

Sevadal Mahila Mahavidyalaya Nagpur

Department of food and Nutrition

**CERTIFICATE COURSE IN CALORIFIC VALUE OF DIFFERENT
FOODS**

Session 2023-2024

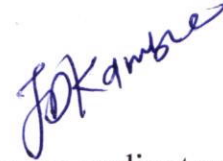


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Notice

All students of B.Sc. AND B.A.part I, II, III year (semester) SCIENCE, HOME SCIENCE AND ARTS are hereby informed that their CERTIFICATE COURSE in calorific value of different foods start from January 1, 2024. All students interested to join the course and take admission in it.



Course co-ordinator

Mrs. JYOTI D. KAMBLE

DEPARTMENT OF Food and Nutrition

Sevadal mahila Mahavidyalaya NAGPUR



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Certificate course in Calorific value of Different Foods

Eligibility : BSc . I st Yr. and II nd yr. Home Science

Marking scheme –

Theory -70

Practical -20

Internal Assessment -10

Examination : Theory and practical examination conduct to be separately

Workload

2 theory / week

1 Practical/ week

Teaching Methods

Demonstration

Powerpoint presentations

Practicals

Job Oppportunities

1. Dietitian
2. Diet Counsellor
3. Health club dietitian and calorie maintainance.



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Caloric Value of Food and its measurement

Caloric Value of Food

the energy accumulated in food substances (proteins, fat, and carbohydrates); the energy value of foodstuffs, expressed in calories (cal) or kilocalories (kcal). The concept is used, for example, in the comparative evaluation of food products and in planning diets.

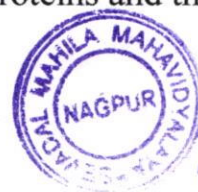
The caloric value is determined by the presence of unoxidized atoms of carbon and hydrogen. A molecule of fat contains more unoxidized atoms of carbon and hydrogen than a carbohydrate molecule or a molecule of protein. One g of fat yields 9.3 kcal (1 kcal = 4.1868 × 10³ joules); 1 g of carbohydrate, 4.1 kcal; and 1 g of protein, 4.1 kcal. The following gives the caloric value (in kcal) of some products (per 100 g): milk (kefir, sour milk), 62; butter, 734; first-grade beef, 154; first-grade mutton, 206; ham, 365; choice sausage, 290; eggs, 150; scallions, 21; fresh cucumbers, 15; potatoes 89; cabbage, 27; carrots, 36; apples, 48; lemons, 41; cepes, 32; walnuts, 612; rye bread, 204; and sugar, 390. The caloric value of foodstuffs must be known in order to work out rations, which are determined by the energy expenditures of persons of different occupations, sexes, and ages.

the nutritional value of feeds, for establishing norms of feeding livestock, and for planning feed requirements. The caloric value of dry matter in most feeds is 4.0-4.5 Meal per 1 kg. The useful caloric value of a feed for the animal depends on the digestibility of the feed and the absorbability of the digestible substances.

Caloric Value of Food

How to Measure Calorific Value of Food

The body requires energy for its internal and external work. This is provided by the oxidation of food e.g. carbohydrates, fats, and proteins. The foodstuffs contain varying amounts of carbohydrates, fats, and proteins and therefore, the



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energy obtained from different foods vary. This can be determined by two methods – direct and indirect.

Direct Method:

The caloric value of a foodstuff can be determined by measuring the heat produced when a given amount is completely burnt in oxygen. It is done in a 'bomb calorimeter' where the oxygen is put in under considerable pressure. Since it requires a calorimeter of robust construction, it has been called a bomb calorimeter.

The one commonly used for the purpose is the 'Atwater' bomb calorimeter. It consists of a heavy steel bomb, with platinum or gold plated copper lining. It has a cover which is held tightly by a strong screw-collar. A weighed amount of the sample is placed and the bomb is charged with an oxygen valve. The valve is then closed and the bomb is immersed in a weighed amount of water.

The burning of the sample is set off by an electric spark and the heat liberated is measured by the rise in temperature of the surrounding water by means of a differential thermometer which can read up to one-thousandth of a degree.

