12 y	34·9	2220	35	26·2	100	650	223	12	7·0	100	1·3	1·7	12	1·7	180	2	45	360	400
Girls	10 – 12 y	36·4	2060	45	26·6	100	650	214	16	7·1	100	1·2	1·6	12	1·6	186	2	44	370	400
Boys	13 – 15 y	50·5	2860	50	36·4	100	800	294	15	11·9	100	1·6	2·2	16	2·2	238	2	60	430	400
Girls	13 – 15 y	49·5	2400	35	34·7	100	800	270	17	10·7	100	1·3	1·9	13	1·8	204	2	59	420	400
Boys	16 – 18 y	64·4	3320	40	45·1	100	850	338	18	14·7	100	1·9	2·5	19	2·5	286	2	69	480	400
Girls	16 – 18 y	55·7	2500	35	37·3	100	850	279	18	11·8	100	1·4	1·9	14	1·9	223	2	57	400	400

ORGANISATION

We are all student divided into each individual groups. And we are surveyed individual family selected area.

METHODOLOGY

During Survey we adopted the weightment of raw foods method. Because these methods area conside-ned the accurate for family diet Survey than other. oral questionnaire method is also adopted for knowing any addition or deletion of food stuff from the respondent. And also the calleeted for demographic data from the family.

IMPLIMENTATION

The diet Survey and clinical assessment is carried out for 3 days simultaneously.

EQUPMENT

- ☐ Benevolence with weights / kitchen balance
- ☐ Diet Survey schedule
- ☐ Pencil and eraser

19/06/2023

DIET SURVEY REPORT :—

TABLE NO - 1

* Serial NO:-
Year of Servey :-
Date :- 02/9/2023 — 4/9/2023

*Data Colector :-
Name of the Student :- Monija khatun
class - B.Sc 2nd Semester
Roll NO :- 220311000018
Reg NO :- 222010044490 of 2022-23

TABLE NO - 2

* Data Colection :-
Head of the family :- SK Abu Taleb
occuption :- Farmer
Total family income :- 30,000 Per month
Adress :- (of the family Survey)
vill - Dangapara
P.O - Nityanandapur
P.S - Bhatar
dist - Purba Burdwan
Pin - 713125.

TABLE NO - 3

Details of Residance :—

1. Rented / owned :-	woned
2. If rented, Rent Paid Per month :-	—
3. Kuccha / Pucca :-	Pucca
4. Number of Rooms :-	4
5. Separated Kitchen (Yes or NO) :-	yes
6. Separated bathroom / Toilet (yes / NO) :-	yes

TABLE NO - 4

Data of individual member of the family :-

	Name	Age :y:	Hight :cm:	Weight :kg:	Body mass Index kg/m²	Body surface Index :m²:	Relation with need of the family	occupation	Education
1.	Sk Abu Taleb	55	167.64	63	24.5	1.626	Father	Fermar	M.A Pass
2	Salema Bibi	45	152.4	68	29.8	1.626	mother	House wife	H.S Pass
3	Sk Moinul Hasan	26	167.64	66	24.6	1.68	Elder Brother	B.Tech Engineer	Engineeing Pass
4	Sk Ainul Haque	23	162.56	57	20.3	1.568	Brother	Electrician	B.A Pass
5	Monja khatun	19	157.48	50	20.2	1.450	Self		Reading in college (1st year)

NOTE :-

- Body mass index (BMI) :- $\frac{\text{weight in kg}}{\text{Height in m}^2}$
- Body surface area :- $0.07 \times (\text{weight})^{0.425} \times (\text{hight})^{0.725}$

(Dubois formula)
BSA

[weight in kg, Hight in cm
Surface area in m^2]

TABLE NO - 5

Total Adult Consumption unit of the family :-

Serial No.	Name	Sex M/F	Age year	Type of worker	ACU
1	Sk Abu Taleb	M	55	Moderate	1·2
2	Salema Bibi	F	45	Sedentary	0·8
3	Sk Moinul Hasan	M	26	Sedentary	1·0
4	Sk Amul Haque	M	23	Sedentary	1·0
5	Monija Khatun	F	19	Sedentary	0·8

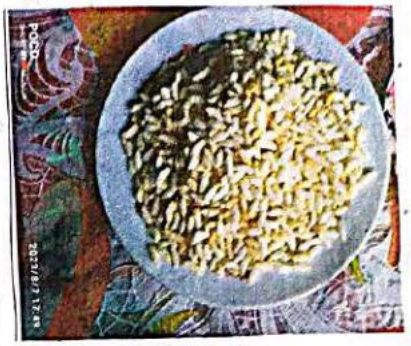
NOte :-

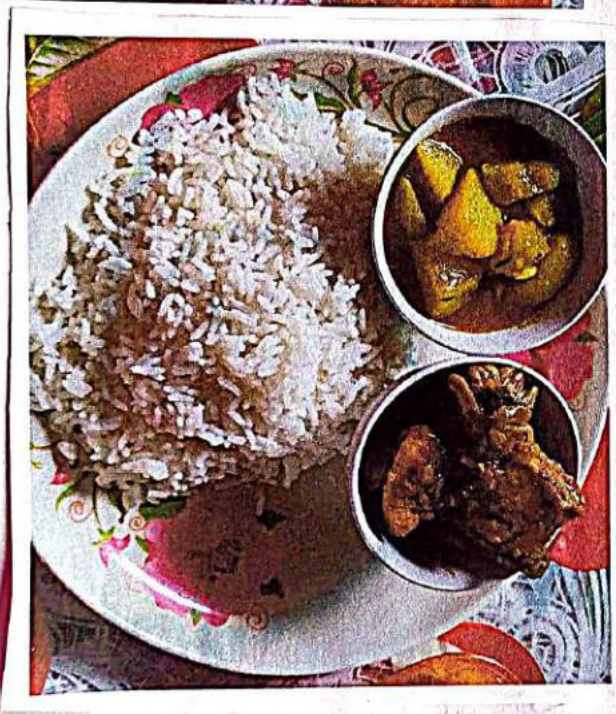
Total ACU of the family = 1·2 + 0·8 + 1·0 + 1·0 + 1·0 = 5·0

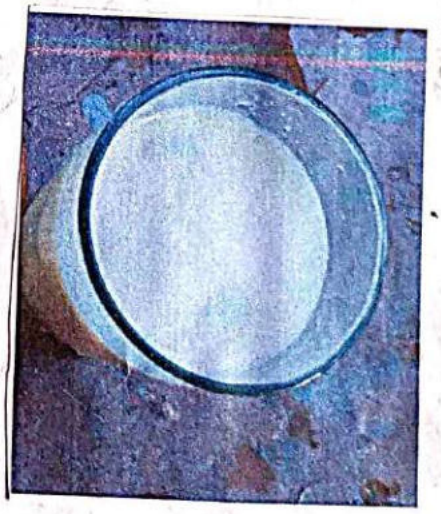
1 ACU = 2400 kcal

∴ Total Calory of the family = 12000 kcal

kcal/day ∴ Avarage = 2304 kcal



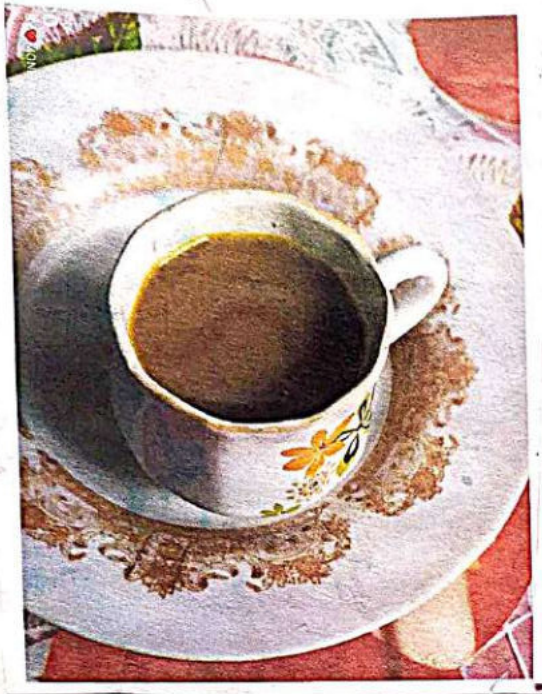


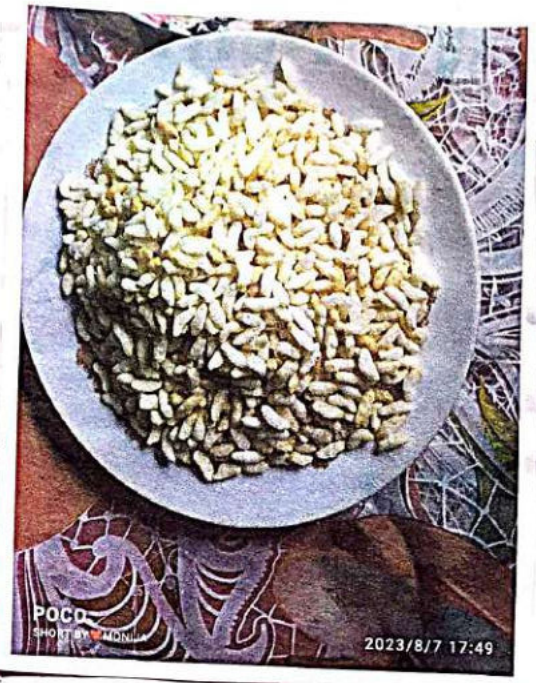


3 Days Menu Table

First day :-

Time	Food items	Amount
1. Breakfast	Puffed rice Egg Brinjal Milk	200 gm 315 gm 300 gm 500 gm
2. Mid Morning	Rice Parboiled Potato Lentil Onion	500 gm 250 gm 100gm 25
3. Lunch	Rice Parboiled Potato onion cucumber chicken	500 gm 250 gm 250 gm 250 gm 250 gm
4. Evening Snacks	Milk	500 gm
5. Dinner	Rice Parboiled Potato onion Chicken Pumpkin	500 gm 250 gm 25 gm 250 gm 500 gm

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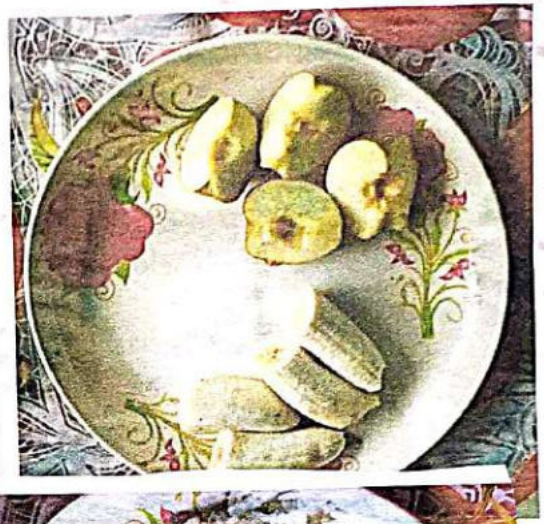
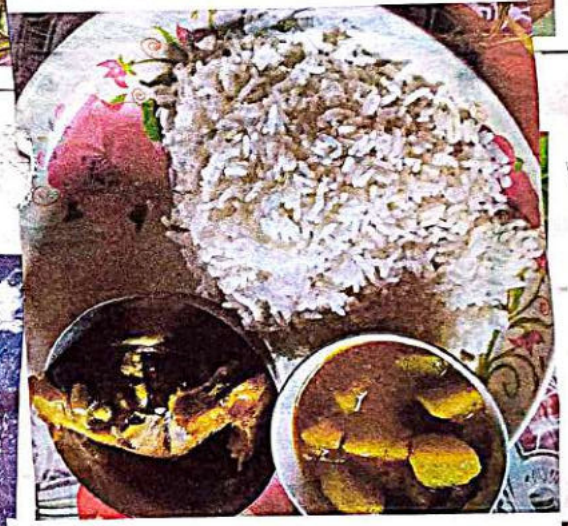
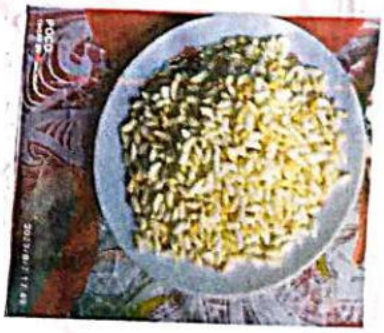




2nd day

Time	Food items	Amount
Break fast :	Puffed rice	200
	Tea	5 cup
MID Morning :	Rice Parboiled	500 gm
	Lentil	100 gm
	Potato	100 gm
	onion	25 gm
Lunch :	Rice Parboiled	500 gm
	Lentil	100 gm
	Potato	300 gm
	Onion	125 gm
	Parwar	50 gm
	Fish	250gm
Evining Snacks	Apple	250 gm
	Banana	500gm
Diner	Rice Parboiled	500 gm
	Potato	200 gm
	onion	100 gm
	Parwar	50 gm
	Fish	250 gm
Bed Time	Milk	500 gm



3rd day

Time	Food items	Amount
Break fast :	Puffed rice	300 gm
	Tea	5cup
Mid Morning:-	Rice Parboiled	500 gm
	Lintil	50 gm
	Potato	250 gm
Lunch	Rice Parboiled	500 gm
	Lintil	100 gm
	Potato	250 gm
	Onion	150 gm
	Cucumber	250 gm
	Beef	500 gm
evening snacks	Puffed rice	300 gm
	Tea	5cup
Diner	Rice Parboiled	500 gm
	Lintil	50 gm
	Potato	250 gm
	Onion	150 gm
	Beef	300 gm
	Ridge gourd	500 gm
Bed Time	Milk	500 gm

Total Amount of the food stuff Consumed by the family :

	Foodstuff	First day	Second day	Third day	Total amount
1.	Puffed rice	200 gm	200 gm	200 gm	600 gm
2.	Egg	315 gm	–	–	315 gm
3.	Rice Parboiled	1500 gm	1500 gm	1500 gm	4500 gm
4.	Lentil	100 gm	200 gm	200 gm	500 gm
5	Potato	750 gm	600 gm	750 gm	2100 gm
6	Brinjal	300 gm	–	–	300 gm
7	cucumber	250 gm	–	250 gm	500 gm
8	onion	100 gm	200 gm	300 gm	600 gm
9	Parwar	–	100 gm	–	100 gm
10	Pumpkin	500 gm	–	–	500 gm
11	Ridge gourd	–	–	500 gm	500 gm
12	Fish	–	500 gm	–	500 gm
13	chicken	500 gm	–	–	500 gm
14	Beef	–	–	800 gm	800 gm
15	Milk	1000 gm	500 gm	500 gm	2000 gm
16	Apple	–	250 gm	–	250 gm
17	Banana	–	500 gm	–	500 gm

Food stuff	Total amount	Average amount
1) Puffed rice	600 gm	120 gm
2) Egg	315 gm	63 gm
3) Rice Parboiled	4500 gm	900 gm
4) Lentil	500 gm	100 gm
5) Potato	2100 gm	420 gm
6) Brinjal	300 gm	60 gm
7) cucumber	500 gm	100 gm
8) onion	600 gm	120 gm
9) Parwar	100 gm	20 gm
10) PUMPKIN	500 gm	100 gm
11) Ridge gourd	500 gm	100 gm
12) Fish	500 gm	100 gm
13) chicken	500 gm	100 gm
14) Beef	800 gm	160 gm
15) Milk	2000 gm	400 gm
16) Apple	250 gm	50 gm
17) Banana	500 gm	100 gm

	Food stuff	Amount	Energy (Kcal)	Carbohydrate (g)	Protein (g)	Fat (g)
1	Puffed rice	120 gm	390	88.32	9	0.12
2	Egg	63 gm	114	0.5	8.50	8.60
3	Rice Parboiled	900 gm	3114	711	57.60	3.60
4	Lentil	100 gm	343	59	25.10	0.70
5	Potato	420 gm	407.40	94.92	6.72	0.42
6	Brinjal	60 gm	14.40	2.40	0.84	0.18
7	cucumber	100 gm	13	2.5	0.4	0.1
8	onion	20 gm	10	2.22	0.24	0.02
9	Parwar	100 gm	20	2.20	2.0	0.3
10	Pumpkin	100 gm	25	4.6	1.4	0.1
11	Ridge gourd	100 gm	17	3.4	0.5	0.1
12	Fish	100 gm	111	2.9	19.5	2.4
13	Chicken	100 gm	173	—	13.3	
14	Beef	160 gm	656	0.32	126.72	16.32
15	Milk	400 gm	268	17.60	12.80	16.80
16	Apple	50 gm	29.5	6.70	0.10	0.25
17	Banana	100 gm	116	27.2	1.2	0.3
		2996	5821.3	1025.78	260.82	50.31

4

	Food Stuff	Amount	vitamin A (µg)	vitamin c (mg)	Calcium (mg)	Iron (mg)
1)	Puffed rice	120 gm	0	0	27.60	7.92
2)	Egg	63 gm	255	—	44	1.57
3)	Rice parboiled	900 gm	-	0	81	9
4)	Lentil	100 gm	270	0	69	7.58
5)	Potato	420 gm	100	71.40	42	2
6)	Brinjal	60 gm	44.40	7.20	10.8	0.22
7)	cu[illegible]	100 gm	0	7	10	0.60
8)	onion	20 gm.	0	1.80	9.38	0.12
9)	Parwar	100 gm	153	29	30	1.7
10)	Pumpkin	100 gm	50	2	10	0.44
11)	Ridge gourd	100 gm	33	5	18	0.39
12)	Fish	100 gm	[illegible]	[illegible]	53[illegible]	[illegible] 0.9
13)	chicken	100 gm	420	78.3	60	2.1
14)	Beef	160 gm	0	0	108.80	30
15)	Milk	400 gm	212	80	480	0.80
16)	Apple	50 gm	0	0.5	5	0.60
17)	Banana	100 gm	78	7	17	0.36
		2993 gm	1615.4	289.2	11552.58	66.30

Meal Break or Guest Table

A.

Sl. NO.s of the family members who are not Consuming partially or fully :-	Meals not taken			
	Break fast	Lunch	Dinner	Any other
NO	X	X	X	X
NO	X	X	X	X
NO	X	X	X	X

B.

Particulars of guest if (any) consuming food on the day of survey :-

	NAME	AGE	SEX	ACTIVITY	Physiological status
1.	NO	X	X	X	X
2.	NO	X	X	X	X
3.	NO	X	X	X	X

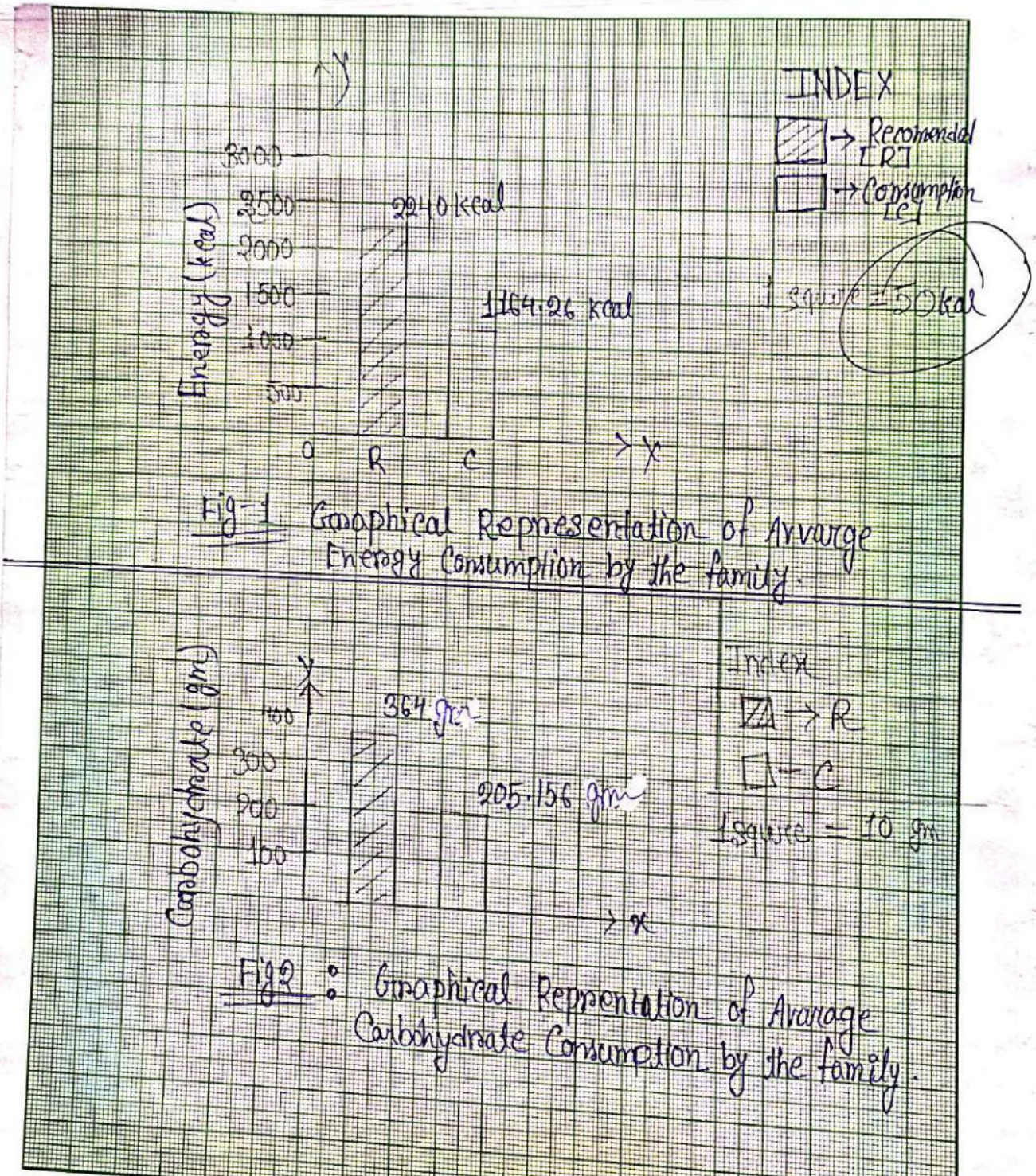


Fig-1 Graphical Representation of Avarage Energy Consumption by the family.

Fig-2 : Graphical Representation of Avarage Carbohydrate Consumption by the family.

Table - 6

ENERGY

Recomended	Consumption	Excess	Deficient
Avarage. Acu Energy = 2240 kcal	$\frac{5821.3}{5}$ kcal = 1164.26 kcal	—	2240 - 1164.26 = 1075.74 kcal.

Table - 7

CARBOHYDRATE

Recommended	consumption	Excess	Deficient
65% of Avarage Acu Energy = $2240 \times \frac{65}{100}$ = 1456 kcal = $\frac{1456}{4}$ kcal = 364 gm	$\frac{1025.78}{5}$ gm = 205.156 gm		364 - 205.156 = 158.844 gm

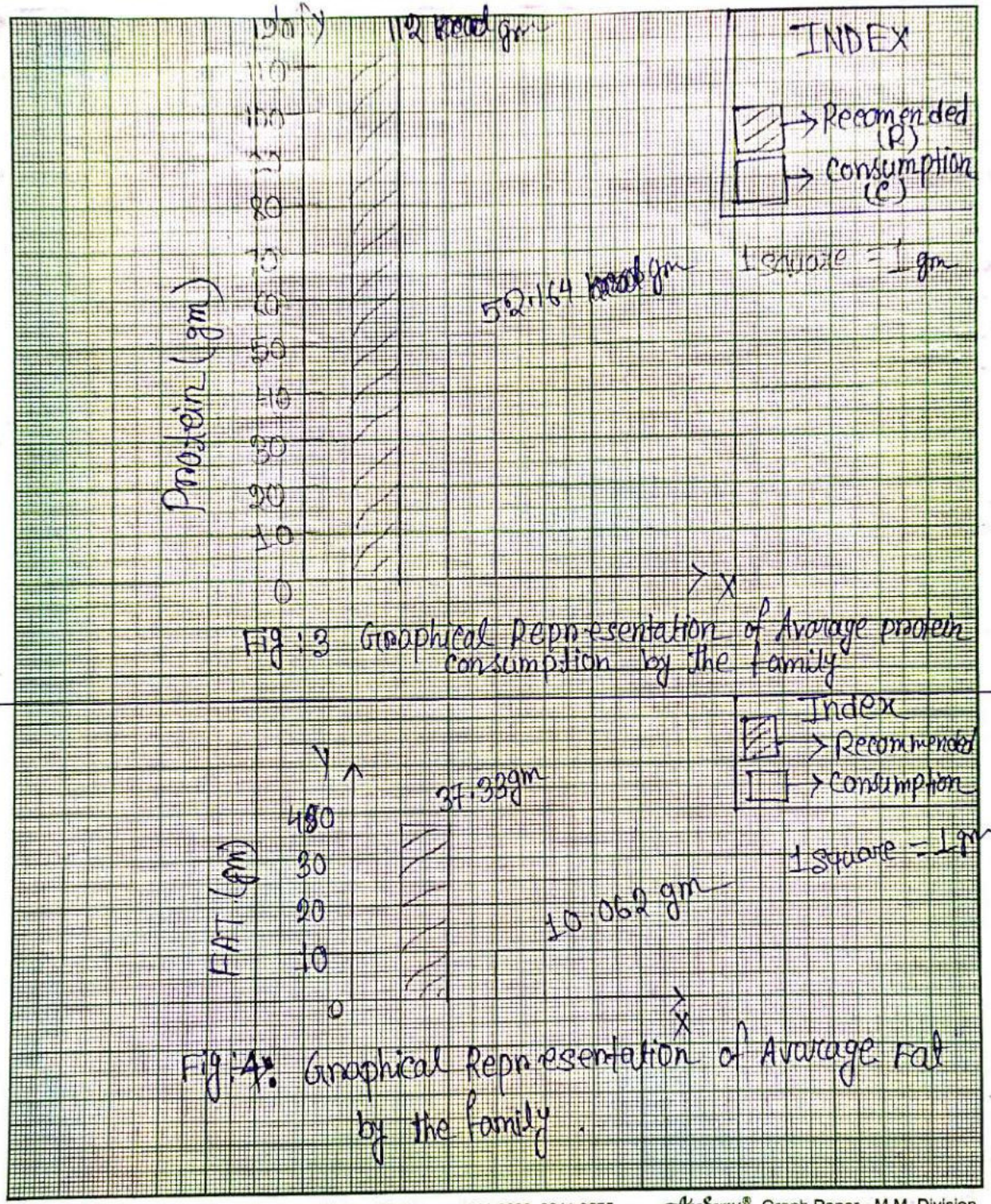


Fig : 3 Graphical Representation of Average protein consumption by the family

Fig : 4. Graphical Representation of Average Fat by the family.

