

ANNEXURE – I

Questionnaire for the Type II Diabetic Subjects

**Hypoglycemic effect of bitter gourd (*Momordica charantia L.*) on
prediabetics and Type II diabetics**

Date:

Socio- Economic Details

1. Name of the Subject:
2. Name of the Hospital:
3. Name of the Doctor:
4. Age:
5. Sex: Male Female
6. Address:

Mobile:

7. Family members

- Children <5 years
- Children 5-14 years
- Female adults
- Male adults

10. Marital status

- Single
- Married
- Separated/divorced
- Widowed

11. Education

- Illiterates
- Primary
- High school
- Degree
- Professional

12. Occupation

Doctor
Engineer
Government
Private
Farmer
Business
House wife
Retired

13. Activity type

Sedentary
Moderate
Heavy

14. Income level

Economically
Weak
Low
Middle
High

15. Anthropometric data

Body weight (kg)
Height (cm)
Waist circumference
BMi
Waist to height ratio
Conicity index

16. Bio chemical parameters

Fasting blood glucose(mg/dl)
Pot prandial blood sugar (mg/dl)
HbA1c (%)
Lipid profile

17. Remarks:

Herewith I confirm that I participated in this interview and answered these questions voluntarily. I was assured that my personal data won't be misused or given to others.

Date:

Signature of the participant:

Dietary pattern

1. Dietary habit

Vegetarian Non-Vegetarian

2. Daily meal pattern

2 3 4

3. Do you drink Milk/ Coffee/ Tea

Yes No

With Sugar Without sugar

4. Do you take lunch from home?

Yes No

If No, where else do you eat?

Hotel Mess Canteen Any other

5. Daily Meal Pattern(24 hrs)

Meal/ Day	Menu	Ingredients	Quantity Consumed
Break fast			
Mid morning			
Lunch			
Tea time			
Dinner			

Diabetic Details

1. Do you take any medicine for your diabetes?

No Yes

If yes, what kind of medicine do you take?

2. How often do you see the doctor to check your diabetes?

Weekly

Monthly

More than six times a year

Two to six times a year

Once a year

Less than once a year

3. If possible, would you specify the amount of your weekly expenses for your...
 ...diabetes medication?
 ...doctor visits?
blood analysis?

4. Do you know the causes of diabetes?

No Yes

If yes, what are the causes?

Bitter gourd details

1.

Have you ever heard about the health effects of the bitter gourd?

No Yes

1.1 If yes in question 1, can you specify the health effects?

1.2 If yes in question 1, where did you get the information from?

- Market
- Radio / Media
- Neighbors or friends
- Family members
- Doctor
- Others, please specify

1.3

If yes in question 1, do you use bitter gourd to treat any disease(s)?

No Yes

1.3.1 If yes, which disease(s)?

1.3.2 If yes, how do you use it?

(describe preparation, amount & frequency)

1.4 Did you hear anything about the use of bitter gourd to treat...

1.4.1 ...diabetes? No Yes

1.4.2 ...overweight? No Yes

1.4.3 ...hypertension? No Yes

1.4.4 ...other diseases? If yes, please specify No Yes

2. Do you eat / drink any bitter gourd as a vegetable?

If no in question 2, continue with question 3 No Yes

2.1 If yes in question 2, how often?

Daily

More times a week

Once a week

Once a month

Other, please specify

2.2 If yes in question 2, how do you eat / drink

the bitter gourd? Raw (e.g. as a salad)