Deduction of the heat arising out of accessory combustions is made in order to obtain the heat liberated in calories from the combustion of the actual sample.

Indirect Method:

The caloric value can also be determined indirectly by burning the food in oxygen in an oxy-calorimeter. The volume of oxygen required to burn the food sample is measured and the caloric value is calculated. The energy production is accurately related to oxygen utilization.

The calculation is based on the principle that when 1 litre of oxygen is utilized in the oxidation of organic nutrients, approximately 4.8 Kcal of heat is liberated. The measurement of oxygen consumption which is a relatively simple technique is now universally employed to estimate the metabolic rate. This is 'indirect calorimetry'.

The energy obtained as a result of complete combustion is the potential energy but the energy liberated in the body is not the same, and this is called the physiological energy. Since carbohydrates and fats contain carbon, hydrogen and oxygen, they can be completely burnt to CO₂ and water and hence the potential energy is the same as the physiological energy. However, in the case of the proteins, the nitrogen is eliminated as urea etc. so the physiological energy is less than the potential energy



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In our daily lives, we often hear about calories and their importance in our diet. Calories are a measure of the energy content in foods, and they play a crucial role in the functioning of our body. Understanding the caloric content of different foods can help us make informed choices about our diet and energy consumption.

Calories

Types of Calorific Values

There are two primary types of calorific value: higher calorific value (HCV) and lower calorific value (LCV). The difference lies in the treatment of the water vapor produced during the combustion process.

Higher Calorific Value (HCV): Also known as the gross calorific value (GCV), HCV includes the latent heat of vaporization of the water formed during combustion. This value represents the total heat released when the fuel burns completely, and the resulting water vapor remains in the gaseous state.

Lower Calorific Value (LCV): On the other hand, the lower calorific value, also called net calorific value (NCV) or physiologic calorific value (PCV), accounts for the heat energy released during combustion but excludes the latent heat of vaporization of water vapor. It assumes that the water vapor formed during combustion is condensed back into a liquid state, and the heat released during this process is not available for use.

Sources of Calories in Foods

The energy content of foods primarily comes from the catabolism of carbohydrates, proteins, and fats. Each of these macronutrients yields a different amount of energy per gram:

Carbohydrates and proteins yield about 4 kcal/g of energy.

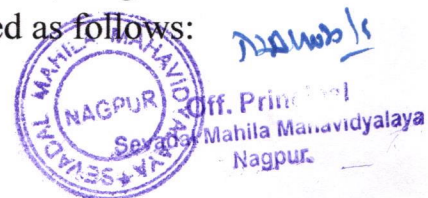
Fats provide a more significant amount of energy, approximately 9 kcal/g.

Alcohol, found in some foods and beverages, yields about 7 kcal/g when metabolized.

The gross calorific value of fats is 9.45 kcal/g, for carbohydrates, it is 4.1 kcal/g and for proteins, it is 5.65 kcal/g.

Calculating caloric content in foods

To determine the number of kilocalories from a specific component in a food item, multiply the number of grams of that component by its respective energy content. For example, if a meal contains 37 grams of carbohydrates, 20 grams of fat, and 15 grams of protein, the caloric content can be calculated as follows:



Ans. Carbohydrates: $37 \text{ g} \times 4 \text{ kcal/g} = 148 \text{ kcal}$

Fat: $20 \text{ g} \times 9 \text{ kcal/g} = 180 \text{ kcal}$

Protein: $15 \text{ g} \times 4 \text{ kcal/g} = 60 \text{ kcal}$

Total kcal in the slice of pizza: $148 \text{ kcal} + 180 \text{ kcal} + 60 \text{ kcal} = 388 \text{ kcal}$.

Making informed food choices

Understanding the caloric content of foods empowers us to make informed choices about our diet and overall health. By being aware of the energy content in different food items, we can make decisions that align with our nutritional goals and lifestyle. Here are some tips to help make mindful food choices:

Choose nutrient-rich foods: Choose foods that provide essential nutrients and a balance of macronutrients (carbohydrates, proteins, and fats) to support overall well-being.

Be mindful of quantity: Pay attention to portion sizes, as large portions of high-calorie foods can contribute to excessive energy intake.