Table - 8

PROTEIN

Recomended	Consumption	Excess	Deficient
20% of Avarage Acu Energy = $= 2240 \times \frac{20}{100}$ $= 448$ kcal $= \frac{448}{4}$ kcal $= 112$ gm	$\frac{260.82 \text{ Kcal}}{5}$ $= 52.164$ kcal	—	$112 - 52.164$ $= 59.836$ gm

Table - 9

FAT

Recommended	Consumption	Excess	Deficient
{Total Avarage Acu Energy − (carbohydrate energy + Protein energy $= \{2240 - (1456+448)\}$ $= 336$ kcal $= \frac{336}{9}$ $= 37.33$ gm	$\frac{50.31}{5}$ $= 10.062$ gm	—	$37.33 - 10.062$ $= 27.268$ gm

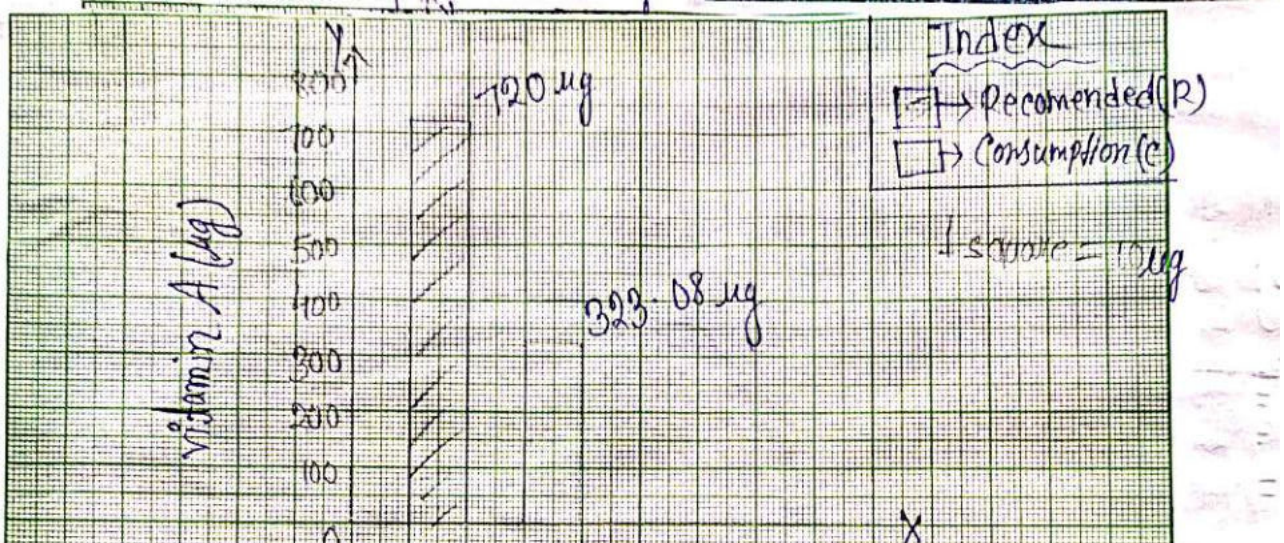


Fig-5 :— Graphical Representation of Avarage vit-A consumption by the family.

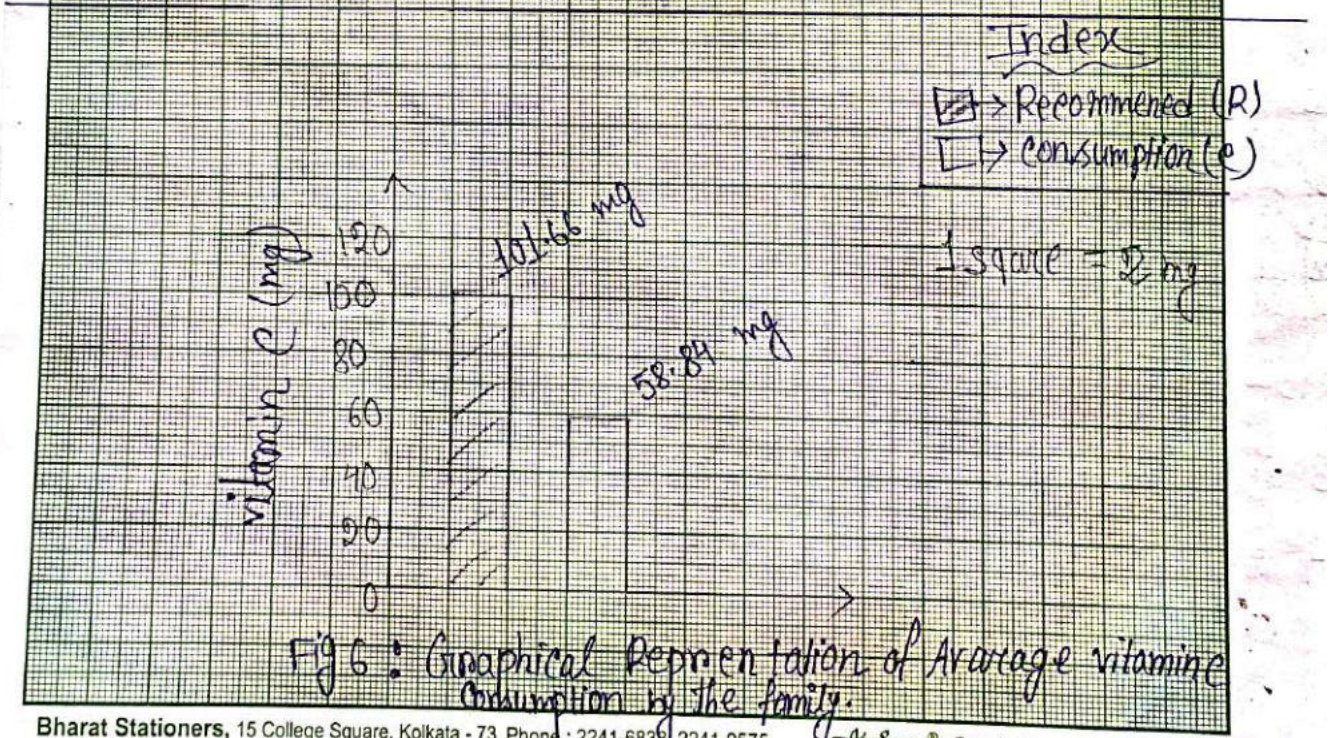


Fig 6 : Graphical Represen tation of Avarage vitamine Consumption by the family.

Table - 10

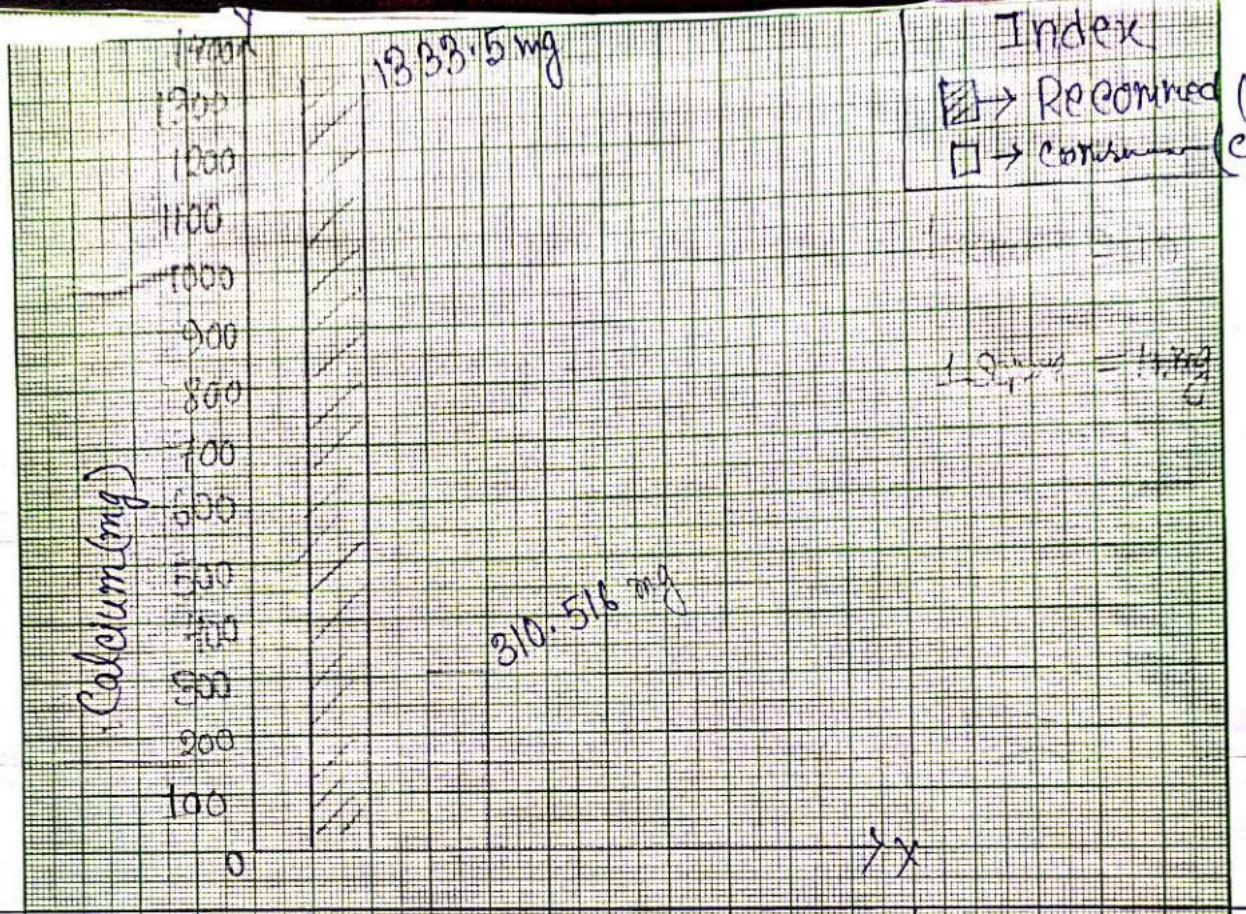
VITAMIN-A

Recommended	Consumption	Excess	Deficient
(460+460+460+390+390) = 2160 µg = 2160/3 = 720 µg	1615.4 / 5 = 323.08 µg	—	720 - 323.08 = 396.92 µg

Table - 11

VITAMIN-C

Recommended	Consumption	Excess	Deficient
(65+65+65+55+55) mg = 305 = 305/3 = 101.66 mg	289.2 / 5 = 58.84 mg	—	(101.66 - 58.84) = 42.82 mg



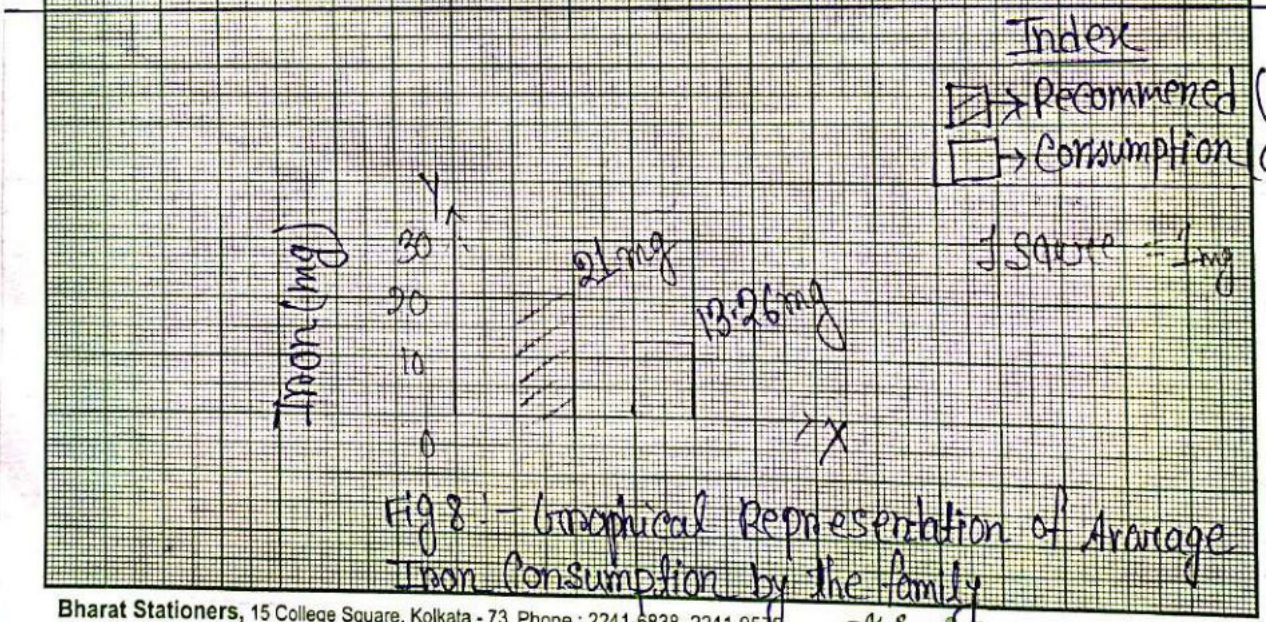


Fig 8:- Graphical Representation of Average Iron Consumption by the family

Table - 12

CALCIUM

Recommened	Consumption	excess	deficient
(800 + 800 + 800 + 800 + 800) = 4000 mg = $\frac{4000}{3}$ = 1333.3 mg	$\frac{1552.58}{5}$ = 310.516 mg	—	(1333.3 − 310.516) = 1022.78 mg

Table - 13

IRON

Recommened	Consumption	excess	deficient
(11 + 11 + 11 + 15 + 15) = 63 mg = $\frac{63}{3}$ mg = 21 mg	$\frac{66.30}{5}$ = 13.26 mg	—	(21 − 13.26) = 7.74 mg

Comment

Energy :- To perform diet survey I went to middle class family. I can see that the intak of energy is much less (2240 − 1164.26) = 1075.74 Kcal than the required amount (2240 kcal)
Energy deficient diseases are weight loss, weaks, Protein - energy Malnutrition (Table-6)

They also consume few more amount of energy rich food in their diet. Like - Ghee, butter, egg, fish meat and nuts (Groundnuts (Groundnuts, pista, cashewnut etc.

Carbohydrate :- I can see that the intake of Carbohydrate is less (364 - 205.156 gm) than the requirment amount (364 gm) (Table -7)
Energy deficient diseses are Constipation, Hypoglycemia, ketosis, headaches etc.

They also consume, few more amount of carbohydrate rich food in their diet like rice, puffed rice, Lentil, Bengal genm (chole) etc

Protein :- I can see that the intake of Protein is much less {(112 - 52.164) = 59.836 gm}
than the required amount (112 gm) (Table -8)

They also consume few more amount of protein rich food in their diet. like - fish, meat, milk, Lentil etc.

Protein deficiency disease are Protein energy Malnutrition, kwashiorkor, Marasmus

FAT :- I can see that the intake of Fat is less 27.368 gm than the required amount 37.39 gm
Fat deficiency diseses are dryskin
They also consume few more amount of fat in their diet like Butter Ghee

vitamin A :- I can see that the intake of vitamin A 396.92 µg
A deficiency disess are consuntiva xerosis.
They also consume few more amount vit A Milk egg youlk.

Calcium :- I can see that the intake of Calcium is very less 1022.78 mg.
Iron I can see that the intake of calcium is very less 7.74 µg.

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Department of Nutrition
Gurukara Mahila Vidyalaya

Referance

Nutritive value of Indian Foods

Gushkara Mahavidyalaya

CBCS B.SC (HONOURS) 4 TH SEMESTER PRACTICAL EXAMINATION, 2022-23

EXAMINED 21/08/2023 Department of Nutrition Gushkara Mahavidyalaya

NAME – SANTANU DEBSHARMA

CLASS – SEMESTER IV COLLEGE ROLL NO – 84

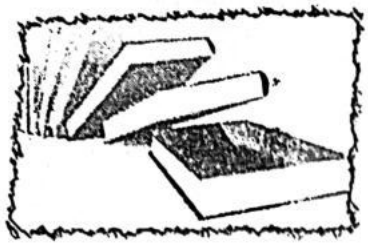
ROLL NO -210311000037

REGISTRATION NO – 202101005605 OF 2021-22

SUBJECT – NUTRITION COURSE CODE – CC- 9

COURSE TITLE – VISIT TO AN ICDS CENTRE AND REPORT PREPARATION ON NUTRITONAL STATUS AND HEALTH CONCERN

I N D E X



Name Santanu Debsharma

Class _____ Section _____ Roll No. _____ Year _____

Subject _____

Sl. No.	Experiment Description	Page no.	Date	Remarks Signature
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2.	Defination of Growth chart	1		
3.	Assessment of Growth	1		
4.	Method of Assessment of Growth	2-3		
5.	Types of Growth Chart	3		
6.	The Growth chart of (WHO)	3-4		
7.	The Growth chart used in India	4-5		
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9.	Filling up the Growth chart	6		
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11.	Visit to an ICDS centre for Growth monitoring and promotion	9		
12	Information about ICDS centre	9		
13.	The objective of ICDS	10		
14.	Name of the ICDS centre	11		
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17	Conclusion.	25		

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Gauhati University

GROWTH CHART

Introduction : The term 'growth' refers in physical size of the body. growth not only include physical aspect but also intellectual, emotional and social aspect.

- Normal growth takes places only if there is optimal nutrition free from any type of infection and also free from genetic and environmental influences.
- The process of growth starts from time of conception and continuous throughout childhood.
- Growth Chart : The growth chart is a visible display of the childs physical growth and development. It is also called as "road to health."
It was first designed by David Morley for growth assessment and was later modified by WHO.
- Assessment of growth :

* For the assessment WHO has provided charts for both boys and girls.
* Growth indicators are used to assess growth considering a child's age and measurement togeth.
  - length / height for age
  - Weight for age
  - Weight for length / height.
  - BMI for age.

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Method of Assessment of Growth.

In children the parameters used for monitoring growth are—

→ ① Weight

→ ② Height

→ ③ Head circumference and chest circumference.

Weight: The weight is one of the most important parameter to measure the growth rate of a child. For measuring weight, the measurement technique employed should be checked frequently.

* The different clinic is a beam weighing scale is used because it is very accurate for field condition, body weight machine is quite satisfactory but a shanping weight machine is used for children of 0-3 years. In this case the body is sleeng in a strong and the straps are fixed on a hook of the machine The machine will weight upto 200 kg with an accuracy of gram.

Height: In children upto 2 years of age, height is a good indication of child. Height or rather than length is measured by infantometer. The head of the child should touch the head board and the knees are held extended. The length is read from the measurement mark on the infantometer. The elder children who can stand, can be measured by anthropometer or anthrometric rod. When there is no measuring instrument, height can be obtained by

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simple height scale or by measurement type in following ways—

i) The child should stand bare feet on the flat floor against the wall.
ii) His/her head should held comfortably and mark is made on the wall with the head of an object along the headline.
iii) His/her feet should be parallal and heels, buttocks shoulders and back of the head should touch the wall.
iv) The subject is removed and the height is measured by using a measurment tape on a meter height scale.

Types of Growth chart :

There are many types of growth chart is commonly used in different countries. Some have two reference curves, and other as many as five. The WHO in recent years has made an effort to unify the countless growth charts and curves used throughout the world.

The Growth Chart of 'WHO' :

i) The who prototypes chart has two reference curves.
ii) The upper reference curve represented the medium for boys and the lower reference curve represent the 3rd percentile for the girls.

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iii) The space between the two growth curves has been called road-to-health. Thus the chart can be used for boys and girls.
iv) This will include the zone of normality for most population that is the weight of 95% of normal healthy children.
v) If the child is growing normally, it's growth line will be above the 3rd percentile and will run parallel to the road-to-health curves.
vi) It is very important to locate the position of dots on the growth line.
vii) Falling of the child weight curve indicates growth failure, which are earliest signs of PEM (Protein-energy malnutrition) and such child's need care is to keep the child above the 3rd percentile curve.

:- The Growth Chart used in India :-

i) The growth chart recommanded by the govt of India has four reference curves corresponds to 80% of the medium of the WHO reference standard.

ii) 80% medium weight is approximately equivalent to 25% below the medium which is the conventional lower limit of 'normal range'.

iii) In India of pediatrics in 1972 recommanded classification of nutritional status of the children as follow-

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① upto 80% median reference curve- normal.
② Between 80% - 71% → First degree or grade I or mild malnutrition.
③ Between 70% - 61% → second degree or grade II or moderate malnutrition.
④ Under 60% → Third degree or grade three or severe malnutrition.

In addition grade IV below 50% has been also added. Any weight between two lines are considered 'satisfactory'. This classification is being followed in the country side ICDS programme.

-: Uses of Growth CHART :-

A growth chart has many potential uses-

① Growth monitoring
② diagnostic tool
③ Planning and policy making
④ Educational tool
⑤ Tool for action
⑥ Evaluation.
⑦ Tool for teaching

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Page No. 6
Date

:- Filling Up The Growth Chart :-

In the first thickly outline box on the left side of the growth chart the month and years of birth of the children is written.

- For example : January 2009 marked and like wise March 2009 and so on.
- The weight of the child is plotted on the growth chart against the age (month)
- This plotting can be done every month after birth and the dates, thus dates obtained are joined by a line which shows the growth of the child.

Provision is made on the chart for recording and presenting information on the following-

1) Identification and registration
2) Birth dates and weight
3) Chronological age.
4) Weight and height measurement
5) Weight and height reference values.
6) History of sibling age.
7) Immunization procedures
8) Infant feeding guidelines.
9) Child spacing practices.

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2. Growth monitoring and promotion :-

1) In the growth chart the growth line can be comporated to the reference weight for the age curve.

2) The direction of growth curve is very important to this matter.

3) As long as the direction of the curve is upward in connecting to the reference line, the growth is considered satisfactory.

4) When the line remain downward it indicates their is growth retardation and weighing a child regularly is called growth monitoring (GM)

5) The ideal formed is growth monitoring and promotion (GMP)

6) Here not only regular weight is recorded but also special care is taken to the cause of any abnormality or any this satisfactory records upto the age of 6 months, the child should gain weight quickly and any growth failure at this stage is due to inadequate food intake.

7) Some have the motion, the breast milk is most cases not enough to meet the need of the body.

Teacher's Signature 25/04/2022

8) So, the child is given dilute animal milk and other semi solid food for their growth promotion.

9) But it should be encouraged that to keep the body exclusively on breast milk for 6 months.

Teacher's Signature .....

VISIT TO AN ICDS CENTER FOR GIROWTH MONITORING AND PROMOTION

The survey of ICDS center is done for analysing health status for pre school children in a certain community.

- This survey is essential for growth monitoring and promotion of growth of the children utilizing the data collected from the ICDS centre by weighing their weight measuring their height and collecting their age.

- Then we can put the data on a growth chart easily and can assess their growth rate

Information about ICDS Centre :-

The full form of ICDS is Integrated child Development services scheme This scheme was started on 2nd october 1975. It was partly founded by central government and partly by UNICEF. This programme is implemented in Tamil Nadu

1) To include and assess the nutritional and health status of children in age group of 1 to 6 years

2) To lay the foundation for proper psychological, physical, and social development of the child.