As a tea

As a juice

Boiled

Fried

Other, please specify

- 2.3** When you eat bitter gourd, approximately, how much do you eat?
- | | < 100 g | 100 - 200 g | > 200 g |
|--|--------------------------|--------------------------|--------------------------|
| | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
- 2.4** If yes in question 2, where do you usually get the bitter gourd from?
- | | |
|------------------------|--------------------------|
| Market | <input type="checkbox"/> |
| Super market | <input type="checkbox"/> |
| Own garden | <input type="checkbox"/> |
| neighbors or friends | <input type="checkbox"/> |
| Others, please specify | <input type="checkbox"/> |
-
- 2.5** How do you prepare bitter gourd before cooking?
- | | |
|--|--------------------------|
| No treatment before cooking | <input type="checkbox"/> |
| Soak in tamarind water | <input type="checkbox"/> |
| Soak in salt water | <input type="checkbox"/> |
| Soak in water in which rice was washed | <input type="checkbox"/> |
-
- 2.6** Why do you do this?
-
-
- 2.7** Do you remove the seeds before eating / drinking?
- No Yes



Bitter Gourd Recipes for South India



ANNEXURE - II BITTER GOURD RECIPE BOOK



AVRDC – The World Vegetable Center is an international nonprofit institute committed to alleviating poverty and malnutrition through the increased production and consumption of nutritious, health-promoting vegetables. The Center's improved vegetable lines and technologies help small-scale farmers boost yields, increase their incomes, and safely grow nutritious vegetables for their families and communities.

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Bitter Gourd Recipes for South India

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Introduction

Diabetes currently affects 285 million adults worldwide and the number is growing. Africa alone will double its diabetic population in the next 16 years (Shaw et al., 2010). India and China currently have the largest diabetic populations in the world. It is estimated that up to 80% of coronary heart diseases and 90% of type 2 diabetes could be prevented through healthier lifestyle choices (Boutayeb and Boutayeb, 2005). As diabetes care and access to low-cost and readily available treatment such as insulin and blood glucose monitoring are limited in these countries, it is important to find food-based approaches to diabetes prevention and management. Two of the most effective and practical means for preventing and treating diabetes are dietary management and physical activity (Esposito et al., 2010).

In 2011, AVRDC - The World Vegetable Center, Justus-Liebig University, Geissen (Germany), Avinashilingam University for Women (India), Punjab Agricultural University (India), Kilimanjaro Christian Medical Centre (Tanzania), and National Taiwan University (Taiwan) initiated a project entitled, "A better bitter gourd: Exploiting bitter gourd (*Momordica charantia* L.) to increase incomes, manage type 2 diabetes, and promote health in developing countries". Funded by the Federal Ministry for Economic Cooperation and Development, Germany (BMZ), the project studied the potential of bitter gourd in the prevention and management of type 2 diabetes.

Bitter gourd (*Momordica charantia* L.) is a popular vegetable in Asia traditionally used as a treatment for many illnesses, particularly diabetes. High in vitamin C and fiber, bitter gourd contains insulin-like compounds and acts through different mechanisms in the body to lower blood glucose levels. Bitter gourd is sometimes called "plant insulin" due to its efficacy for glucose management. As a food-based treatment for diabetes, bitter gourd can become an easily accessible and low-cost alternative to insulin and medicinal drugs.

As lifestyle and eating habits in India have been changing in recent decades, cases of type 2 diabetes have been increasing at a fast pace. The project aimed to research the antidiabetic properties of bitter gourd to help improve the quality of life of diabetics and to promote healthy eating for the general population.

Dietary management is an essential component of managing diabetes. The project worked with nutrition experts from Avinashilingam University for Women in Coimbatore, India and Kilimanjaro Christian Medical Centre in Moshi, Tanzania to develop healthy and nutritious bitter gourd recipes designed to suit local

preparation methods, ingredients, materials and taste. The recipes have been modified for reduced sugar, salt, and oil content, and cooking time. Each dish has been carefully planned and taste-tested to ensure these easy-to-prepare dishes will delight the palates of everyone in your family. From soups to main dishes, appetizers to snacks, there is a recipe suitable for you.

This recipe book was developed to promote the usage of bitter gourd in South Indian cuisine. The recipes follow healthy dietary guidelines and incorporate bitter gourd in everyday dishes. However, the recipes are not meant for diabetic patients under treatment. Certain recipes need to be modified to accommodate the special dietary guidelines for diabetics. Recommendations on the usage of bitter gourd for diabetics will be made available.