Balance calories with physical activity: Regular physical activity can help balance caloric intake and expenditure, supporting weight management and overall health.

Limit empty calories: Reduce the consumption of foods and beverages with high caloric content but little nutritional value, such as sugary drinks and processed snacks.

Stay hydrated: Choose water or other low-calorie beverages to stay hydrated, as they provide essential hydration without adding extra calories.

Calories measure the energy content in foods. There are two types of calorific values: Higher Calorific Value (HCV) and Lower Calorific Value (LCV). HCV includes all heat released during combustion, while LCV excludes the heat from vaporized water. Carbohydrates and proteins provide about 4 kcal/g, fats about 9 kcal/g, and alcohol about 7 kcal/g. Understanding calories helps make informed food choices for a balanced diet and overall health. Choose nutrient-rich foods, be mindful of portions, balance calories with physical activity, and limit empty calorie intake for a healthier lifestyle.



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Course Title : Certificate Course in Calorific Values of different Foods

Duration: 3 months

Course Outline and Syllabus

Unit -I

1. Meaning and definition of calorific value of foods
2. Energy ,measurement of Energy , calorie .
3. Basal metabolic rate

Unit -II

- 1.Sources of Calorie , properties of clorie rich foods
2. overweight and undernutrition
3. Calorie deficiency

Unit -III

1. Calorie measurement and unit of energy measurement
2. Calorie content and energy needs of different age groups

Unit -IV

1. Calorie content of different food.
2. calorie rich foods and their importance in diet

Teaching Methodology : Lectures, Practicals and Demonstration
Method



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Proposed Guest Lecture : NA

Assessment And Evaluation Method – Examination and Papers
evaluation

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NAAC Reacr edited 'A' Grade

NOTICE

All the staff of department of food and nutrition are inform that their certificate course of Calorific Value of Different Foods want to be start and meeting of course arrange in Principals chamber. Hon'ble Principal Sir will chair the meeting and address the gathering on date 10 January 2023 in presence of NAAC Coordinator Dr. A. P. LAMBAT Sir. The Agenda of meeting are as follows.

1. To commence the certificate course in Food And Nutrition.
2. To frame the syllabus of course.
3. Any other matter with the permission of chair,



PRINCIPAL

PROF. PRAVIN CHARDE



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Sevadal Mahila Mahavidyalaya, Nagpur

Place of Higher Learning And Research (Research Academy)

Sakkardara chowk Umred Road Nagpur, 440024

Minutes of Meeting dated Certificate course in

The meeting regarding the certificate course in Calorific value of different food on held on 10 January at 11am in the hon'ble Principal's chamber. Hon'ble Principals sir presided over the meeting

Agenda of meeting

- 1 To commence the Certificate course in
- 2 To frame the Syllabus of the course.
- 3 Any other matter with the permission of the chair.

Following members were present at meeting:

- | | |
|----------------------------|----------------------|
| 1. Prof.. Pravin Charde | Chairman |
| 2. Dr. Meghali Johrapurkar | Member |
| 3. Mrs. Jyoti D. Kamble | Course Co- Ordinator |

Mrs. Jyoti D. Kamble, Course co-ordinator acted as secretary in the meeting. The co-ordinator welcomed the chairperson, Hon'ble Principal sir and other members and called the meeting in order with the permission of chairperson. The coordinator read out the agenda of meeting and subsequently discussed the matter.

1. Item no. 1: To commence the Certificate course in calorific value of different foods
2. Resolution: Unanimously it was decided to commence the Certificate course in calorific value of different foods from the session 2023- 24
3. Item no. 2: To frame the syllabus of the course.

Resolution: Hon'ble Principal expressed his views regarding the framing of course syllabus Mrs. Jyoti D. Kamble were asked to



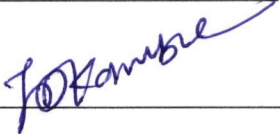


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prepare syllabus of certificate course in calorific value of different foods.

Item no. 3: Any other matter with the permission of the chair.

Resolution: As there was no other matter to discuss the coordinator sum up the meeting by expressing thanks for everyone's gracious attendance.