3) To reduce the incidence of the mortality and morbidity and also malnutrition and school drop out of the pre-school children.

4) To enhance the capacity of the mother to look after the normal health and nutritional need and also proper growth of the child through the proper nutrition.

Teacher's Signature .....

Name of the ICDS Centre :-

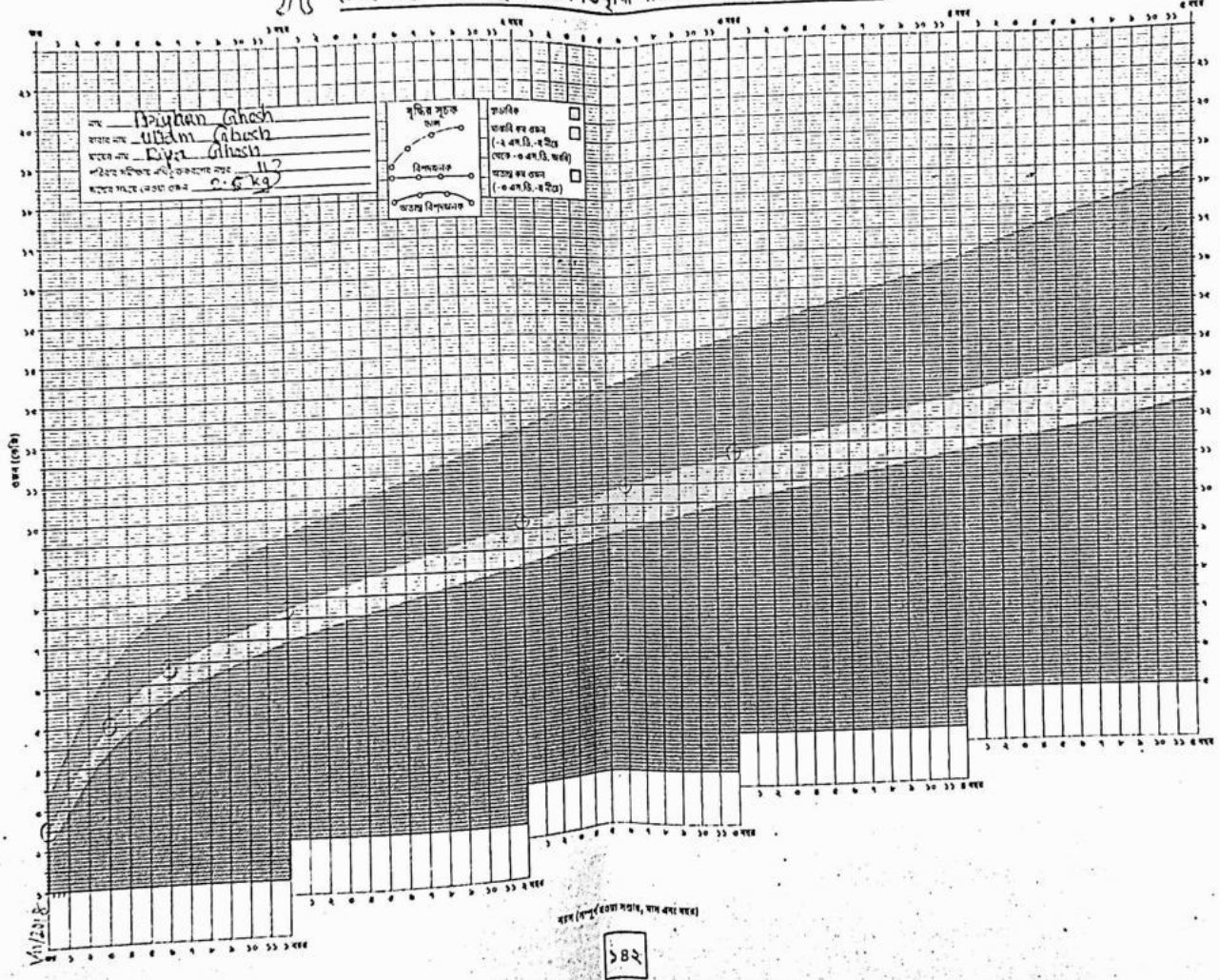
Sl No. Abhiramapur AWC

Date :- Abf 22.07.2023

We B.Sc 1st year 2nd semester Nutrition Honours students of Gurukapa Mahavidyalaya, went to that ICDS centre for assessing health status and growth monitoring of the pre-school children (0-5 years) under the supervision of our college teachers.

ছেলে ঃ বয়স অনুপাতে ওজন — জন্ম থেকে ৫ বছর

(বিশ্ব স্বাস্থ্য সংস্থা অনুমোদিত শিশুবৃদ্ধি পরিমাপের নতুন মান অনুযায়ী)



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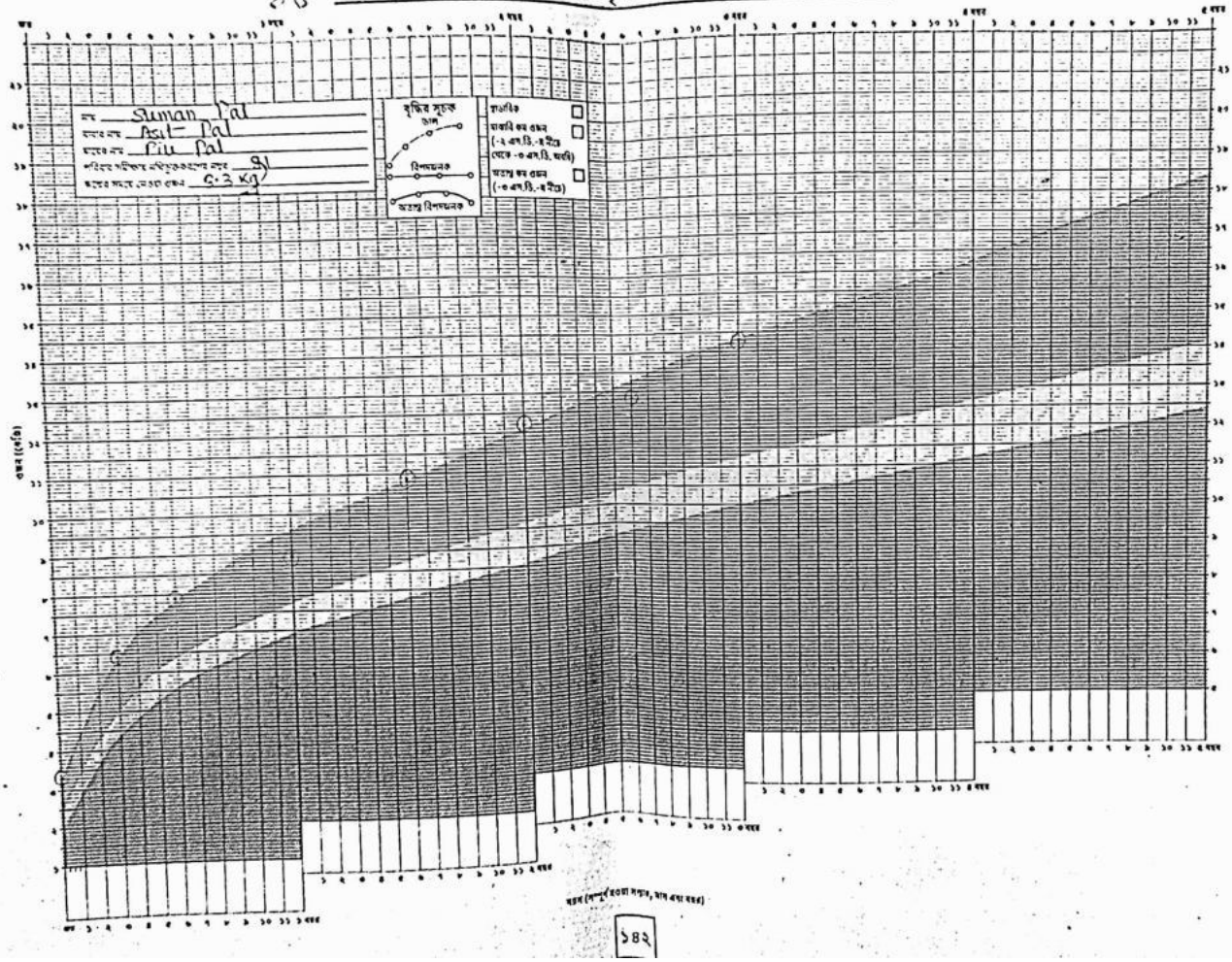

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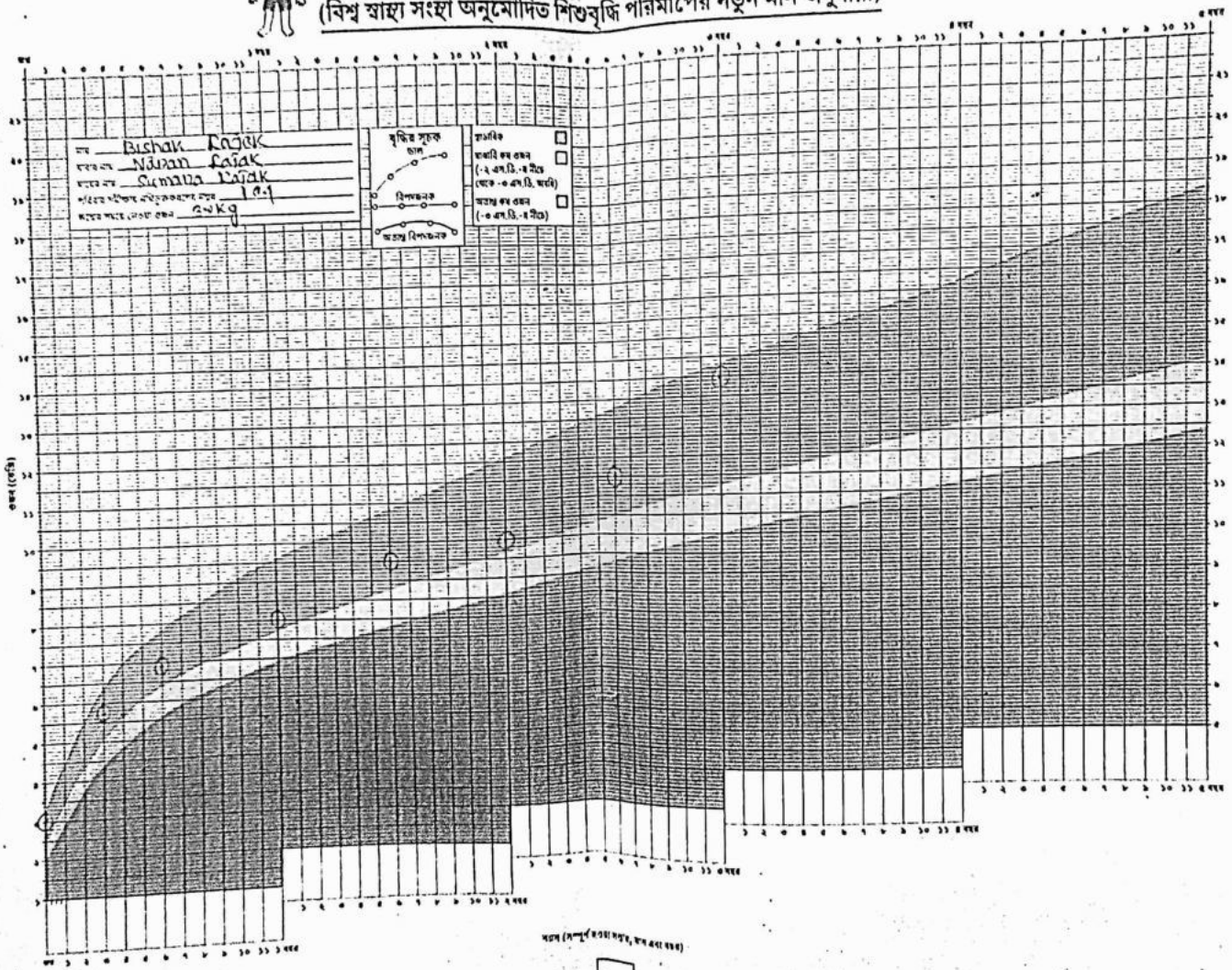
(বিশ্ব স্বাস্থ্য সংস্থা অনুমোদিত শিশুবৃদ্ধি পরিমাপের নতুন মান অনুযায়ী)



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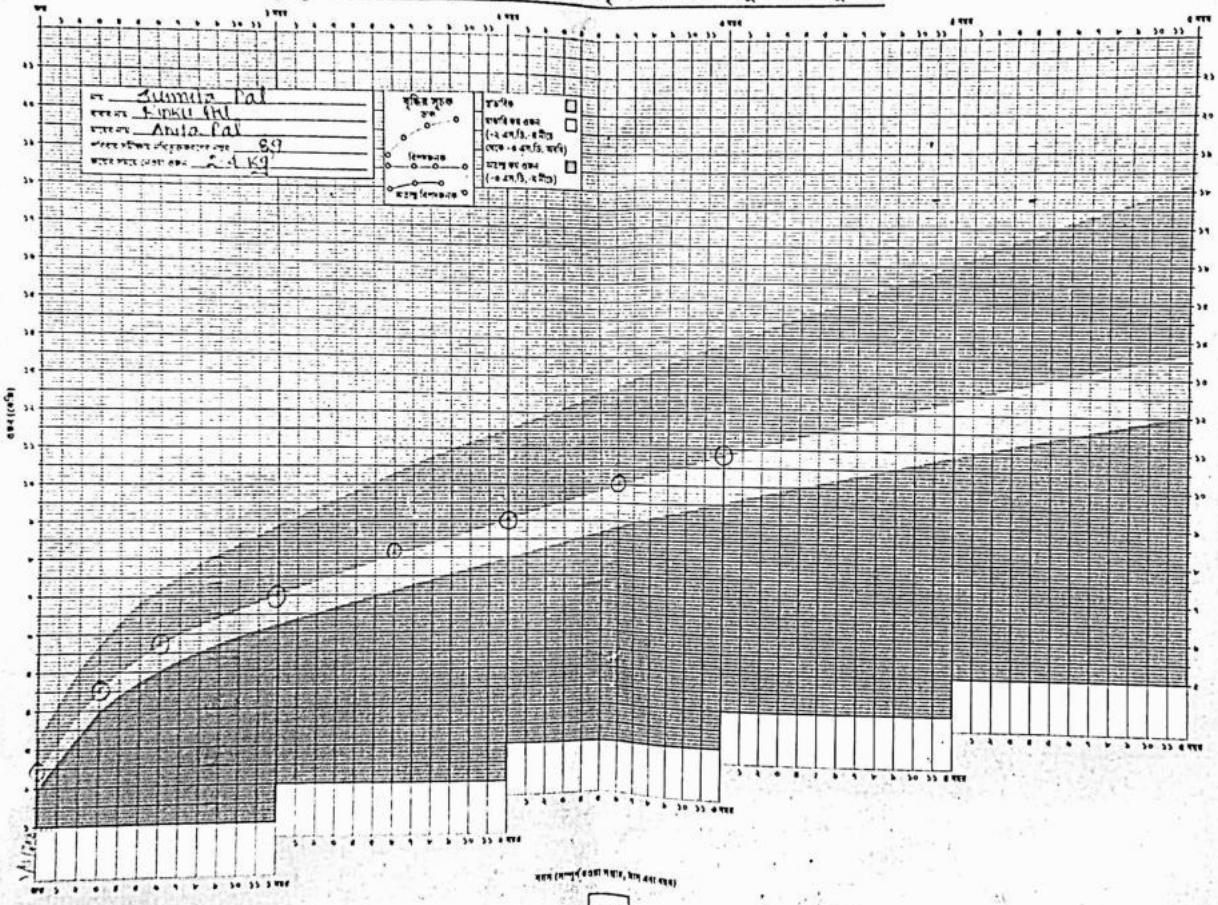
(বিশ্ব স্বাস্থ্য সংস্থা অনুমোদিত শিশুবৃদ্ধি পরিমাপের নতুন মান অনুযায়ী)



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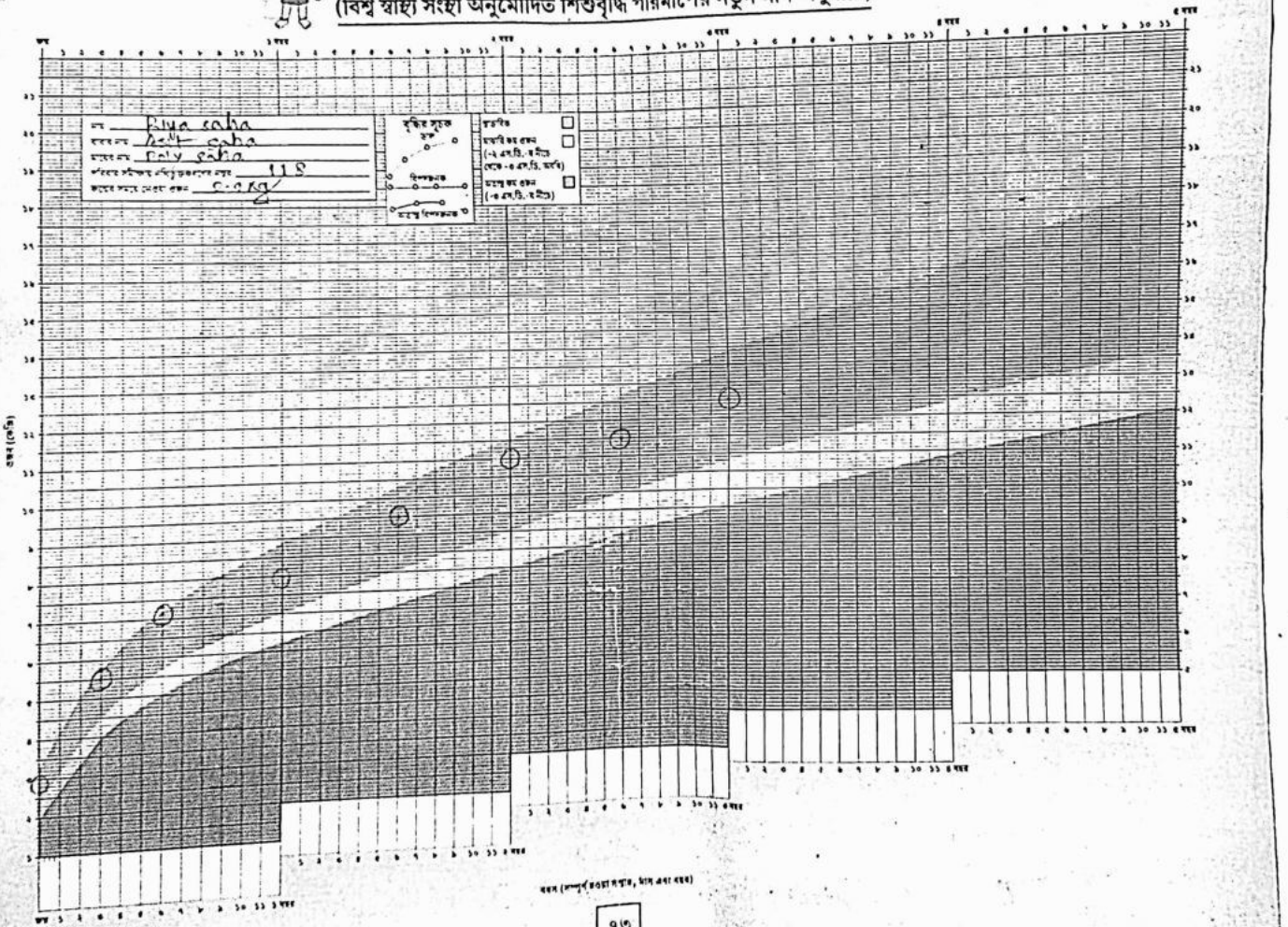
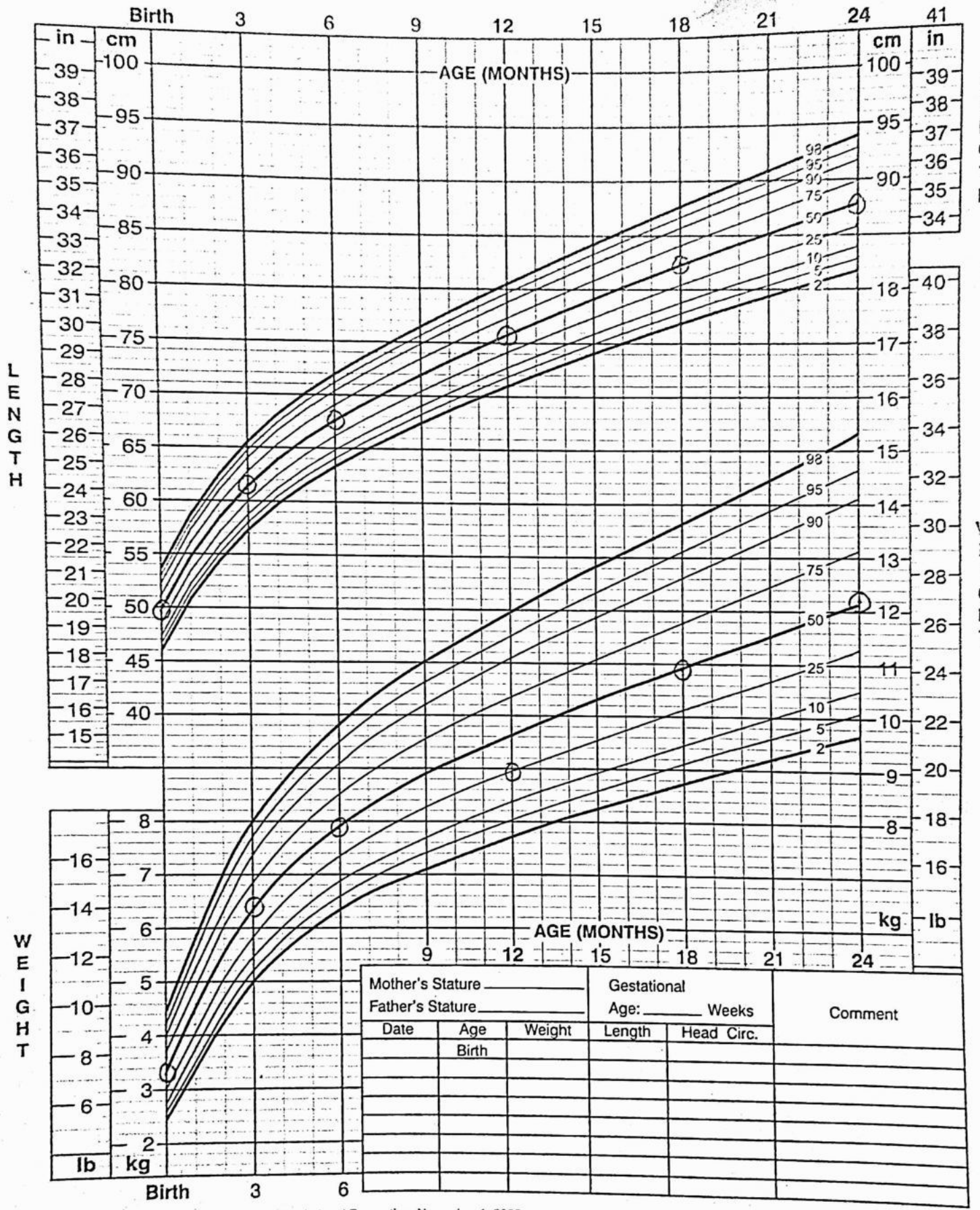


(18)

Birth to 24 months: Boys
Length-for-age and Weight-for-age percentiles

NAME Suman Pal

RECORD #



Mother's Stature _____ Father's Stature _____			Gestational Age: _____ Weeks		Comment
Date	Age	Weight	Length	Head Circ.	
	Birth				

Published by the Centers for Disease Control and Prevention, November 1, 2009
SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth/en)

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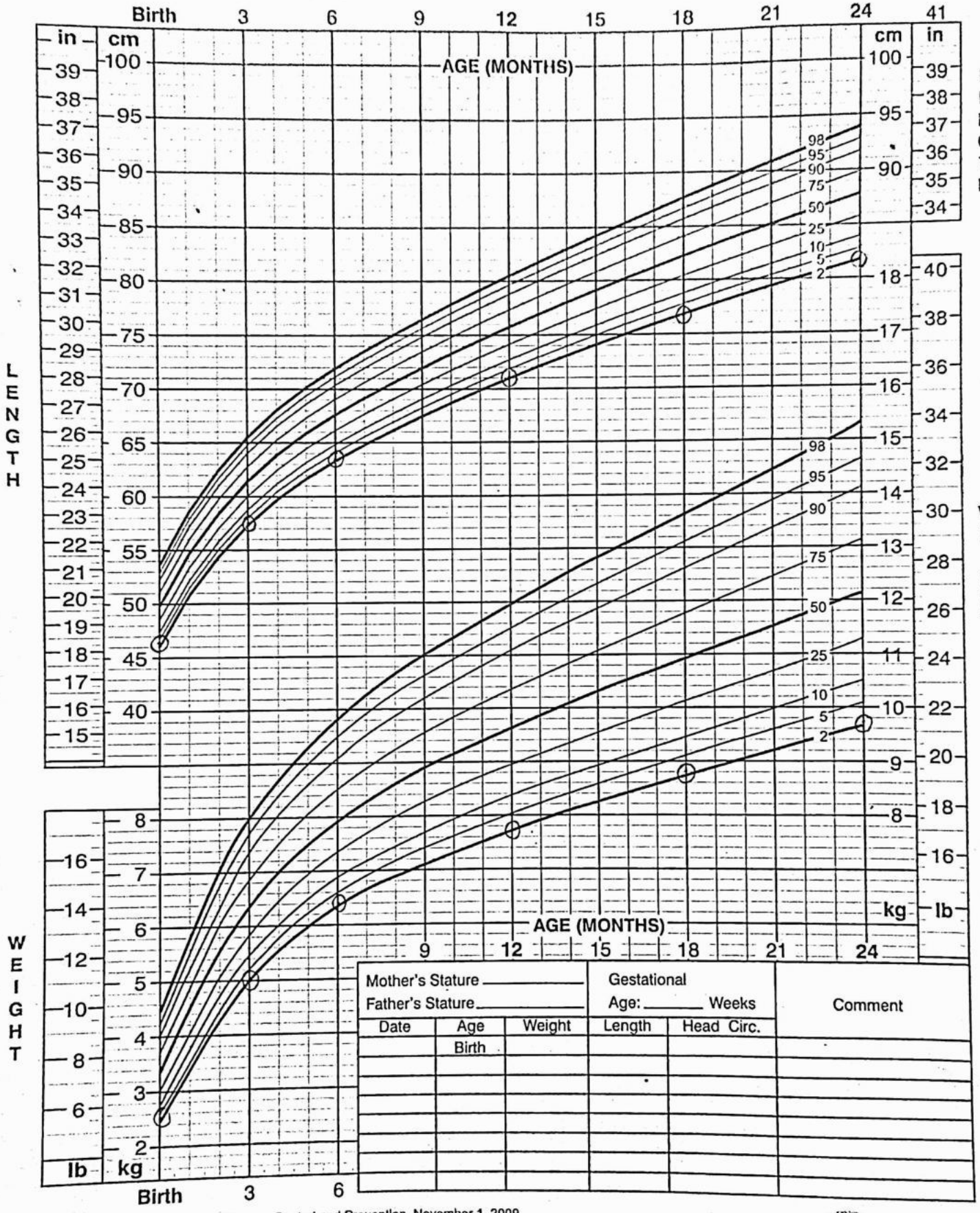
CDC

Birth to 24 months: Boys
Length-for-age and Weight-for-age percentiles

NAME Priyhan Ghosh

RECORD #



Mother's Stature _____ Father's Stature _____			Gestational Age: _____ Weeks		Comment
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Published by the Centers for Disease Control and Prevention, November 1, 2009
SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth/en)

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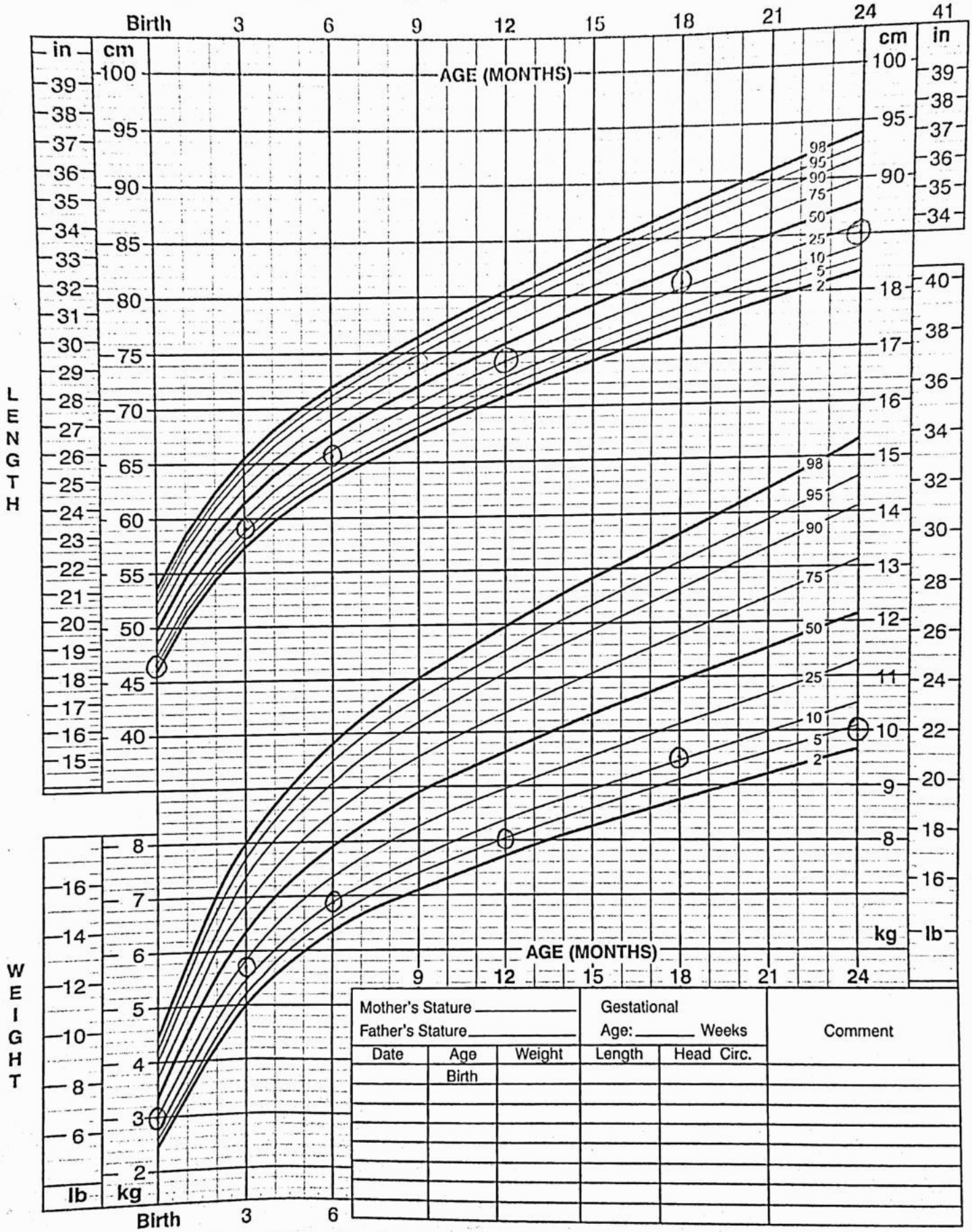
Birth to 24 months: Boys
Length-for-age and Weight-for-age percentiles

NAME Bishal Rajak

RECORD #



Mother's Stature _____ Father's Stature _____			Gestational Age: _____ Weeks		Comment
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SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth/en)

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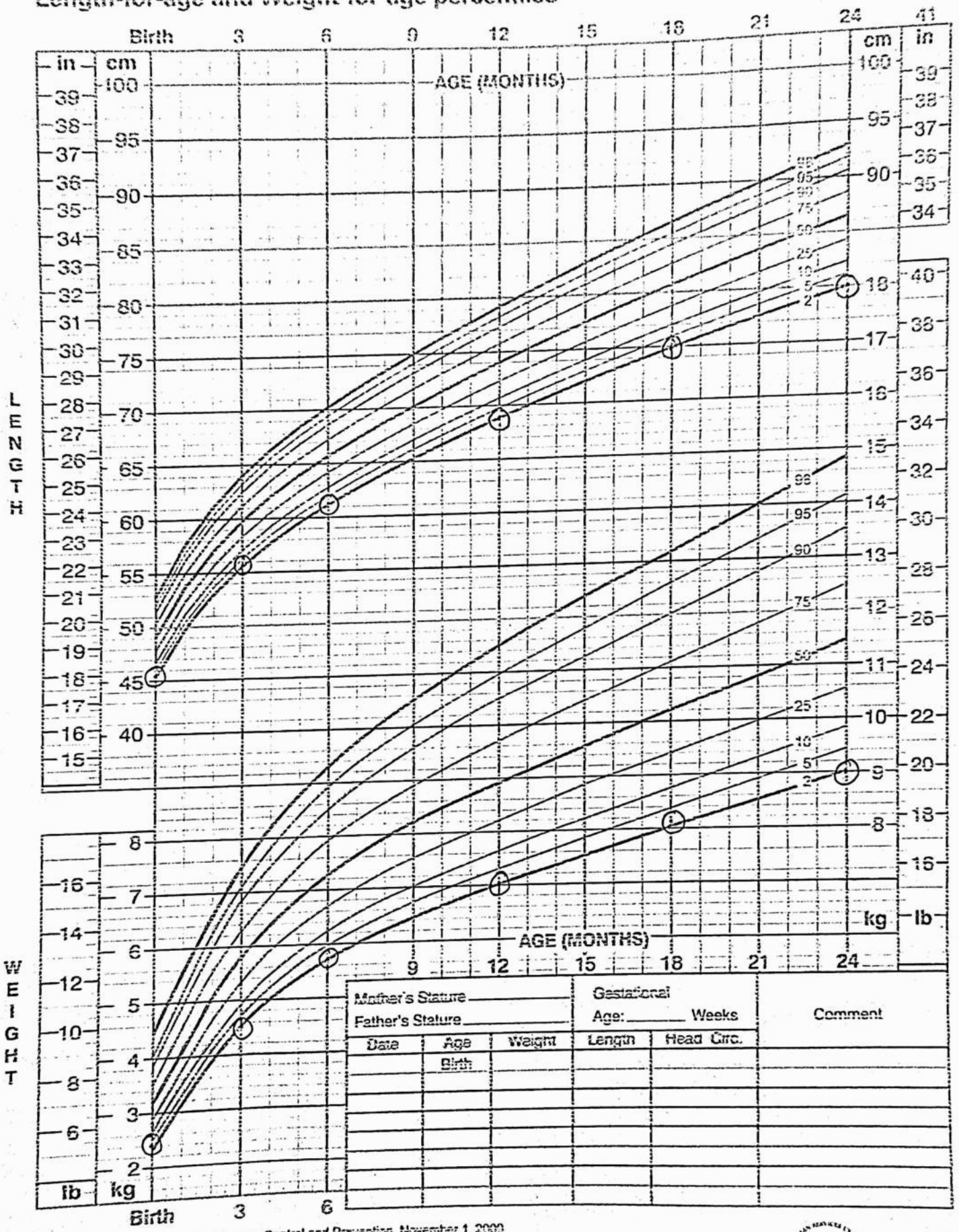
Birth to 24 months: Girls
Length-for-age and Weight-for-age percentiles

NAME Susmita Kaner

RECORD #



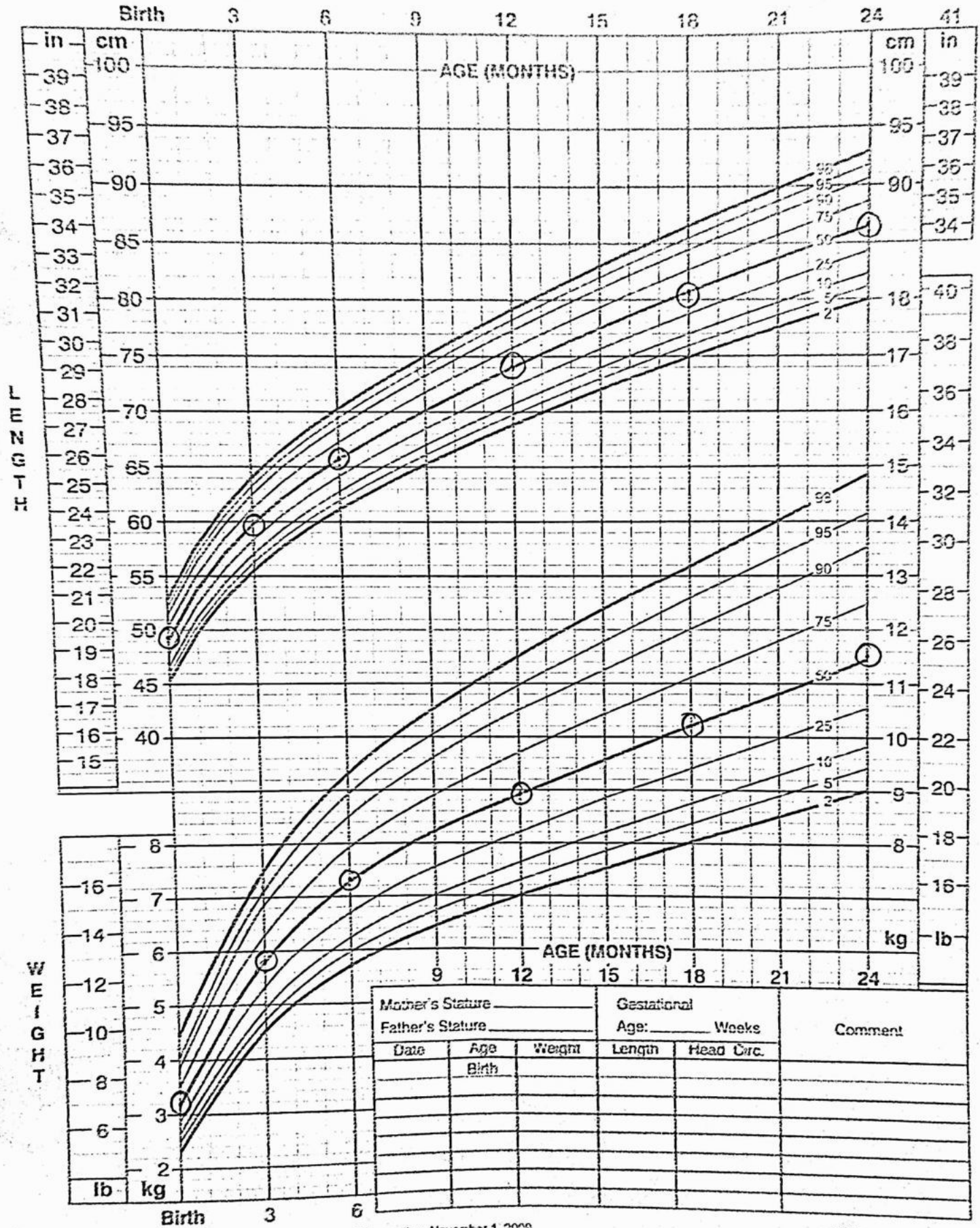
Published by the Centers for Disease Control and Prevention, November 1, 2009
SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth/en)

22

Birth to 24 months: Girls
Length-for-age and Weight-for-age percentiles

NAME Priyanka Pal

RECORD #



Mother's Stature _____

Father's Stature _____

Gestational Age: _____ Weeks

Date	Age	Weight	Length	Head Circ.	Comment
	Birth				

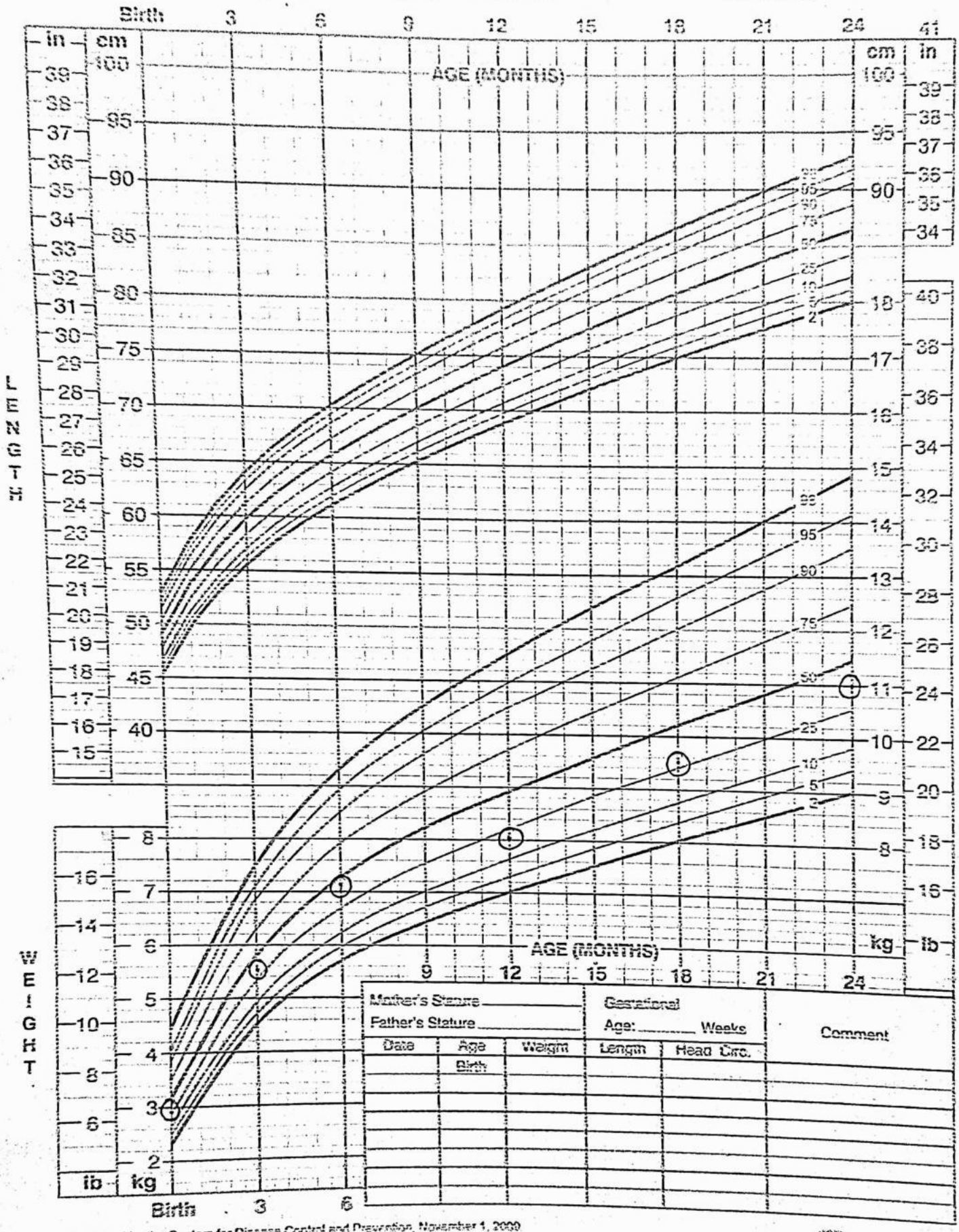
Published by the Centers for Disease Control and Prevention, November 1, 2009

SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth/en)

Birth to 24 months: Girls
Length-for-age and Weight-for-age percentiles

NAME Riya saha

RECORD #



Published by the Centers for Disease Control and Prevention, November 1, 2009
SOURCE: WHO Child Growth Standards (http://www.who.int/childgrowth)

CDC

Instrument Required :-

→ ① weight machine
② Measuring tape
③ Height measuring rod (Anthropometric Rod)
④ Schedule note book
⑤ Pencil and graph paper.

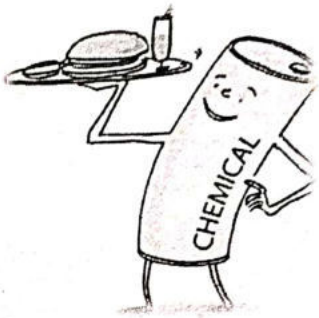
Each child of the ICDS centre were examined physically in the daylight. At first we measured the height in cm and weight in kg by measuring tape and weighing machine respectively. The data was reported in the schedule note book. The data was taken per each student. The age of the children was collected from the centre. Then the data was plotted on the growth chart of India and again the different data of each children was plotted on mm graph paper for their growth monitoring.

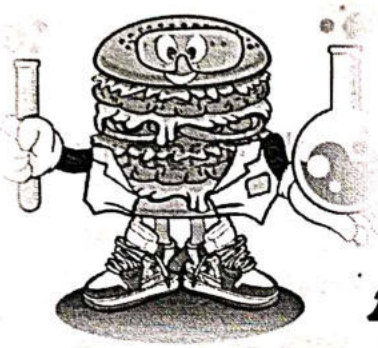
Teacher's Signature .....

Conclusion :->

On collecting the data, the weight and height of any two children (one girl and one boy) was selected and the collected data was plotted on the age to weight graph and Age to Height graph. According to the ICDS curve, the weight and height of two children are normal. Their growth is normal and no trace of malnutrition is absorbed.

THE UNIVERSITY OF BURDWAN





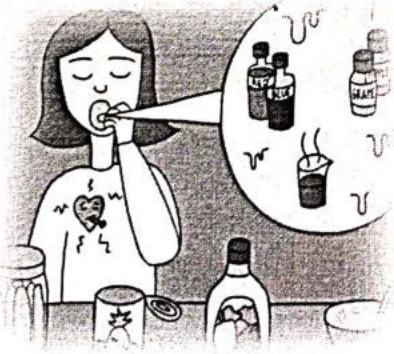
A REVIEW ON RELATIONSHIP BETWEEN DIFFERENT TYPES OF PRESERVATIVES AND HUMAN HEALTH

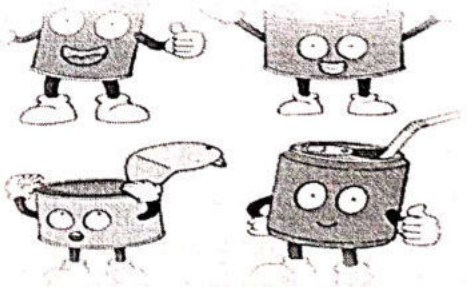
EXAMINED
Department of Nutrition
Guskara Mahavidyalaya

Submitted by –

Sneha Chatterjee, Roll No- 200311000039

Smriti Ghosh, Roll No- 190311000050





GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. *Date:*

CERTIFICATE

This is to certify that Smriti Ghosh.

Reg. No.- 201901001565 *of* 2019-20 *&*

Roll No.- 19021100050

of a Bonafede student of B.Sc. Semester- VI *in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled* a review on relationship between different types of preservatives and human health

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/ Term Paper on the above topic for B. Sc. Practical Examination 2023

I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. *Date:*

CERTIFICATE

This is to certify that SNEHA CHATTERJEE

Reg. No.- 202001004818 of 2020-21 &

Roll No.- 20031100039

of a Bonafede student of B.Sc. Semester- ..... *in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled* a review on relationship between different types of preservatives and human health.

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I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

-:CONTENTS:-

AKNOWLEDGEMT:-

Primarily I would thank God for being able to complete this report. First and foremost I would like to thank my parents and tutor for their constant encouragement and moral support, without which I wouldn't able to give my best.

Then, I would like to thank my teachers Dr. Saurabh Sarkar, Assistant Professor, Dept. Of Zoology, and in- charge of Nutrition department and Mr. Santu Nandi dept. Of Nutrition Guskara Mahavidyalaya, for their constant guidance and providing a very nice topic to learn.

I would like to thank Dr.Sabina Begum, Teacher in charge, Guskara Mahavidyalaya, for her constant encourage and support.

Lastly, I would like to thank my classmates who have help in various phases of the completion of project.

We are thankful for everything to our departmental teacher for visiting this horticulture department and we are very thankful to the respected principal and teachers of Dept. of Horticulture, Sikkim University, for unconditional support and very convincing encouragement.

Sneha Chatterjee
Smriti Ghosh.

ABSTRACT:-

Food is an essential thing for human survival, food provides us a source of energy for our daily activities, in the present scenario there as a variety of packaged food availed for our consumption to meet our daily energy requirements in those packaged food preservatives has become essential for increasing the life of food for our consumption. Preservatives delay the food spoilage but on the other hand many of them may lead to health hazards and become essential for increasing the life of food for our consumption. Preservatives delay the food spoilage but on the other hand many of them may lead to health hazards and become carcinogenic to human preservatives generally classified as natural food preservatives (class 1) chemical food preservatives (class 2) and artificial food preservatives (class 3) . There are a variety of food preservatives like sodium benzoate [E211], sulphur dioxide [E220], calcium benzoate [E213], aspartem, calcium sulphide might have prolonged health effects on digestive system, hypertension, cardiovascular system, nervous system. Thus, it is recommended to lowering the use of hazardous preservatives for our better health management.