Name	Signature
1. PROF. PRAVIN CHARDE	
2. Dr. Meghali Joharapurkar	
3. Mrs. Jyoti Kamble	




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Certificate Course In Calorific Values of Different Foods
List of Students session 2023-2024

- 1 Ms.Ashfiya Firdous Riyaz Khan Pathan
- 2 Ms.Divya Rajendra Bharadwaj
- 3 Ms.Janvi Narendra Paithane
- 4 Ms. Janvi Tilak Khare
- 5 Ms. Komal Zabu Chavan
- 6Ms. Krutika Yeshwant Khairkar
- 7 Ms. Manaswi Anil Selwatkar
- 8 Ms. Mubshera Fatema meer Ashfaque Ali
- 9 Ms. Purnashvi Khushal Bahe
- 10 Ms. Ruchika Vilas Bhongade
- 11 Ms. Rumaysha Naaz shahjad Mulla
- 12 Ms. Saba Anjum Moiun Qureishi
- 13 Ms.Saniya Rizwan Khan
- 14 Ms. Shahin Sadaf Ansar Sheikh
- 15 Ms.. Shruti D. Jawade
- 16 Ms. Sonal Sureshrao Wadichar
- 17 Ms. Tanisha R. Mahajan
- 18 Ms. Ramchandra Awazad
- 19 Ms. Trisha Prakash Bhonde
- 20 Ms. Vaishnavi Rajesh Sayawan
- 21 Ms. Yamini Bhalchandra Lonare

Course Coordinator
J. Kamble
Mrs. Jyoti D. Kamble



M. Kamble
Office In-charge
Sevadati Mahila Mahavidyalaya
Sevadati, Nagpur, Maharashtra
Nagpur.

OUTCOME FROM THE COURSE

Certificate course in Calorific value of Different foods

1. Learn and develop skill about calorific value.
2. Learn how to measure the calorific value.
3. Develop and cook the recipe rich in calorific value of different foods
4. Improvement in knowledge about the course



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Certificate Course In Calorific Values of Different Foods
List of Students session 2023-2024

Evaluation Sheet of Certificate course calorific value of Different foods

Name of Students	GRADE
1 Ms.Ashfiya Firdous Riyaz Khan Pathan	A
2 Ms.Divya Rajendra Bharadwaj	A
3 Ms.Janvi Narendra Paithane	A
4 Ms. Janvi Tilak Khare	A
5 Ms. Komal Zabu Chavan	A
6Ms. Krutika Yeshwant Khaikar	A
7 Ms. Manaswi Anil Selwatkar	A
8 Ms. Mubshera Fatema meer Ashfaque Ali	A
9 Ms. Purnashvi Khushal Bahe	A
10 Ms. Ruchika Vilas Bhongade	A
11 Ms. Rumaysha Naaz shahjad Mulla	A
12 Ms. Saba Anjum Moiun Qureishi	A
13 Ms.Saniya Rizwan Khan	A
14 Ms. Shahin Sadaf Ansar Sheikh	A
15 Ms.. Shruti D. Jawade	A
16 Ms. Sonal Sureshrao Wadichar	A
17 Ms. Tanisha R. Mahajan	A
18 Ms. Ramchandra Awazad	A
19 Ms. Trisha Prakash Bhonde	A
20 Ms. Vaishnavi Rajesh Sayawan	A
21 Ms. Yamini Bhalchandra Lonare	A

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J.D. Kambale
(Mrs. J.D. Kambale)



Sevadal Shikshan Sanstha's
NAAC RE-ACCREDITED WITH 'A' GRADE

Sevadal Mahila Mahavidyalaya

Place for Higher Learning and Research (Research Academy)
Sakkardara Square, Umrer Road, Nagpur-440024

Certificate of Completion

This certificate is awarded to

Ms. Spurti Wandhare

she has successfully completed the Certificate Course in

"Calorific Value of Different Foods",

conducted by the Department of Food & Nutrition (Home Science).

Date : 30/04/2024

JDKamble

Mrs. Jyoti D. Kamble
Course Coordinator

Ndhoble

Prof. (Mrs.) Nirupama S. Dhoble
Off. Principal

Sevadal Mahila Mahavidyalaya, Nagpur



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