1.INTRODUCTION:-

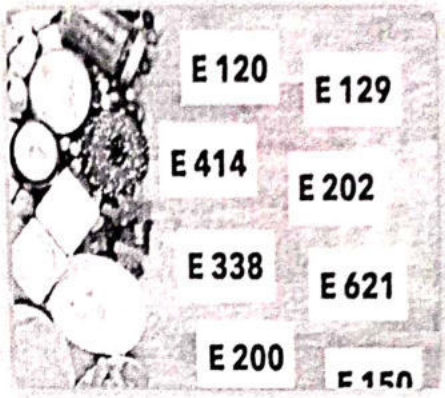
Food is an essential thing for human in our modern life. Human cannot survive a single day of their life without foods. Expect our own garden plants all the foods we use to eat nowadays have preservatives in it. The food has limited shelf life , in order to increase the shelf life and maintain the quality of the food preservatives are used. Preservatives are the substances which were used to prevent the food items from spoilage, which is caused by the microorganisms. We use food preservatives to inhibit the growth of microorganism like bacteria, fungi in it. Food preservation is used among us from the ancient period of time. Food preservatives were become an essential thing nowadays. It plays an essential role in food transportation; this will help the food to prevent spoilage for a long period of time. Each and every packaged food have preservatives in it, otherwise the food items has no longer survive. Radioactive material (cobalt-30) is used as food preservative. Modern packaging techniques like vacuum and hypobaric packaging were also acts as preservation technique. It mainly aims to preserve the appearance, characteristics like Oder, taste etc and to preserve the food for a long time.

Preservatives also have some harmful effects in human body. The additive sodium salt which is commonly used as chemical preservative in food items and it is found mainly in industrialized deinks. Sodium benzoate is considered safe by measurability agencies but there is still controversy over its effect on human health. Many effects like food allergy ; multiple sclerosis ; brain damage ; nausea ; food intolerance ;hyperactivity disorder ;attention deficit ; cardiac disease among other have been reported. Now a day's mostly all food products have preservative. The purpose is generally to preserve the natural characteristics of food and to increase the shelf life of food, and inhibit natural ageing and discoloration that can occur during food preparation. [1]

1.1FOOD-

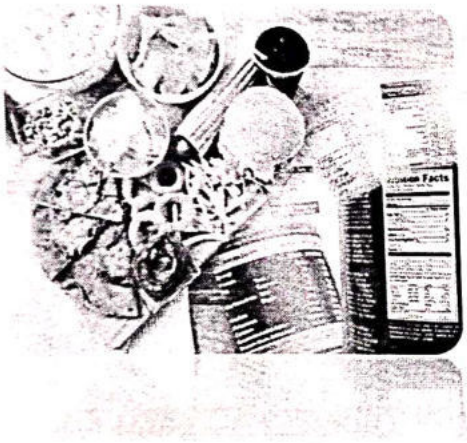
Food is any substances which can consume by organisms for the nutritional support. Food is usually of plant, animal or fungal in origin and contains essential nutrients. These nutrients are essential for growth, development and maintenance of good health throughout life. According to WHO **"food is a substance consisting essentially of protein carbohydrate fat and other nutrients used in the body of an organism to sustain growth and vital processes and to furnish energy."** The absorption and utilization of the food by the body is fundamental to nutrition, it is also facilitated by the digestion. [2]

1.2 PRESERVATIVES-



A preservative is a substance or a chemical that is added to products such as food items , beverages , pharmaceutical drugs , cosmetics , paints , wood , biological amples and many other products to prevent the decomposition by microbial growth or by undesirable chemical changes . In general preservation is devided into two modes chemical and physical. Chemical preservation is adding chemical compounds to the product and physical preservation entails processes like drying or refrigeration. It reduces the risk of food borne illness, decrease microbial growth and preserve fresh attributes and nutrition in the foods. [3]

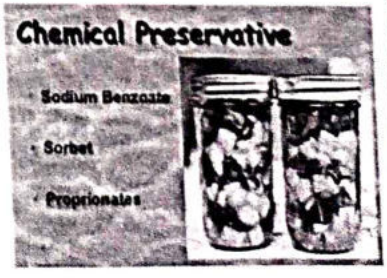
1.3 USES OF PRESERVATIVE IN OUR DAILY LIFE –



Food are an essential thing of our daily life, we can't imagine a single day of our life without food. Food is an essential thing for human survival, food provides us a source of energy for our daily activities, in the present scenario there is a variety of packaged food available for our consumption to meet our daily energy requirements. In those packaged foods preservatives has become essential for increasing the life of food for our consumption. Food preservatives play a vital role in preventing deterioration of the food products, it protect against the spoilage from mold , yeast , life-threatening botulism and other organisms that can cause food poisoning. By extension, preservative reduce food cost, improve convenience, lengthen shelf life and reduce food waste. There are a variety of food preservatives like sodium benzoate [E211] , sulphur di-oxide [E220] , calcium benzoate[E213] , aspartame , calcium sulphide might have prolonged health hazards on digestive system , hypertension , cardiovascular system , nervous system etc . Thus, it is recommended to lowering the use of hazardous preservative for our better health. [4]

1.4 CLASSIFICATION OF PRESERVATIVE-

Preservatives are classified as Natural food preservatives, Chemical food preservatives and Artificial preservatives:-



1) ***Natural Preservatives*** – Natural preservatives belongs to natural sources which also exhibit preservative effects in foods.

Example of class 1 preservatives is sugar, salt, vinegar, honey, spices, edible oils etc.

2) ***Chemical Preservatives***- Chemical preservatives are obtained by chemical derivation of compounds. Sorbates, Benzoates, Propionates and Sulphites are used broadly as chemical preservatives in fruit processing.
Chemically preservatives are categorized as antimicrobial, antioxidant and antienzymatics.

Antimicrobials: They can destroy the growth of bacteria, yeast and moulds example nitrites and nitrates prevent food poisoning by bacteria in meat products. Sulphur dioxide prevents for the degradation in fruits, wine and beer. Benzoates and sorbates are antifungal agents used in cheese, jams, salads and pickles prevent fungal growth.

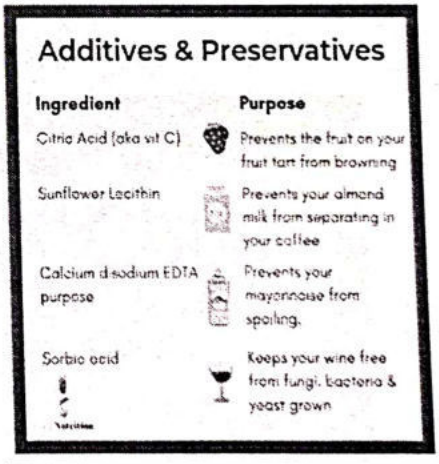
Antioxidants: These slow or stop the breakdown of fats and oils in food that occurs in presence of oxygen proceed to rancidity. There are three types of antioxidants:-

a) ***True antioxidants:-*** BHA , BHT.
b) ***Reducing agents:-*** Ascorbic acid .
c) ***Antioxidantssynergists:-*** Sodium edentate .

Anti enzymatic preservatives: These blocks the enzymatic processes like ripening occurring in food stuffs even after harvest, example erythorbic acid and citric acid stop the action of enzyme phenology that leads to a brown color on the exposed surface of cut fruits.

3) **Artificial Preservatives** – Artificial preservatives are the substances used to prevent spoilage, discoloration and growth of bacteria in food. Sodium benzoate, sorbic acid are the examples of artificial preservatives. [1]

1.5 USES OF PRESERVATIVES IN FOOD PRODUCTS –



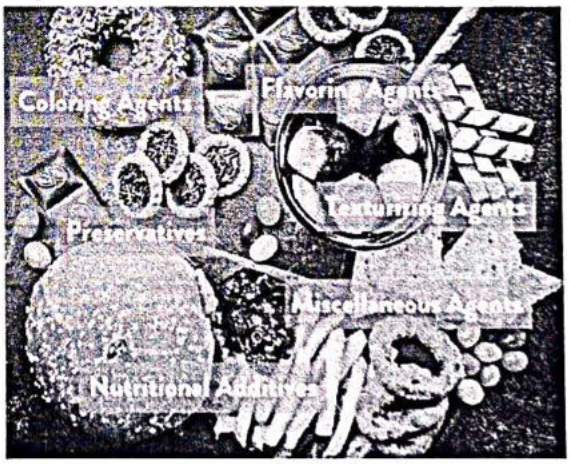
The term preservative refers to the functional name of a variety of natural or synthetic compounds that helps to prevent the bacterial growth in a wide range of products like foods, medicines, personal care etc. Here in this review we only focus in the preservatives which were use in food products.

Preservatives are added in food products to fight against the spoilage caused by the bacteria, fungus, yeast and moulds. Preservative can keep food fresher for longer periods of time and extends its shelf life. It also uses to prevent or slow down the changes in color, flavor or texture and rancidity.

1.6 ***Some examples of food preservatives and their uses in food products are given below –***

Food preservatives	Uses in food products
Sodium and potassium benzoate, benzoic acid	This preservatives were used in pickles , fruit juices , jams , cheese , baked goods , margarine and snacks
Sorbic acid, sodium, potassium and calcium sorbates	This preservatives were generally used in dairy products, bakery goods, syrups, fruit juices, beverages, bakery goods, jellies etc.
Sulfites and sulfur dioxide	This preservatives were generally used in the dry fruits , potatoes , shrimp , lobster etc
Nitrites and Nitrates	These preservatives are generally used in the meat products.
BHA (butylated hydroxy-anisole) &BHT(butylated hydroxytolune)	It is generally used in the baked foods, snacks and meats, breakfast cereals, potato products etc.
Tetra -butylhydro - quinone (TBHQ)	It is used in the baked foods and snacks and meats.
Propionate	This type of preservatives was usually used in the bakery products, cheese and fruits.
Erythorbic acid (iso-ascorbic acid) and citric acid	This type of preservatives was usually used in soft drinks, juices, wines and cured meats.

TABLE NO - 1 [4]

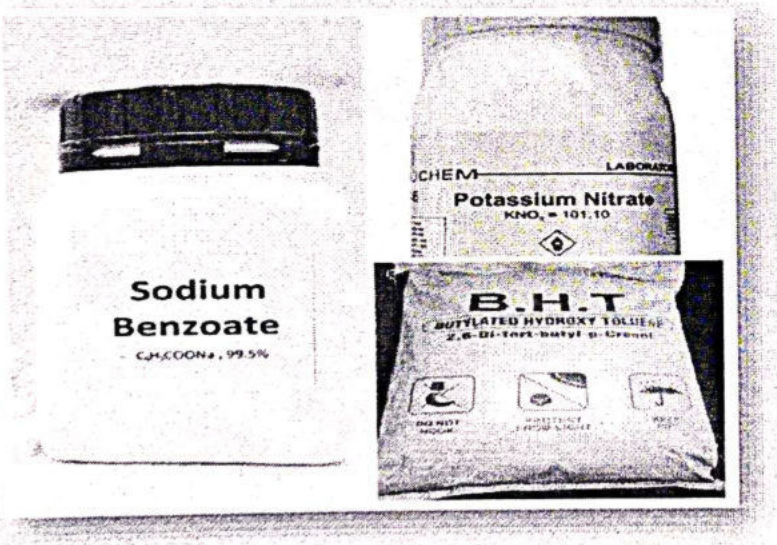


1.7 RECOMMENDED VALUES OF FOOD PRESERVATIVES IN FOOD PRODUCTS

=

PRESERVATIVES	RECOMMENDED AMOUNT
Sodium and Potassium benzoate , Benzoic acid	200ppm
Sorbic acid , Sodium , Potassium and calcium sorbates	200ppm
Sulfites and sulfur dioxide	200-300ppm
Propionates	0.32%
Nitrites and nitrates	100-200ppm
BHA (butylateddhydroxy-anisole) and BHT(butylatedhydroxytoulene).	100 ppm for meat products, 50ppm for breakfast cereals and potato products.
Erythorbic acid (iso-ascrobic acid) and citric acid.	200-350ppm.

TABLE NO - 2 [4]



2.AIMS AND OBJECTIVES:-

2.1 AIMS:-

1. Relation between preservatives & CVD.
2. Relation between preservatives & Kidney.
3. Relation between preservatives & Liver.
4. Relation between preservatives & Digestive system.
5. Relation between preservatives &Hormonal balance.
6. Relation between preservatives &Metabolism.
7. Relation between preservatives & premature ageing.

Relation between preservatives &Cancer.

8. Relation between preservatives & Optical Damage.

2.2 OBJECTIVE:-

- Identify the relations between different types of preservatives and human health.

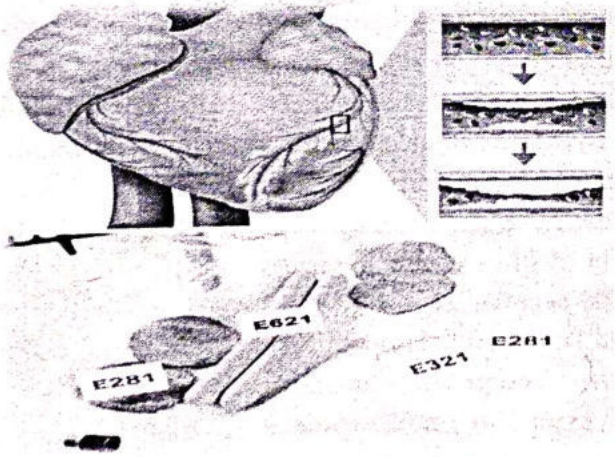
3.REVIEW OF THE LITRATURE:-

Food preservatives are added to food to fight against the spoilages caused by bacteria, fungi , yeast etc . Preservatives can keep food fresh for a long period of time. It is used to slow or prevent changes in colour, texture and delay the rancidity of the food product. Now a day's mostly all food products have preservatives. The purpose is generally to preserve the natural characteristics of food and to increase the shelf life of the food products.

Artificial preservatives are mostly considered safe, but several have negative effects and carcinogenic effects and life threatening side effects in human health. Here we are talking about the effects of food preservatives in our health.

3.1 Relation between preservatives & CVD:-

Heart condition which gets effected by the food preservatives were heart vessels, structural problems, blood clots etc. The most general causes of CVD are higher LDL levels in blood stream that often enters the cardiac cycle and ruins the ideal blood thickness which later keeps increasing heavy amounts of heart wall fats and thus disturbing its rythem of cycle. In the modern times of consumption of packaged and preserved foods the nutrition leads to dissolution of preservatives in blood stream as well. Also shows up similar LDL disposition tendency on heart walls and hence ends up pulling CVD conditions.



Food preservatives(sodium nitrate, aspertame, BHA and BHT) taken with foods.

⇩

Increase the amount of LDL in blood and thicknes it.

⇩

Thus cause blockage in heart walls and disturbes the heart rythem, causing CVD in human.

Chart No- 1

3.2 Relation between preservatives & Kidney:-

Intake of food preservatives (like sodium benzoate) through the food products.

⇩

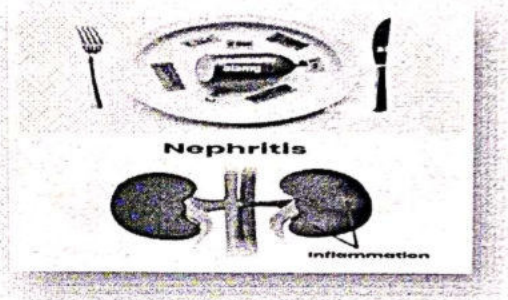
It damages the kidney 's stracture and functions and effects nephrones.

⇩

Which leades to the disfunction of kidneys causing nephrities or kidney damage.

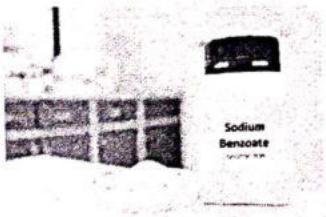
Chart no – 2

Generally the threats caused in the kidneys were followed by a resulting condition known as Nephritis, which means kidney disease. Nephritis can be caused due to a several reasons but in the modern era of hustle bustle the consumption of pre packaged foods is great role player where the preservatives used are a threat caused by kidney. The used preservatives often tend to pull sediments on nephrons and hence ends up creating blockage on the zones not only blockages but also these preservatives often tend to damage the nephron cells. Hence including severe issues of kidney sensitivity by triggering the release of creatinine and GH in excess and putting its way to worse.



3.3 Relation between preservatives & Liver:-

Mostly the general factors that concern the liver damage are liver diseases, which are hypertonic liver and hepatitis (HA, HB, HD, and HE.), where liver is prone to lowered food synthesis and hormonal break downs. The actioned damage caused on liver due to preservatives is by continuous sedimentation of calcium and sodium based preservatives mostly along with ketogenic nature preservatives. The sedimentation of preservatives causes hypertonicity of liver that tends to increase liver's mass index and hence ends up liver's secretions and drools effecting the digestive capacity of the liver. The rampant sedimentation of preservatives also shows successful deterioration of liver's antibody effects and makes it as an ideal host to get sacrificed under hepatitis causing viruses which effects the human body by several adverse effects and diseases. The general effect to be considered on preservatives upon liver is statutory sedimentation of them and henceforth leading to lowered liver activity.



Intake of food products which have sodium and calcium based food preservatives with ketogenic nature preservatives.

⇩

It causes hypertonicity of liver that tends to increase liver's mass index and hence ends up liver's secreactions and decreases itd digestive capacity.

⇩

leads to liver diseases which are hypertonic liver and hepatities.

Chart No- 3

3.4 Relation between preservatives & Digestive system:-

The modern period population has become a great victim against digestion and poor GI activity capacity. In this context of digestion the body often gets wrong influence from the heavy chained preservatives in the food products. Food preservatives like titanium dioxide, maltodextrin; saccharin etc effects the intestine and leads to IBD. They activate the inflammation through the secretion of IL-18 absorbed by phagocytic cells, causing inflammation in the colon mucosa that promotes precancerous changes accumulates in Payer's patches. Hence the lowered capacity of digestion is a tended cause of excessive consumption of preservatives biased foods.

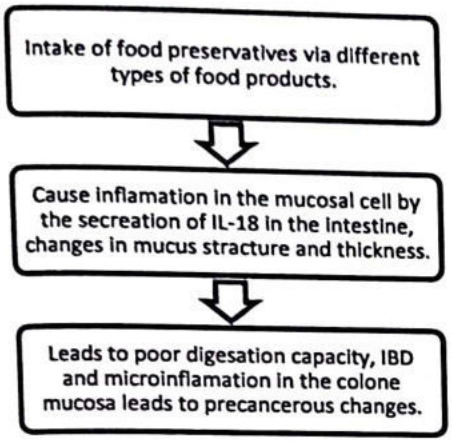
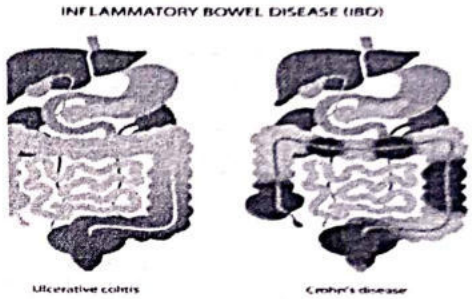


Chart no - 4



3.5Relation between preservatives &Hormonal balance :-

In human body hormones play a greater part of activity on stimulating and relaxing the body, the major hormones being affected due to preservatives are steroidal hormones, which are oxytocin and estrogen in females and testosterone in males, hence reducing their functionality and enhancing the effects of cortisol so a result of low muscle development, improper mood swings and poor blood pressure occurs. Thus it impact a healthy life.

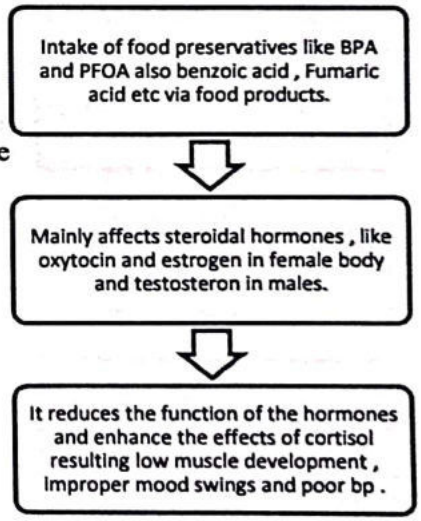
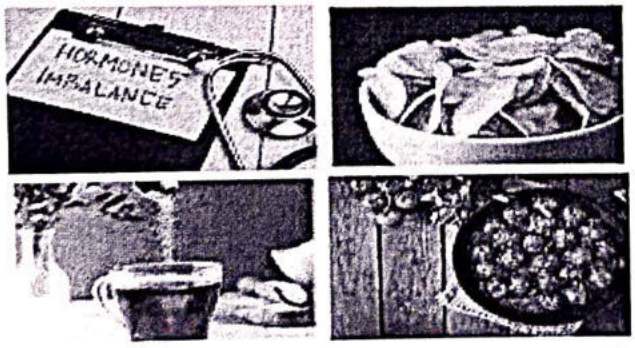


Chart no – 5



3.6 Relation between preservatives & Metabolism :-

Intake of food preservatives via food products.

⇩

Heavy sedimentation of food preservatives effects the working capacity of the liver.

⇩

As a result liver losts its working capacity and goes through a hyper tonic stage becoming unstable and low functional in nature .

The impact on metabolism is an unavoidable factor where the liver is tend to lower its capacity to break down and use up of taken molecules as the heavy sedimentation of preservation are one of the vital cause where liver is forced as a hyper tonic stage becoming unstable and low functional in nature. It also cause IBS and IBD in GI tract .It disrupts the mucosal barrier leading to inflammation.

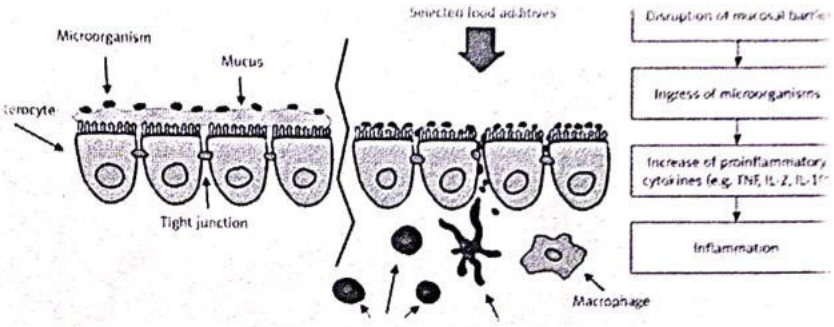


Chart no – 6

3.7 Relation between preservatives & Premature ageing :-

This is also a general factor that is observed in now a day's lifestyle where youth are being prone to insane laziness and fatigue which is a major symptomatic factor for premature aging besides low digestion, poor sleep and depressed thoughts, these factors are able by the action of preservatives that are consumed from packed foods of all forms due to busy lifestyle in the modern era. The symptoms of premature ageing are very often induced due to production of ROS or free radical in higher amount.

Intake of heavy dose of food preservatives via packaged food products.

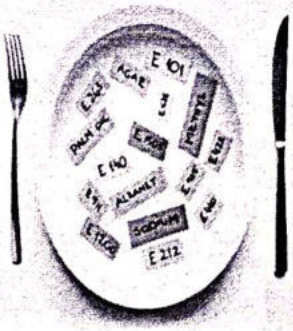
⇩

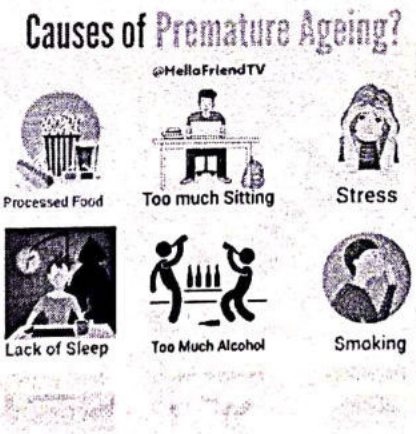
Formation of ROS or Free readical in the blood stream.

⇩

As a result low digesation,poor sleep, depressed thoughts were occuring in the people leading them to the premature ageing.

Chart No - 7





3.8 Relation between preservatives &Cancer :-

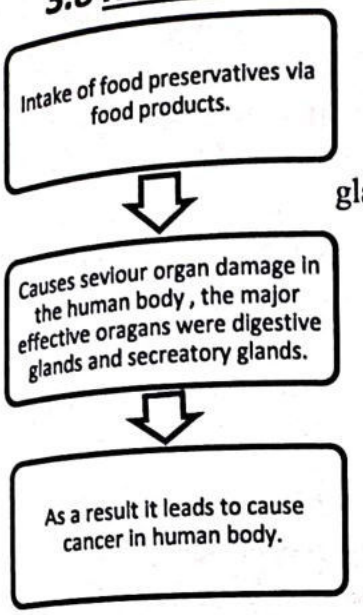
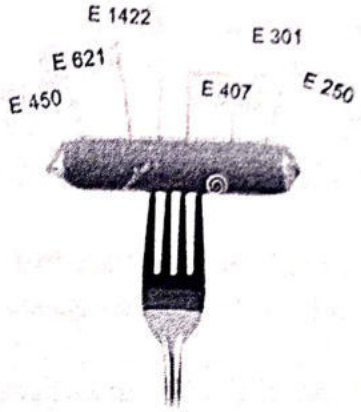


Chart no - 8

One of the brutal affect which is unavoidable is the deadly diseases cancer. It can be triggered due to the severe organ damage potential of the preservatives in our body. The major effected organs are digestive glands and secreatory glands of the human body. The cause of cancer induced by the preservatives on a severe resultant cause of production of free radical in higher amounts.



3.9 Relation between preservatives & Optical Damage :-

The optic nervous system is often prone to heavy damage due to preservatives sedimentation as a direct cause but that's not the major issue. Issue shoes up as due to heavy tendency of NIDDM (Non Insulin Dependent Diabetes Mellitus / type 2 Diabetes Mellitus) this happens as of the nervous system gets damaged and later on the optical leg is observed as a cause.

[5,6,7,8,9,10,11,12,13,14,15]

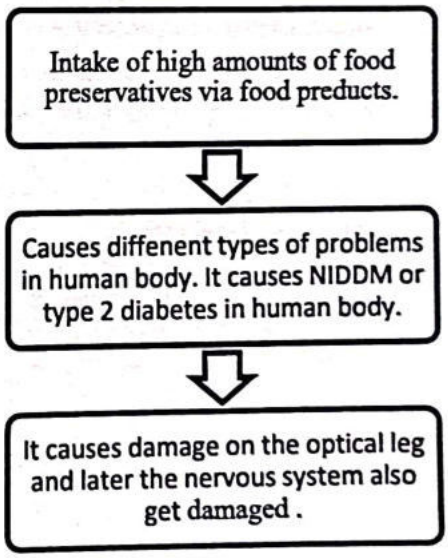
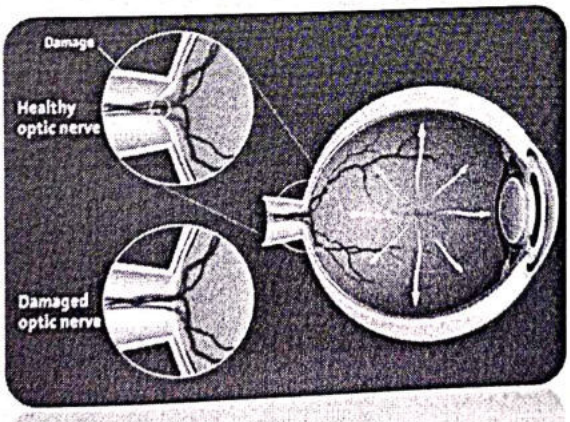


Chart no – 9

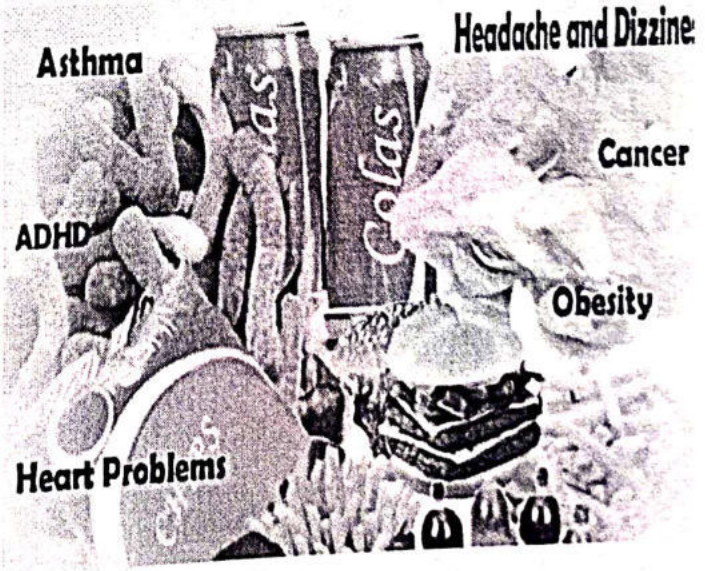


4.DISSCUSION:-

In this project we were studying about different types of food preservatives and its effects on our daily life and health. Preservatives were generally used to prevent any type of microbial growth in food products and make the food products safe to eat. But a constant level of intake of these preservatives for a long period of time can effect our health in several ways. It can cause seviour kind of diseases in our body, the consequences of consumption of preservatives in food products cannot be avoided by the modern conscious machines, but the consumption can be minimized to lower the effects of the caused. Till some measures that can be taken to minimize the effects were-

1. Cravings of the preserved food needed to minimize and the only way to control the craving is to supply body with ample water.
2. The another way to lower the effects caused in the busy barbaric life style of human beings by the consumed food is to provide body with enough amount of vitamins, minerals and water.
3. The best way to deal with the adversity caused by the preservatives in our body is that by lower the intake of preserved foods and increasing the intake of freshly cooked home food.
4. Prefer choosing the best alternative from the sources of the foods and thus making a easy and smart move while satisfying both body and taste buds.

However these are just measures that should be taken in to task by every conscious lives on earth working from dawn to dusk without caring about their health. Although the valid proverb prevention is much better than curance must be kept in mind before taking any steps forward and making any move.



5. SUMMARY:-

Food being a great need of the daily life plays vital maintenance role in maintaining the entire body and its functions. Thus with the modern times of hustle bustle and grinding the body type is now under a maintained hyperbolic declining slope due poor nutrition because of heavy consumption of packaged foods. These consumed packaged foods are being enhanced with a endured shelf life by the use of preservatives of mostly second class types. Thus we can much clearly notice that the consumption of food nutrients are minimized and consumption of enhanced anti nutrient based preservatives is maximized with those packaged preserved foods. Hence the famous saying of "Hippocrates-The father of medicine" let food be the medicine , let medicine be the food is now defamed by the modern habits of the habitants causing food as a toxin and toxins as food. Thus here we concluded with the harmful effects of the preservatives in this paper.

6.CONCLUSION:-

Preservatives are used to increase the shelf life of food and to maintain the quality for longer time. Synthetic food additives react with the cellular component of the body leading to the various food effects. If we must use food additives, because of their advantages, they should be the normal ones which have minimal effects .Those that are generally recognized as safe and in the case of those that are generally recognized as safe and in the case of those not generally recognized as safe .The acceptable daily intakes should not be exceeded. To minimize the risk of developing health problems due to food additives and preservatives one should avoid the foods containing these additives and preservatives. Before purchasing the canned food, its ingredients should be checked. Purchase only organic foods, which are free from artificial additives and preservatives.

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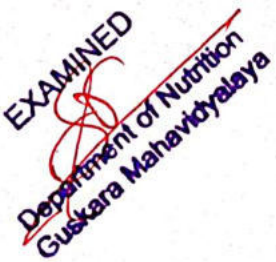

THE UNIVERSITY OF BURDWAN

Comparative Study Between Rice bran Oil, Sunflower Oil & Soyabean Oil

B.Sc. HONOURS IN NUTRITION

6th SEMESTER

GUSHKARA MAHAVIDYALAYA

By

SUDESHNA BHATTACHARJEE

&

MAHIMA DALUI

GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No. Date:

CERTIFICATE

This is to certify that Sudeshna Bhattacharjee

Reg. No.- 202001004828 of 2020-21 &

Roll No.- 20031100048

of a Bonafede student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Comparative Study Between Rice bran oil, Sunflower oil, Soyabean oil

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/ Term Paper on the above topic for B. Sc. Practical Examination 2023

I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Guskara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA.
E-mail: office@gushkaramahavidyalaya.ac.in
nutritionhons@gushkaramahavidyalaya.ac.in

Ref No.

Date:

CERTIFICATE

This is to certify that Mahima Dalui

Reg. No.- 20200100479 6 of 2020-21 &

Roll No.- 200311000018

of a Bonafede student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Comparative Study Between Rice bran oil, Sunflower oil, Soyabean Oil.

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I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

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Sudeshna Bhattacharjee.

Mahima Daki

CONTENT

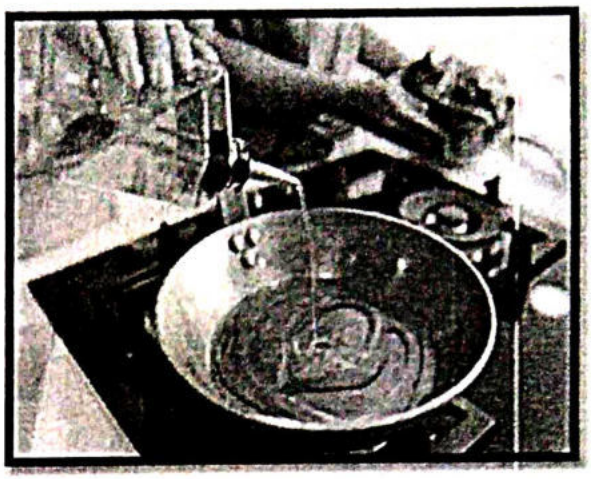
Comparative Study between Rice Bran, Sunflower oil and Soya bean Oil

ABSTRACT

Oils of plant origin have been predominantly used for food-based applications. Plant oils not only represent a non-polluting renewable resource but also provide a wide diversity in fatty acids (FAs) composition with diverse applications. Besides being edible, they are now increasingly being used in industrial applications such as paints, lubricants, soaps, biofuels etc. In addition, plants can be engineered to produce fatty acids which are nutritionally beneficial to human health. Thus, these oils have potential to 1) substitute ever increasing demand of non –renewable petroleum sources for industrial application and 2) also spare the marine life by providing an alternative source to nutritionally and medically important long chain polyunsaturated fatty acids or 'Fish oil'. The biochemical pathways producing storage oils in plants have been extensively characterized, but the factors regulating fatty acid synthesis and controlling total oil content in oilseed crops are still poorly understood. Thus understanding of plant lipid metabolism is fundamental to its manipulation and increased production. This review on oils discusses fatty acids of nutritional and industrial importance, and approaches for achieving future designer vegetable oil for both edible and non-edible uses. The review will discuss the success and bottlenecks in efficient production of novel FAs in non-native plants using genetic engineering as a tool.

INTRODUCTION

1.1 OIL AND MODERN LIFE



(https://images.app.goo.gl/kMuncFdGatYxoTxQ7)

Traditionally, Indians have broadly used two types of edible oils. The first was 'vegetable' oil obtained from crushing local oilseeds — mustard in northern and eastern India; groundnut in Gujarat, Maharashtra, Karnataka and Andhra Pradesh; sesame and groundnut in Tamil Nadu; and coconut in Kerala – in what was known as "Kachchi-Ghani" (cold presses). The second cooking oil medium was 'animal' fat, mainly desi-ghee prepared from milk. India's monthly requirement is about 1.9 million tones and operates at 30 days stock against which currently holding stock of 2.662 million tones, equal to 42 days requirement. [1]

The first major market revolution came in 1937 when Hindustan Unilever (then Lever Brothers) launched 'Dalda'. This was essentially vanaspati or hydrogenated vegetable oil. The purpose behind hydrogenation by adding hydrogen to convert unsaturated liquid fats into saturated solid fats was to harden and raise the melting point of the oil, which yielded a product mimicking desi-ghee. The higher melting and smoke point (at which the molecules start breaking down) made vanaspati better suited for deep frying than normal vegetable oils. The samosas and vadas fried in vanaspati were crispier. Cooking in vanaspati also extended the shelf life of food, which was a huge deal when only a few homes could afford refrigerators. Above all, it was cheap; even today vanaspati retails at under Rs 80 per kg, as against Rs 350 plus for ghee.

(https://images.app.goo.gl/5DVVhUBVHLbYbFBS6)

Nutritional recommendations regarding the consumption of dietary fats have seen many revisions over the years. However, dietary guidelines from national and international health organizations have consistently emphasized the need to lower the consumption levels of *trans* and saturated fats. The negative effect of *trans* and saturated fats on cardiovascular health is linked to their role in increasing the levels of LDL (low density lipoprotein) also known as "bad cholesterol", in contrast, mono and polyunsaturated fats tend to lower LDL levels, which is why the nutritional guidelines recommend replacing the *trans* and saturated fats in diet with unsaturated fats. Most European countries have already placed strict legislative limits (that more or less corresponds to a virtual ban) on *trans*-fats for quite some years and recently, the US Food and Drug Administration (FDA) has also banned the use of partially hydrogenated oils (the main source of artificial *trans*-fats) in processed foods, the

food manufacturers have three years from now to rework the formulation of their products for complete removal of *trans*-fats. It has been argued recently, that unlike *trans*-fats, saturated fats are not as bad as they are perceived to be and that substituting saturated fat with carbohydrates (in an attempt to lower saturated fat intake) is actually a worse option.

However, the results of meta-analysis do show that there is a clear benefit of replacing saturated fat with polyunsaturated fat and essential fatty acids. Hence, the dietary guidelines with relation to saturated fat (the current consumption limit is less than 10% of total calories) is unlikely to change in the near future. Therefore, food manufacturers are currently looking for ways to formulate their food products without the use of a significant amount of solid fats. However, formulating food products in absence of solid fats is quite challenging as they are responsible for providing the required structure, texture, and mouth feel to the products. [2][3][4]

1.2 OIL DEFINITION

Oil is a viscous liquid that is primarily used in the preparation of food. It is derived from a variety of plant and animal sources and is a common ingredient in many households and commercial kitchens.

Oil is typically obtained by extracting the oil from the seeds, fruits, or nuts of various plants. This is usually accomplished through a combination of crushing, pressing, and/or solvent extraction processes. The resulting oil is then filtered and refined to remove any impurities and improve its shelf life.

While cooking oil is primarily used for cooking and frying, it also has a variety of other applications. It is commonly used as a lubricant in machinery, as a fuel for lamps and candles, and even as an ingredient in some cosmetics and skincare products.

Due to the variety of sources and processing methods used to produce cooking oil, there are many different types and varieties available. Some of the most common include vegetable oils (such as soybean, canola, and corn oil), animal fats (such as lard), and specialty oils (such as sesame or peanut oil).

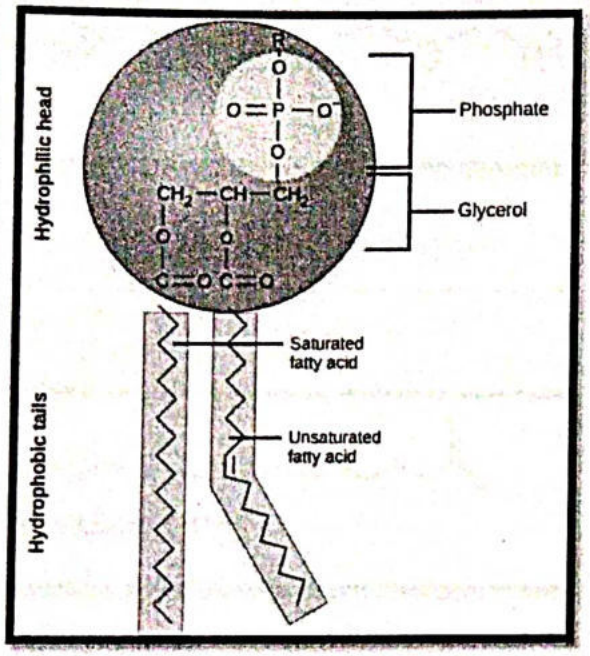
Overall, cooking oil is a versatile and essential ingredient in many aspects of modern life. Whether used for cooking, fuel, or other applications, it plays an important role in our daily routines and is a valuable resource for many different industries.[4]

1.3 CHEMICAL STRUCTURE

The chemical structure of oil varies depending on the type of oil. However, many oils are made up of triglycerides, which are molecules composed of three fatty acid chains attached

to a glycerol molecule. The fatty acids can be either saturated or unsaturated, and the degree of saturation affects the oil's melting point, stability, and health properties.[3]

Phospholipids



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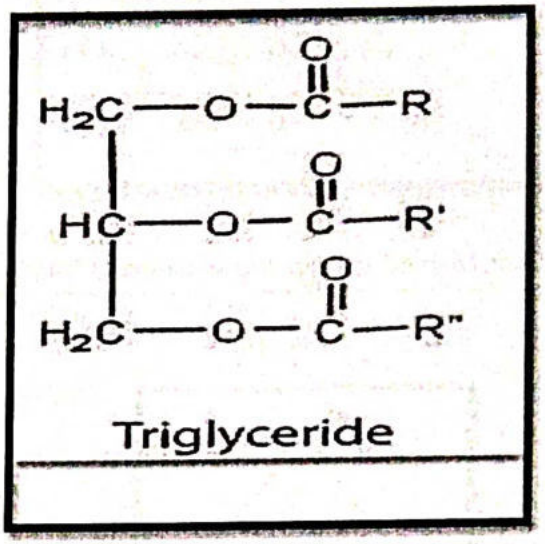
Triglyceride



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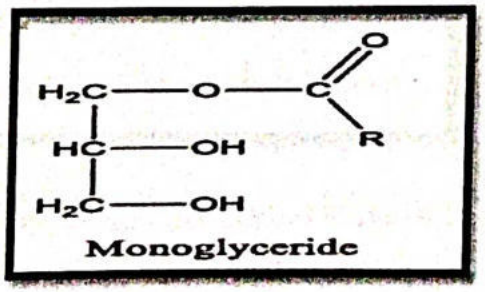
Monoglyceride



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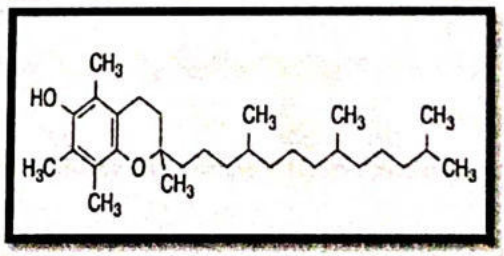
Tocopherol



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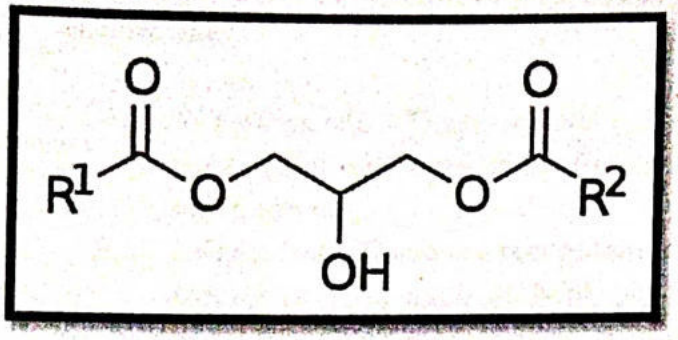
Diglyceride



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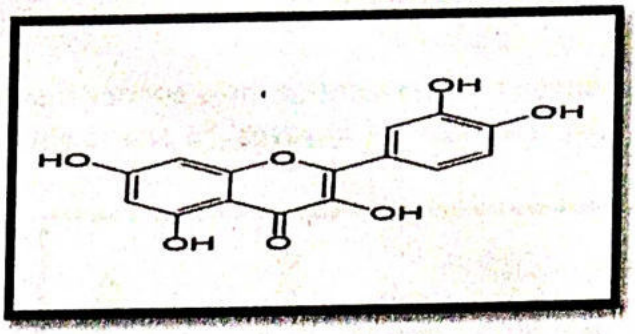
Polyphenols



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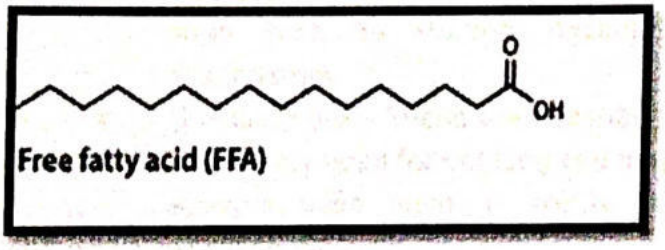
Free fatty acid



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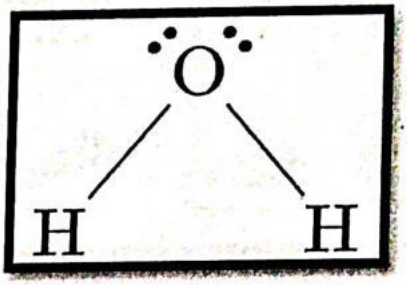

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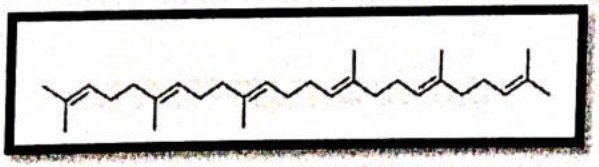
Squalene



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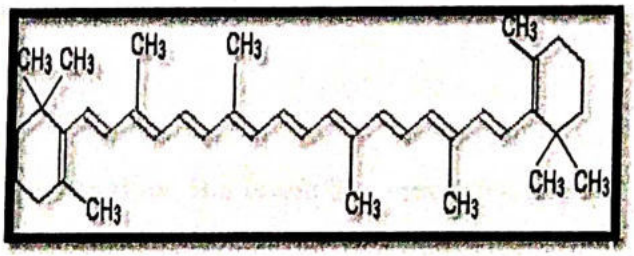
Beta-carotene



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Overall, the specific composition of cooking oil determines its properties and suitability for different types of cooking and food preparation.

1.4 CLASSIFICATION

Cooking oils can be classified into the following categories based on their source and properties:

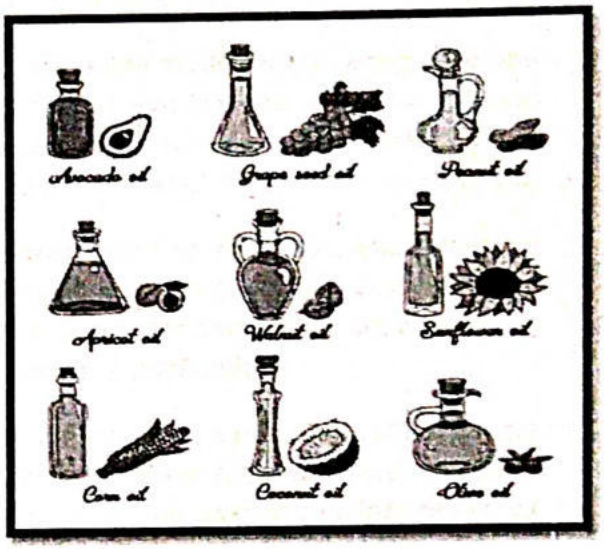
i. Vegetable oils - These are oils extracted from various plant sources such as seeds, nuts, fruits, and vegetables. Examples include canola oil, soybean oil, sunflower oil, and palm oil.

ii. Animal fats - These are fats obtained from animal sources such as beef, pork, and duck. Examples include lard, tallow, and duck fat.

iii. Seed oils - These are oils extracted from seeds of plants such as flaxseed, sesame seed, and grapeseed.

iv. Nut oils - These are oils extracted from nuts such as almond, hazelnut, and macadamia.

v. Specialty oils - These are oils that are not commonly used for cooking and may have specific uses such as truffle oil and avocado oil.



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Cooking oils can also be classified based on their smoking point, which is the temperature at which the oil starts to smoke and break down. High smoke point oils such as canola and peanut oil are suitable for high-heat cooking methods like frying, while low smoke point oils such as olive oil and sesame oil are best suited for low-heat cooking methods like sautéing and salad dressings.[6]

1.5 PROPERTIES OF OIL

The Viscosity - Viscosity describes internal resistance to flow. The lower the viscosity, the thinner and more fluid the lubricating oil.

The pour point - Pour point is the temperature below which the liquid loses its flow properties; Oil flow rates are typically 1 to 2 cc/hr. and as the flow rates are so low, the oil is not usually recovered.

The density: Density was determined in the temperature range of 20 °C - 50 °C, with a 10-degree step increase it based on experimental data. The density of most oils will range between 700 and 950 kilograms per cubic meter (kg/m3).

The flash point: The flash point is the lowest temperature at which an oil develops sufficient vapors under specified conditions and at which a liquid will generate sufficient vapor to flash (ignite) when exposed to a source of ignition or fire.

The smoking point: The temperature at which an oil or fat begins to produce a continuous bluish smoke that becomes clearly visible is also Known as burning point.

Other properties of oils are solubility, compressibility, specific tension etc. [6][7]

1.6 SOURCES OF OILS

Oil can be obtained from various sources, both natural and synthetic. Here are some common sources of oil:

- Petroleum: Petroleum, also known as crude oil, is the most widely recognized and significant source of oil. It is a naturally occurring fossil fuel found in underground reservoirs. Petroleum is extracted through drilling wells and undergoes refining processes to produce various products like gasoline, diesel, jet fuel, and heating oil.
- Vegetable Oils: Vegetable oils are derived from plants and seeds. Common sources include soybeans, canola seeds, sunflower seeds, palm fruits, olives, coconuts, and corn. These oils are extracted through processes like pressing or solvent extraction. Vegetable oils have culinary, industrial, and cosmetic applications.
- Animal Fat: Certain oils are derived from animal sources, particularly from the fat tissues. Examples include tallow (rendered beef or mutton fat), lard (rendered pork fat), and fish oil (derived from fish tissues). Animal fats are used in cooking, industrial applications, and the production of soaps and cosmetics.
- Synthetic Oils: Synthetic oils are artificially produced through chemical processes. They are designed to have specific properties and characteristics for various applications. Synthetic oils can be derived from petroleum or other chemical sources. They are commonly used as lubricants in machinery, automotive engines, and industrial equipment.
- Essential Oils: Essential oils are concentrated liquids extracted from plants, typically through steam distillation or cold pressing. They are highly aromatic and contain the essence or "essential" characteristics of the plant. Essential oils are used in aromatherapy, perfumes, cosmetics, and as flavorings.
- Biofuels: Biofuels are renewable energy sources derived from biological materials. They include biodiesel, which is produced from vegetable oils or animal fats, and ethanol, which is primarily made from corn, sugarcane, or another biomass. Biofuels are used as alternatives to fossil fuels in transportation and energy generation.

It's important to note that while petroleum is a non-renewable resource formed over millions of years, vegetable oils, animal fats, and biofuels are renewable sources. The availability and environmental impact of different oil sources can vary, and there is ongoing research and development into sustainable alternatives to minimize reliance on fossil fuels.[8]

1.7 USES OF OIL

Oils have numerous uses across various industries and in everyday life. Here are some common uses of oils:

1. Cooking: Oils such as vegetable oil, olive oil, coconut oil, and others are widely used in cooking and baking. They provide flavor, aid in food preparation, and are used for frying, sautéing, and as salad dressings.
2. Lubrication: Oils, including motor oil and lubricating oils, are essential for reducing friction and wear between moving parts in machinery, vehicles, and engines. They help to prevent corrosion, cool the components, and ensure smooth operation.
3. Skincare and cosmetics: Many oils, such as coconut oil, argan oil, jojoba oil, and almond oil, are used in skincare and cosmetic products. They can moisturize, nourish, and protect the skin, hair, and nails, and are often found in lotions, creams, serums, and hair treatments.
4. Pharmaceuticals: Certain oils, like fish oil and flaxseed oil, are used as dietary supplements due to their high omega-3 fatty acid content. They are believed to have various health benefits, including reducing inflammation, improving heart health, and supporting brain function.
5. Aromatherapy: Essential oils extracted from plants are widely used in aromatherapy for their therapeutic properties. They are often diffused or used topically to promote relaxation, relieve stress, enhance mood, and provide other benefits.
6. Industrial applications: Oils are utilized in numerous industrial processes. For example, mineral oil is used as an insulator in transformers, hydraulic oil is used in machinery, and cutting oils are used in metalworking to cool and lubricate cutting tools.
7. Fuel: Oils, particularly fossil fuels like petroleum and diesel, are major sources of energy for transportation, power generation, and industrial processes. They are burned in engines and power plants to produce heat, mechanical work, and electricity.
8. Painting: Artists and painters use various types of oils, such as linseed oil, walnut oil, and poppy seed oil, as mediums for mixing with pigments to create oil paintings. These oils provide a long drying time, smooth texture, and rich colors.
9. Preservation and seasoning: Oils, such as mineral oil or food-grade oils, can be used to preserve and protect wooden surfaces like cutting boards and furniture. Additionally, oils like sesame oil or mineral oil can be used to season cast iron cookware to maintain its quality and prevent rust.

These are just a few examples of the many different applications of oils. The specific type of oil and its properties determine its suitability for various purposes.[8][9]

2. REVIEW:

2.1 *Dr. Frank Hu from the Harvard School of Public Health* conducted a study comparing the health benefits of different types of vegetable oils, including rice bran, soybean, and sunflower oil. He found that all three oils are low in saturated fat and high in unsaturated fats, which can help to reduce the risk of heart disease. However, he noted that rice bran oil is particularly high in antioxidants and may have additional health benefits.[10]

2.2 *Dr. R.K. Sharma from the Indian Council of Agricultural Research* conducted a comparative analysis of rice bran, soybean, and sunflower oil. He found that rice bran oil has a higher smoke point and is more stable at high temperatures, making it suitable for frying and other high-heat cooking methods. He also noted that rice bran oil contains oryzanol, which has been shown to have cholesterol-lowering effects.[11]

2.3 *Dr. David Ma from the University of Guelph in Canada* conducted a study comparing the impact of different vegetable oils on gut microbiota. He found that consumption of rice bran oil led to an increase in beneficial gut bacteria, which may contribute to overall health. However, he noted that further research is needed to fully understand the effects of different types of vegetable oils on gut health.[12]

2.4 *Dr. Andrew Salzman from the University of Kansas Medical Center* conducted a review of the literature on the health effects of soybean oil. He found that soybean oil is rich in omega-6 fatty acids, which have been associated with both positive and negative health effects. He also noted that soybean oil is widely used in processed foods and may contribute to the high consumption of omega-6 fatty acids in the Western diet.[13]

2.5 *Dr. John Weisenfeld from the University of Nebraska-Lincoln* conducted a study comparing the sensory qualities of rice bran, soybean, and sunflower oil in potato chips. He found that all three oils produced chips with similar texture and flavor profiles, but noted that rice bran oil produced chips with a slightly darker color due to its higher antioxidant content. He concluded that all three oils are suitable for use in potato chip production.[14]

3. AIMS AND OBJECTIVE

3.1 AIMS

1). To find out the health impact of different types white oil.

2). To find out the which oil is best for consumption

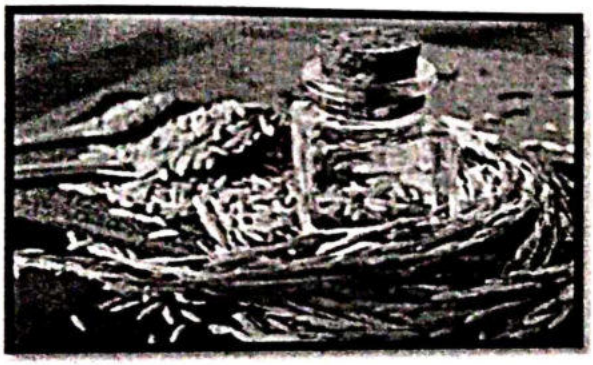
3.2 OBJECTIVE

To develop clear and consistent message about the risk of different types of white oil in our society and improve the general awareness

4. METHODOLOGY

4.1 RICE BRAN OIL

Rice bran oil is a type of vegetable oil that is extracted from the outer layer, or bran, of rice grains. It is produced by first removing the husk and the germ from the rice grain, and then extracting the oil from the remaining bran layer.



Rice bran oil is a rich source of antioxidants, including vitamin E, gamma oryzanol, and tocotrienols, which make it highly stable and resistant to rancidity. It has a light, mild flavor and a high smoke point, which makes it suitable for use in a variety of cooking applications, including frying, baking, and sautéing. [15]

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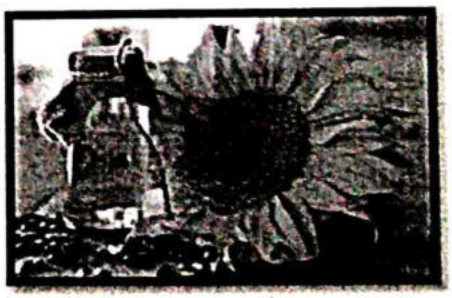
Rice bran oil is also known for its health benefits. It is low in saturated fat and high in unsaturated fats, including both monounsaturated and polyunsaturated fatty acids, which have been shown to promote heart health and lower cholesterol levels. Additionally, rice bran oil contains compounds that may have anti-inflammatory and anticancer properties.

4.2 SUNFLOWER OIL

Sunflower oil is also a type of vegetable oil that is extracted from the seeds of the sunflower plant. It is a common cooking oil and is widely used in both household and commercial kitchens.



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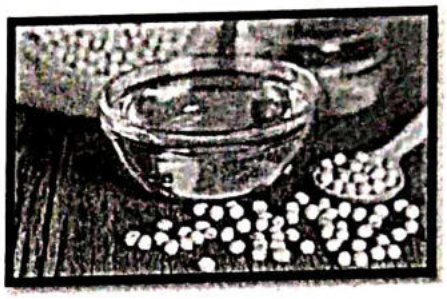
Sunflower oil is produced by pressing the seeds of the sunflower plant to extract the oil. It is a light, clear oil that has a mild flavor and a high smoke point, which makes it suitable for a variety of cooking methods, including frying, baking, and sautéing.

Sunflower oil is also a rich source of vitamin E and other antioxidants, which can help to protect the body from free radical damage and support overall health. It is also high in unsaturated fatty acids, which have been shown to help lower cholesterol levels and reduce the risk of heart disease.

There are two main types of sunflower oil: high oleic and mid oleic. High oleic sunflower oil is made from sunflower seeds that have been bred to have a higher level of monounsaturated fat, making it more stable and suitable for high-heat cooking. Mid oleic sunflower oil has a slightly lower level of monounsaturated fat and is typically used in applications where a milder flavor is desired. [16]

4.3 SOYBEAN OIL



Soybean oil, also known as soy oil, is a vegetable oil that is extracted from the seeds of soybeans, which are a type of legume. It is one of the most widely used vegetable oils in the world and is commonly used for cooking, as well as in the production of a wide range of food products.

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Soybean oil is produced by first cleaning and drying the soybeans, then cracking them into small pieces and heating them to extract the oil. The oil is then refined, bleached, and deodorized to produce a clear, odorless oil that is suitable for cooking.

Soybean oil is a rich source of both polyunsaturated and monounsaturated fats, which have been shown to help lower cholesterol levels and reduce the risk of heart disease. It is also a good source of vitamin E and other antioxidants, which can help to protect the body from free radical damage.

Soybean oil has a mild flavor and a high smoke point, which makes it suitable for a variety of cooking applications, including frying, baking, and sautéing. It is also commonly used as an ingredient in salad dressings, sauces, and marinades. [17]

4.4 SOURCES

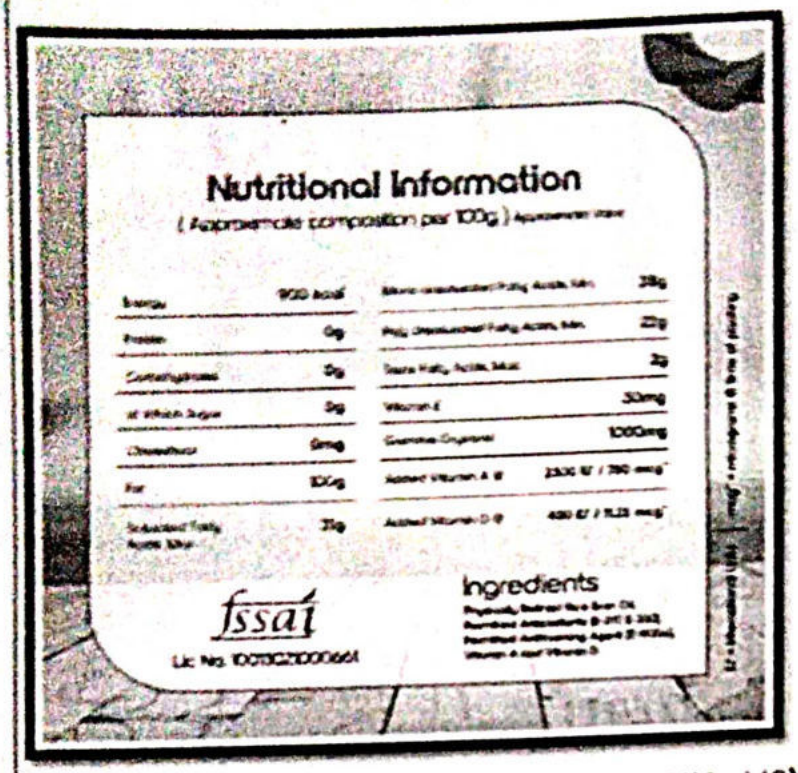
Rice barn oil => Company=> Fortune

Soyabean oil => Company=> Fortune

Sunflower Oil => Company=> Fortune

4.5 INGREDIENTS LIST

1. Rice bran oil



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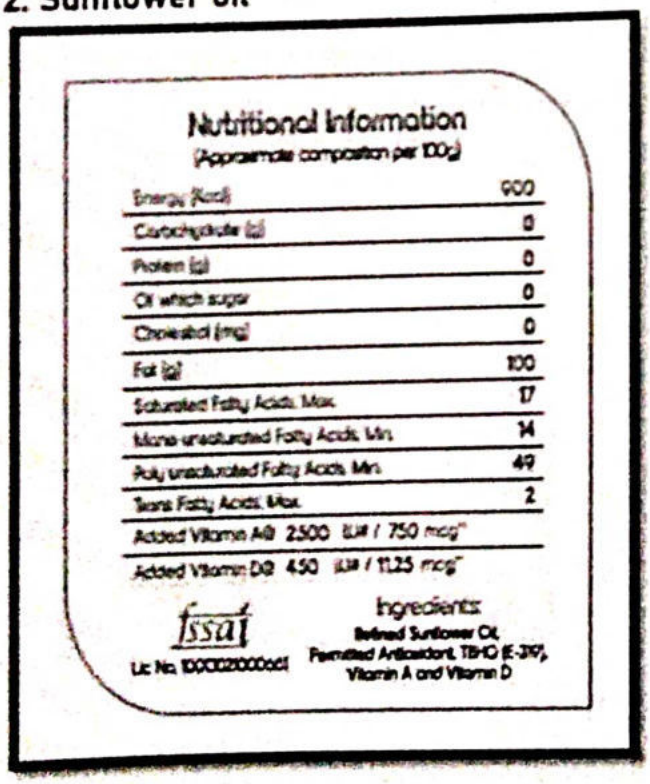
List

Energy – 900 kcal
Protein – 0g
Carbohydrate – 0g
Sugar – 0g
Cholesterol – 0 mg
Fat – 100 mg
Saturated fatty acid (max.) – 31g
MUFA (min.) – 38g
PUFA (min.) – 22 g
Trans fatty acid (max.) – 2g
Vitamin E – 50 mg
Gamma oryzanol – 1000mg
Added vitamin A@ – 2500 IU/ 750mcg.
Added vitamin D@ – 450 IU / 1125mcg.

2. Sunflower oil



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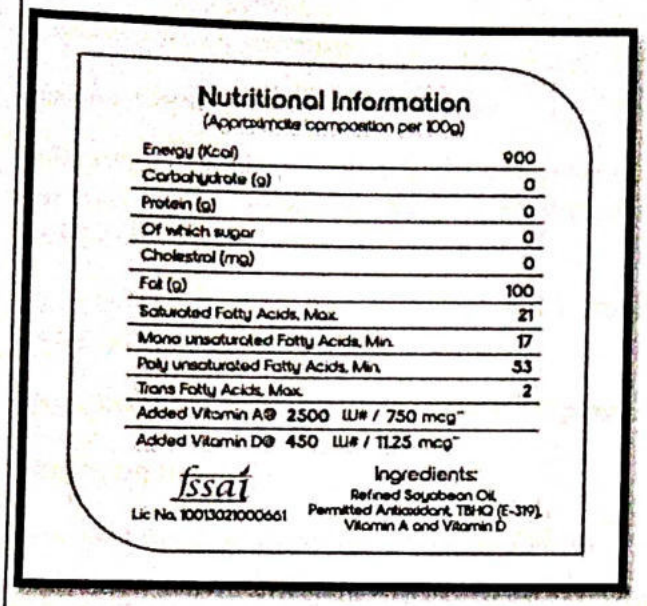
List

Energy – 900
Protein – 0g
Carbohydrate – 0g
Sugar – 0g
Cholesterol – 0 mg
Fat – 100 mg
Saturated fatty acid (max.) – 17g
MUFA (min.) – 14g
PUFA (min.) – 49 g
Trans fatty acid (max.) – 2g
Added vitamin A@ – 2500 IU/ 750mcg.
Added vitamin D@ – 450 IU / 1125mcg.

3. Soybean oil



Nutritional Information
(Approximate composition per 100g)

Energy (Kcal)	900
Carbohydrate (g)	0
Protein (g)	0
Of which sugar	0
Cholestrol (mg)	0
Fat (g)	100
Saturated Fatty Acids, Max.	21
Mono unsaturated Fatty Acids, Min.	17
Poly unsaturated Fatty Acids, Min.	53
Trans Fatty Acids, Max.	2
Added Vitamin A@ 2500 IU# / 750 mcg~	
Added Vitamin D@ 450 IU# / 11.25 mcg~	

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Ingredients:
Refined Soyabean Oil,
Permitted Antioxidant, TBHQ (E-319),
Vitamin A and Vitamin D

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List

Energy – 900 kcal
Carbohydrate – 0g
Protein – 0g
Sugar – 0g
Cholesterol – 0mg
Fat – 100g
Saturated fatty acid (max.) – 21g
MUFA (min) – 17g
PUFA(min) – 53g
Trans fatty acid (max) – 2
Added vitamin A@ 2500 IU / 750mcg
Added vitamin D @ 450 IU / 1125mcg

4.6 DATA ANALYSIS

4.6.1 SATURATED FAT

Fat (100 g)	Rice bran oil	Sunflower oil	Soyabean oil
Saturated fatty acids (max.)	31	17	21

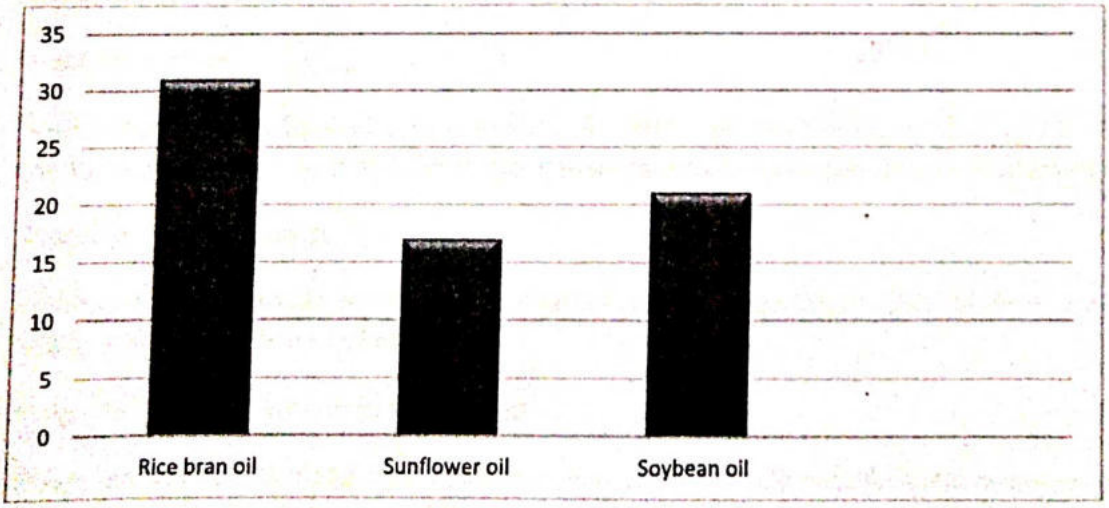

Chart of Saturated fat of 3 types of oil

Is Saturated Fat Healthy?

The short answer is, yes, very healthy.

saturated fat is a key nutrient in the healthiest and most nutrient-dense foods on earth like red meat, eggs, and full-fat dairy. And it plays an essential and supportive role in numerous critical bodily functions.

e.g. - 54% of the fat in human breast milk is saturated fat. This is a strong indicator that it offers critical health benefits.

Let's look at the healthy roles saturated fat plays in the body.

Effects on health

Saturated Fat is an Excellent Source of Energy

Saturated fat is an excellent source of energy and humans have adapted over millennia to thrive on it. We know this because when we eat excess carbs and calories we convert them to saturated fat stores on our bodies.

Our massive, fat-fueled brains are what separates us from our primate ancestors. Our ability to prioritize fat as a primary fuel source is essentially what makes us human.

Supports Cardiovascular Health

In fact, consuming saturated fat in the context of low-carb high-fat diets has been shown to support cardiovascular health. Having lower Lp(a) is generally healthier be it's a carrier for oxidized phospholipids in our blood plasma. Oxidized lipids can embed themselves in your arterial walls creating atherosclerotic lesions. Consuming saturated fat reduces the levels of lipoprotein (a) in your bloodstream and increases "good" HDL cholesterol. The overall effect is the improvement of our heart disease risk factors.

Protects the Liver

Saturated fats have been shown to protect the liver from the effects of alcohol and drugs. In the context of a low-carb diet, SFAs have been shown to alleviate fatty liver disease.

Supports Healthy Lungs

A phospholipid fat made up of saturated palmitic acid keeps the surface of the lungs supple and protects them from irritants.

Supports Healthy Cell and Brain Function

Saturated fatty acids make up a large percentage of our cell membranes. In some areas of the human brain saturated fats make up more than 80 percent of the phospholipids, and over half of the fatty acids in cell membranes are saturated fatty acids.

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THE UNIVERSITY OF BURDWAN

A

Report on workshop visit to The Department of Horticulture, Sikkim University

B.Sc. HONOURS IN NUTRITION

6th SEMESTER

GUSHKARA MAHAVIDYALAYA

Submitted by-

SNEHA CHATTERJEE, SUBHOJIT MONDAL AND SK KHAIRUL BASAR

GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Gushkara, Dist. Purba Bardhaman, PIN 713128, W.B., INDIA
E-mail: [illegible]

Ref No.

Date:

CERTIFICATE

This is to certify that

Sneha Chatterjee

Reg. No.- 20200100 4818 of 2020-2021

Roll No.- 200311000039

of a Bonafede student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Report on Workshop visit to the department of Horticulture Sikkim University

in department of Nutrition, Gushkara Mahavidyalaya as part of curriculum for partial fulfillment of the award of 3-Years degree programme in Bachelor of Science in Nutrition (Honours) from The University of Burdwan.

He is now allowed to submit his Project work/Review work/ Term Paper on the above topic for B. Sc. Practical Examination 2023.

I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Gushkara Dist. Purba Bardhaman PIN 713128 W.B. INDIA
Email: [illegible]

Ref No. Date:

CERTIFICATE

This is to certify that

Subhojit Mondal

Reg. No.- 20200100482 7 of 2020-2021

Roll No.- 20031100004 7

of a Bonafede student of B.Sc. Semester- VI *in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled* Report on workshop visit to the department of Horticulture, Sikkim University

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I wish every success in his/her life.

Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

GUSHKARA MAHAVIDYALAYA

Department of Nutrition

P.O. Guskara Dist. Purba Bardhaman PIN 713128, W.B., INDIA
E-mail: [illegible]

Ref No. Date:

CERTIFICATE

This is to certify that

Sk. Aslaimul Basar

Reg. No.- 202001004815 of 2020-2021

Roll No.- 20031100036

of a Bonafede student of B.Sc. Semester- VI in Nutrition (Honours) of Gushkara Mahavidyalaya under The University of Burdwan, has completed his/ her Project work/ Review work/ Term Paper titled Report on Workshop visit to The Department of Horticulture, Sikkim University.

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Supervisor
Department of Nutrition
Gushkara Mahavidyalaya

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1. Sneha Chatterjee
2. Subhojit Mondal
3. SK Khairul Bosar

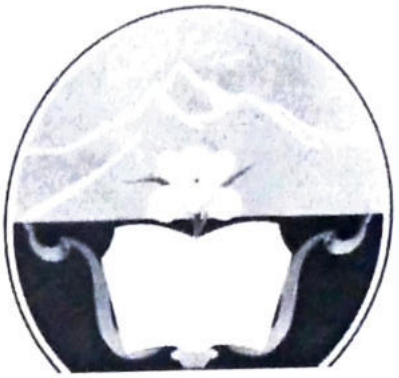
CONTENT

Abstract

Sikkim lies in the Eastern Himalayas between 27° to 28° North latitude and 88° to 89° East longitudes. Its North Border is connecting with the vast stretch of Tibetan Plateau, Nepal in the West, Bhutan and Cumbia valley of Tibet in the East and Darjeeling District of West Bengal in the South. Sikkim climate varies from the Sub-tropical To the Alpine depending upon the altitude. The populace of Sikkim comprises of 14 hill tribes and many plainsmen communities. According to FIBL & IFOAM Year Book 2018, India's rank 9th in terms of World's Organic Agricultural land and 1st in terms of total number of producers. During 2017-18, India produced around 1.70 million Continuing traditional farming and farmers have certain level of knowledge and skills for organic farming. The Large Cardamom, red cherry pepper, cymbidium orchids, ginger, Sikkim mandarin etc. Farmers prefer traditional arbitrational way but farmers are now adopting improved technologies in organic farming system and thus adding Value to the crops which hold the promise to become niche commodities for national and international markets.

1. Introduction of department of Horticulture, Sikkim University

Back in 2003, Sikkim officially took the decision to go organic. In the coming years, Sikkim made a transformational shift from using Chemicals and Pesticides, to imposing a complete ban on them.



In January 2016, Prime Minister Narendra Modi declared Sikkim as India's first, fully organic state.

Department of Horticulture was established in 2009 as one of the foremost professional course departments of Sikkim University, offering integrated B.Sc. - M.Sc. in Horticulture of 6 years' duration. In the year 2013, the department started M.Sc. (Horticulture) and Ph.D. (Horticulture) with four specializations viz. Fruit Science, Vegetable Science, Floriculture, and Plantation, Spices, Medicinal and Aromatic crops.[1]

Teachers' faculty: -			
SL NO.	Name	DESIGNATION	EMAIL ID
1.	PROF. LAXUMAN SHARMA	PROFESSOR, HEAD OF THE DEPT.	isharma@cus.ac.in
2.	DR. NILADRI BAG	PROFESSOR	nbag@cus.ac.in
3.	DR. MANJU RANA	ASSISTANT PROFESSOR	mrana@cus.ac.in
4.	DR. SUJATA UPADHYAY	ASSISTANT PROFESSOR	supadhyay@cus.ac.in
5.	DR. KARMA D. BHUTIA	ASSISTANT PROFESSOR	kbhutia@cus.ac.in
6.	DR. RAJESH KUMAR	ASSISTANT PROFESSOR	rkumar@cus.ac.in
7.	DR. PASHTE VRUSHAL VIJAYKUMARI	GUEST FACULTY	

Lab staff details: -			
SL NO.	NAME	DESIGNATION	EMAIL ID
1.	SHRI GAERAN GURUNG	LAB ASSISTANT	ggurung@cus.ac.in
2.	MS.OMA GURUNG	LAB ASSISTANT	ogurung@cus.ac.in

2. OBJECTIVES

1) The horticulture department of Sikkim University mainly focused in organic farming, climate change residue and development of add a day variety of crops production.
2) To attention the improvement of social and economic nature in food productions.
3) To improve a nutritional quality in food.
4) To improvement long term fertility of soil preparation.
5) Increased a genetic diversity of crops.[2]
6) Promote more usage of natural pesticide in soil improvement.
7) To increase the production and productivity of fruits, vegetable and spices crops.
8) To provide high quality of plants, crops to the farmers.
9) To encourage the farmer to take up cultivation of fruit, vegetable and spices.
10) Horticultural machines are used to help with the cultivation and care of plants, fruits and vegetables.[3]

3. Review of Literature

There is a need to promote seed villages to increase the area under specific crops. This may help to improve quality of seed material. Improving soil fertility by maintaining and building a fertile living soil through the application of organic matter inputs in the form of green manures, compost and farmyard manure and adopting cover crops and crop rotations and intercropping and by implementing low soil disturbance tillage.

Adding organic matter can also increase the activity of earthworms, which in turn can also improve soil aggregation. If organic matter is retained in the soil, the number of microbes (like as bio pesticides, sun bacteria, Rhizobium bacteria etc.) in the soil increases to growth and nutritive value of the crops.

Sikkim is the first state in the world that is 100% organic: All of its farmland is certified organic. The policy implemented a phase-out of chemical fertilizers and pesticides, and achieved a total ban on sale and use of chemical pesticides in the state. The transition has benefitted more than 66,000 farming families.

3.1. HORTICULTURE DEPARTMENT: -

Horticultural activities in the State comprise of activities that aim at promoting production of fruits such as Sikkim mandarin, pear, kiwi, papaya, banana as well as traditional vegetables such as bean, garden pea and other vegetables like tomato, Cole crops, radish, etc. Other cucurbits such as chayote, potato and spice crops like large cardamom, ginger, turmeric, cherry pepper and flowers such as cymbidium orchids, rose, lilium, gladioli, anthurium, carnation, gerbera, alstroemeria and zantedeschia. The activities relating to promotion of non-traditional practices like bee keeping, mushroom cultivation, plantation of bamboo and medicinal plants have been intensified to add greater diversification. The significance of horticulture in improving land use, promoting crop diversification, generating employment and providing nutritional security to people has been recognized by and large by common man, general public, framers and programmed implementers. Hence, horticulture features as an important area in the overall policy framework for development in the State.[4]

Cultivation of fruits, particularly Sikkim mandarin is a traditional practice in the State. The resurgence of orange cultivation after this major setback has strengthened the confidence of farmers. The emerging issues of climate change has posed greater challenges to horticulture development strategy, compelling all to give a serious thought to evolve with strategies for pest and disease management through organic protocol. Changes in time tested cropping patterns and shift in cropping line is a glaring reminder of the climate change impacts. As a first step towards mitigating these challenges, efforts are directed to redesign the ongoing horticulture programmers to introduce greater resilience to these emerging needs.

3.2. BASIC CONCEPT IN HORTICULTURE: -

Improvement in the biological properties of soil is the main focus in organic horticulture. Conservation of energy and resources in production system. Control of pests, diseases, and weeds is achieved largely by the development of an ecological balance within the system and by the use of bio-pesticides, bio-control agents and adopting good agricultural practices. Recycling of all wastes and manures within a farm.

3.3. ORGANIC FARMING: -

Organic farming, agricultural system that uses ecologically based pest controls and biological fertilizers derived largely from animal and plant wastes and nitrogen-fixing cover crops. Modern organic farming was developed as a response to the environmental harm caused by the use of chemical pesticides and synthetic fertilizers in conventional agriculture, and it has numerous ecological benefits.

3.4. COMPONENTS OF ORGANIC FARMING AND SOIL IMPROVEMENT TECHNICS:

Important components of organic farming are biological nitrogen fixation, crop rotation, residues of crops, bio pesticides, biogas slurry etc. Vermicomposting has emerged as a major component [5]

In organic farming which is very effective in enhancing soil fertility and growth of crops in a l Sustainable way.

The various components of organic farming are: -

1. *Crop Rotation: -*

For practicing sustainable agriculture there should be rotation of crops on the same land over a Period of two years or more for maintaining soil fertility and control of insects, weed and Diseases. For example, use of legumes in rotation improves soil fertility.

2. *Crop Residue: -*

Has great potential of using residues of crops and straw of cereals and pulses in recycling of Nutrients during organic farming. Crop residues when inoculated with fungal species improve Physicochemical properties of soil and crop yields.

3. *Organic Manure: -*

Organic manure is obtained from biological sources (plant, animal and human residues). Organic manure helps in increasing crop growth directly by improving the uptake of humid Substances and indirectly promoting soil productivity by increasing availability of major and Minor plant nutrients through soil microorganisms.

a) Bulky organic manure. Which includes Farm Yard Manure (FYM), compost and green managing.
b) Concentrated organic manure. [6]

4. Waste: -

Industrial waste: Industrial by products such as spent wash & coir waste can be used as manure. Municipal and Sewage waste: It is an important component of organic waste.

5. Bio Fertilizers: -

Bio fertilizers; are microorganisms that have the capability of increasing the fertility of soil for example by fixing atmospheric nitrogen and through mycorrhiza fungi and phosphate Solubilizes; These are ecofriendly and sustainable way of achieving soil fertility. Bio fertilizers have biological nitrogen fixing organism which help them in establishment and growth of crop plants and trees, enhance biomass production and grain yields.

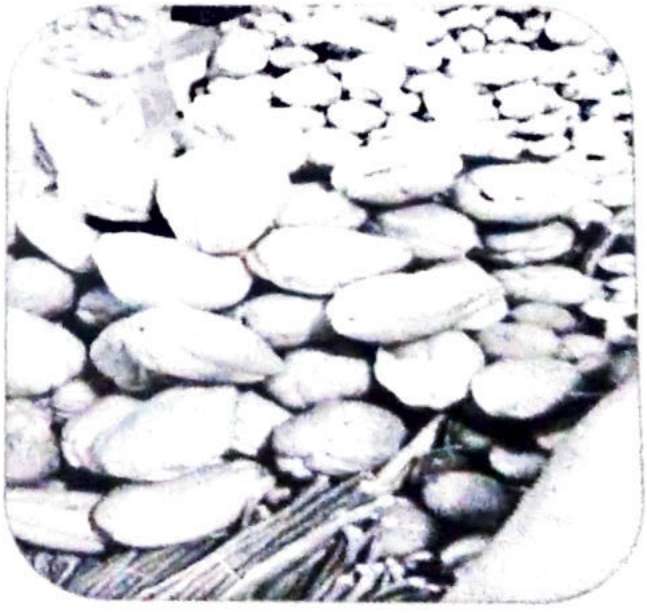
3.5. ORGANIC FARMING CROPS: -

3.5.1.1. ISKUS

- ✓ **Botanical Name: *Sachem edule (Jacq.) Sw.***
- ✓ **Family: Cucurbitaceae**
- ✓ **Common Names: Iskush (Nepali), Chayote (Hindi)**

Introduction

Iskus Chayote (Sechium edule) is a member of the family Cucurbitaceous vegetable. The name chayote is derived from the vine's Indian name, Chacha. It is a popular vegetable in N-E hilly region commonly called squash and grows abundantly without much care and attention in high hills of Meghalaya, Manipur, Mizoram, Nagaland and Sikkim. Chayote is a perennial rooted cucurbit, with climbing vines and leaves resembling those of the cucumber. Its vine can grow as high as 12 meters. Its leaves are heart-shape, 10-25 cm wide and with tendrils on the stem. The flowers are cream-colored or somewhat green that comes out beneath a leaf or branch. It is a monoecious plant but male and female flowers borne in separate places. If the vine is male, the flowers are in cluster; if female, the flowers are slitary. The light green, pear shaped fruit, with deep ridges lengthwise, may weigh as much as one kilogram, but most often is from 170-340 grams. The chayote fruit differs from its multi-seeded relatives, in that it contains only a single, flat edible seed. Fruits may be slightly grooved, and its skin may be prickly or smooth.



3.5.1.2. TOMATO

- ✓ **Scientific Name: *Lycopersicon esculentum***
- ✓ **Family: Solanaceae**
- ✓ **Centre of Origin: Peruvian and Mexican regions**
- ✓ **Common name: Tamatar (Hindi), Rambeda (Nepali)**

Introduction

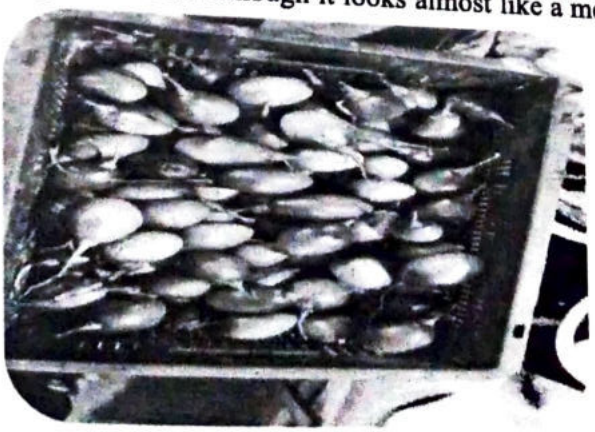
Tomato is one of the most important – "protective foods" because of its special nutritive value and widespread production. It is the world's third largest vegetable crop after potato and sweet potato, but it tops the list of capped vegetables. Tomatoes are used for soup, salad, pickles, ketchup, puree, sauces etc. It was introduced in India by the Portuguese. It is now the most important and remunerative vegetable in India. Uttar Pradesh, Maharashtra, Karnataka, Bihar, Orissa are the major tomato growing states. Because of suitable agro climatic conditions of Sikkim, tomato can be grown throughout year.

3.5.1.3. TREE TOMATO

- ✓ **Scientific Name: *Cyphomandra betacea Sendt***
- ✓ **Family: Solanaceae**
- ✓ **Centre of origin: Probably be the Andes of Peru**
- ✓ **Common name: Rukh rambeda (Nepali)**

Introduction

The fruits closely resemble a tomato; hence its name is the best known of about 30 species of Cyphomandra. Although it looks almost like a medium sized tomato, but the tree tomato is not a true tomato. The name 'tamarillo' was adopted in New Zealand in 1970 and become the standard commercial designation for the fruit. It must have been carried at an early date to East Africa and Asia, as it is well established in the Nilgiri hills and in the hills of Assam. It is cultivated in Venezuela, Malaya, California, Argentina, Florida and high lands of Costa Rica, Guatemala, Puerto Rico, Hawaii, Jamaica and New Guinea.



Tree tomato is grown in Kitchen Garden throughout the hilly areas of Sikkim. The fruit made into 'Charri', 'achar' etc. the introduction of this crop in the hilly areas of Sikkim, Nepal and Bhutan is still not known.

3.5.1.4. BRINJAL

- ✓ **Scientific Name: Solanum melongena L.**
- ✓ **Family: Solanaceae**
- ✓ **Centre of Origin: India**

Introduction

Brinjal is a native of India and one of the most popular vegetables grown throughout the country especially in North East Region. There are many wild relatives of brinjal and are being grown in their kitchen garden. The unripe fruits are used as a cooked vegetable alone or mixed with other vegetables. There is no reliable statistics available regarding the area under this crop in India. It is adapted to a wide range of climatic conditions from North to South and West to East. It is grown as summer crop in hilly regions. Brinjal is used in a variety of culinary preparations. Pickles and industrially processed food are also produced from brinjal.

3.5.1.5. BROCCOLI

- ✓ **Scientific Name: Brassica oleracea var. italic**
- ✓ **Family: Brassicaceae**
- ✓ **Centre of Origin: Mediterranean Region**
- ✓ **Common name: Hario Gobhi (Nepali)**

Introduction

The name 'broccoli' refers to the young shoots which develop in spring on same species of the genus Brassica ('brocco' is Italian for a shoot). In Italy, these have been used as vegetable from early times but their economic importance become appreciable only since the thirties of the century when this vegetable became popular in the U.S.A.

Sprouting broccoli is sometimes briefly called broccoli, through this name is also used for broccoli rape and for winter

cauliflower (winter broccoli or heading broccoli). In India, its cultivation is negligible and limited to kitchen garden but now it is becoming increasingly popular in hotels in Mumbai, Kolkata, Delhi and Chennai. It is mostly cultivated in the hilly region of Himachal Pradesh, Uttar Pradesh, Jammu and Kashmir, Nilgiri hills and northern plains of India. Sikkim has the suitable weather for its cultivation and, therefore, there is a tremendous scope for its cultivation and supply of broccoli to different parts of the country and even export too.[7]

3.5.1.6. AVOCADO

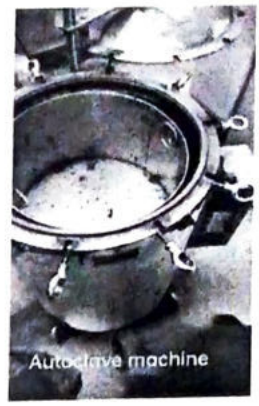
- ✓ **Scientific name- *Persea americana***
- ✓ **Family- Lauraceae**
- ✓ **Center of origin – originated in the highlands bridging south-central Mexico and Guatemala.**
- ✓ **Common names – butter fruit, pomsi**

Introduction

Avocado trees are partially self-pollinating, and are often propagated through grafting to maintain consistent fruit output. Avocados are presently cultivated in the tropical and Mediterranean climates of many countries. Mexico is the world's leading producer of avocados as of 2020, supplying nearly 30% of the global harvest in that year.

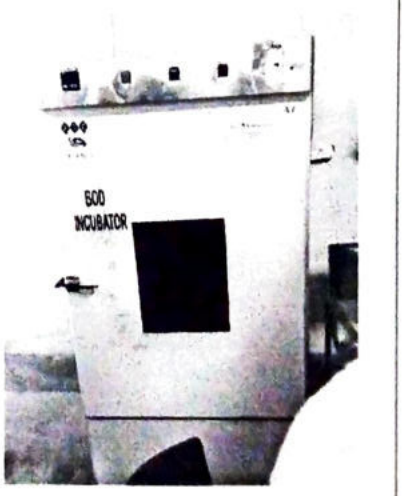
The fruit of domestic varieties have smooth, buttery, golden-green flesh when ripe. Depending on the cultivar, avocados have green, brown, purplish, or black skin, and may be pear-shaped, egg-shaped, or spherical. For commercial purposes the fruits are picked while immature and ripened after harvesting. The nutrient density and extremely high fat content of avocado flesh are useful to a variety of cuisines and are often eaten to enrich vegetarian diets.

3.6. LAB EQUIPMENT'S: -

AUTOCLAVE MACHINE		
Introduction:	An autoclave is a machine that uses steam under pressure to kill harmful bacteria, viruses, fungi, and spores on items that are placed inside a pressure vessel.	
Uses:	They are used to decontaminate specific biological waste and sterilize media, instruments, and lab ware.	
Precaution:	• Always use personal protective equipment (PPE) when using an autoclave. Wear a lab coat, heat-resistant gloves, and safety glasses. • Be sure arms are covered by a lab coat and longer heat-resistant gloves to prevent burns from heat and steam. Inspect the door gasket (seal) for any cracks or bulges.	

HOT AIR OVEN		
Introduction:	Hot air ovens are electrical devices which use dry heat to sterilize. They were originally developed by Louis Pasteur.[1] Generally, they use a thermostat to control the temperature. Their double walled insulation keeps the heat in and conserves energy, the inner layer being a poor conductor and outer layer being metallic. There is also an air-filled space in between to aid insulation.	
Uses:	These are widely used to sterilize articles. Hot air ovens are used for testing food products, pharmaceutical items, and other consumable materials to check their temperature stability during the shelf life. Hot Air Oven plays a significant role in the sterilization process as it is also known as Hot Sterilizer.	
Precaution:	• You should not heat close the temperature unless you use authorized equipment. • With quality testing equipment, you will get pressure relief. • You have to make sure that the oven you use will remain clean and free of germs. Make sure you should not use any plastic material to avoid melting.	

WATER PURIFICATION SYSTEM		
Introduction:	Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids, and gases from water. The goal is to produce water that is fit for specific purposes. Most water is purified and disinfected for human consumption (drinking water), but water purification may also be carried out for a variety of other purposes, including medical, pharmacological, chemical, and industrial applications.	
Uses:	Water purification also meets the needs of medical, pharmacological, chemical, and industrial applications for clean and potable water. The purification procedure reduces the concentration of contaminants such as suspended particles, parasites, bacteria, algae, viruses, and fungi.	
Precaution:	• Do not run water of over 35°C through the filter cartridge. • Do not run water of over 50°C through the unit under any conditions. • Do not store the filtered water. – First thing each morning, run water through "Pure water" for 10 seconds before using or drinking.	

BOD INCUBATOR		
Introduction:	BOD Incubator also known as Biological Oxygen Demand incubator. In microbiology laboratories, it is broadly used for cell culture and fungal growth, BOD test, fermentation, crop and physiology, and various pharmaceutical tests etc.	
Uses:	BOD incubators are especially useful for determining levels of organic matter and nitrogen in waste water samples.	
Precaution:	• Always disconnect the BOD incubator from the socket when it is not in use. • Clean the BOD incubator regularly to maintain its working performance.	

WATER BATH		
Introduction:	A water bath is preferred over an open flame when heating flammable substances. It is employed to enable some chemical reaction with a high temperature.	
Uses:	It can be used for reagent warming, substrate melting, or cell culture incubation. The water bath is the preferred heat source for heating flammable compounds because it allows some chemical processes to occur at high temperatures.	
Precaution:	• Do not heat a bath fluid above its flash point. • Water level should be regularly monitored, and filled with distilled water only. • Disinfectants can be added to prevent growth of organism.	

LAMINAR AIR FLOW		
Introduction:	Laminar airflow, also known as laminar air flow (LAF), is a device, designed to prevent the equipment and working environment from particles. Laminar airflow units create particle-free working environments by sucking air through a filtration system and exhausting it across a work surface in a laminar air stream. They provide an excellent clean air environment for a number of cleanroom requirements.	
Uses:	Laminar air flow systems are used in various applications such as life science research, mushroom cultivation, microbiology, IVF, IUI and histopathology / pathology lab, plant tissue and cell culture and pharmaceutical and electronics industry and many more.	
Precaution:	• The laminar flow cabinet should be sterilized with the UV light before and after the operation. • The UV light and airflow should not be used at the same time. • No operations should be carried out when the UV light is switched on. • The operator should be drawing	

4. Summary: -

Sikkim has distinct advantages of continuing traditional farming and farmers have certain level of knowledge and skills for organic farming. The state also possesses range of agro-climatic conditions and unique Commodities indigenous to the farming viz., large cardamom, ginger, red cherry pepper, Sikkim mandarin etc.

And an emerging new class of educated farmers wanting To make agriculture a professionally viable vocation. For mountain states like Sikkim, this offers hopes of improving soil health of largely marginal hill farmlands, reducing cost of inputs and developing cash crops and agro enterprises with an aim to offer opportunities of employment to a section of its people. Therefore, in 2003, the State Government advocated the idea of making Sikkim An organic state. It was part of a larger concept of making Whole of North Eastern region as wholly organic zone of India. The decision of Government of Sikkim to go organic was based on the premise that farming in this hilly [8]

State was traditionally low external input driven and it will be to the benefit of not only to the sixty-two thousand farming families of the state but also to maintain quality of environment of the state. Government saw comparative advantages in promoting organic farming because use of chemical fertilizers and pesticides was still mini- mal at farmer's level and therefore it will be relatively easy for them to shift to organic or improve their already known organic ways of farming (Anonymous, 2003).

Sikkim has about 15.68% of cultivable area out of the total geographical area of 709,600 hectare. It is estimated that more than 60% of the populace of the State is dependent on Agriculture. The average size of holding is 3.9 ha/person; however, the cultivated land is only 0.74 ha/person (Anonymous, 2010).

Major Challenges of Organic Horticulture

Maintain production in a long-run with nutrient

- Maintain production in a long-run with nutrient and Carbon budgeting.
- Sustain production under the changing climatic con-
- Dictions and increased competition for land, labour,
- Water and energy for other economic uses.
- Material supply chain to augment productivity.
- Develop the cost-effective production technologies for organic horticulture.
- Ignorance of right stage of harvesting and value addiction, which results in low price for their produce.
- Inadequate attention towards value chain management to prevent losses and to ensure supply during
- Odd periods.
- Creation of value chain infrastructure like pre-cooling
- Units, cold stores, refrigerated transportation system,
- Packinghouses, modernized market places.
- Establish market information system for intelligent
- Marketing of truthfully labelled produce to fetch better Price

5. Conclusion

Sikkim has an amazing natural environment, with a rich variety of fauna and flora within a very small geographical area. Indeed, such is the variety, that the area is termed as a biodiversity "hotspot" – one of only two in India (and 34 worldwide). Although Sikkim comprises only 0.2% of the land area of India, it contains an astounding 26% of the nation's biodiversity (including 4,500 species of flowering plants, 550 species of birds and more than 600 species of butterflies). Unless Organic Farming is adopted there is a continuous threat to the State's Biodiversity of flora and fauna with the intensive chemical – agrihorti – sylviculture system in the biodiversity "hotspot" of Sikkim. [9]

Organic farming yields more nutritious and safe food. The popularity of organic food is growing dramatically as consumer seeks the organic foods that are thought to be healthier and safer. Thus, organic food perhaps ensures food safety from farm to plate. The organic farming process is more eco-friendly than conventional farming. Organic farming keeps soil healthy and maintains environment integrity thereby, promoting the health of consumers. Moreover, the organic produce market is now the fastest growing market all over the world including India. Organic agriculture promotes the health of consumers of a nation, the ecological health of a nation, and the economic growth of a nation by income generation holistically. India, at present, is the world's largest organic producers (Willer and Lernoud, 2019) and with this vision, we can conclude that encouraging organic farming in India can build a nutritionally, ecologically, and economically healthy nation in near future.

Horticulture encompasses a remarkable range of technologies, from sacks of soil that allow landless vegetable gardeners to enrich their diet and income to the automated efficiency of controlled greenhouses, sorting machinery that can sense texture or color, and packaging that combats post-purchase waste by informing customers when produce is at peak ripeness. Horticulture, which offers employment and advancement opportunities at all educational levels, finds itself in a time of transformation.[10]

Horticulturists apply their knowledge, skills, and technologies used to grow intensively produced plants for human food and non-food uses and for personal or social needs. Their work involves plant propagation and cultivation with the aim of improving plant growth, yields, quality, nutritional value, and resistance to insects, diseases, and environmental stresses. They work as gardeners, growers, therapists, designers, and technical advisors in the food and non-food sectors of horticulture.[11]

Today, increasing production in horticulture through area expansion is gradually making way for concern like enhanced productivity, ecofriendly production, safe and nutritionally rich produce, volume for processing, value addition and value chain management, international competitiveness, intellectual property issues, sustaining production under changing climate etc… Despite several challenges and constraints, there are also successes in various sectors of horticulture.[12]

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