On that note, we hope you will enjoy cooking from this healthy recipe book and share these delicious dishes with family and friends.

References

- Boutayeb, A. (2006) The double burden of communicable and non-communicable diseases in developing countries. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 100, 191.
- Boutayeb, A. and Boutayeb, S. (2005) The burden of non-communicable diseases in developing countries. *International Journal for Equity in Health*, 4, 2.
- Esposito, K., Kastorini, C. M., Panagiotakos, D. B. and Giugliano, D. (2010) Prevention of type 2 diabetes by dietary patterns: a systematic review of prospective studies and meta-analysis. *Metabolic syndrome and related disorders*, 8, 471-476.
- Shaw, J., Sicree, R. and Zimmet, P. (2010) Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Research and Clinical Practice*, 87, 4-14.

Words from Gomathi Kannusamy

Bitter gourd is a common vegetable used in Indian cooking. Only a few recipes are popular and people try to reduce the bitterness by adding sugar or by soaking the bitter gourd in salt water or tamarind juice.

Earlier studies showed that many phytochemicals and other active components in bitter gourd act as hypoglycemic agents. Hence, an effort was made to develop these healthy bitter gourd recipes.

Healthy recipes do not have to be complicated or hard to make. Cooking with extra care such as boiling for a shorter time, frying with a minimum amount of oil at a lower temperature and not adding extra sugar or salt can help minimize the nutrients lost during preparation. These healthy bitter gourd recipes are prepared by common cooking methods such as boiling, pan-frying or stir-frying, and have been modified to enhance the nutrition quality of the dish.



South India is noted for its deep belief that serving food to others is a service to humanity, as is common in many regions of India. The region has a rich cuisine featuring traditional non-vegetarian and vegetarian dishes. Rice, legumes, vegetables and lentils are the mainstays of the diet, along with distinct aromas and flavours achieved by blending spices such as curry leaves, tamarind, coriander, ginger, garlic, chili pepper, cinnamon, clove, cardamom, cumin, nutmeg, coconut and rose water. South Indian dishes are part of tiffins—light foods eaten for breakfast or dinner—or meals, which are usually taken during lunch. The word “curry” is derived from the Tamil *kari*, meaning something similar to “sauce”. A balanced diet is important to diabetics and non-diabetics alike. Eating a variety of foods, including plant sources, is essential to provide the nutrients we need.

I present to you these healthy bitter gourd recipes, which will not only wake up your taste buds, but also add color to your dining table and supply healthy nutrients to your body!

Gomathi Kannusamy
Dietician and Ph.D Research Scholar, Avinashilingam University for Women

Guide to Nutritional Information

Nutritional information for each recipe is included to help you understand the nutritional value of your meal. Following the labeling criteria developed by the U.S. Food and Drug Administration (FDA), the Daily Value is based on an intake of 2,000 calories for adults as a standard reference. For those who eat more or less than 2,000 calories a day, the requirement will be higher or lower. The % Daily Value illustrates the percentage of daily nutrient requirement met by the recipe. It includes both the DRV (Dietary Reference Values) and RDI (Reference Dietary Intakes). Daily Value is an expression similar to DRI (Dietary Reference Intake) and RDA (Recommended Dietary Allowance).

The reference Daily Values based on an intake of 2,000 calories for adults:

Food Component	Daily Value (DV)
Total Fat	65 g
Saturated Fat	20 g
Cholesterol	300 mg
Total Carbohydrate	300 g
Dietary Fiber	25 g
Protein	50 g
Vitamin A	500 µg RE
Vitamin C	60 mg
Vitamin D	400 IU
Vitamin E	30 IU
Vitamin K	80 µg
Thiamine	1.5 mg
Riboflavin	1.7 mg
Niacin	20 mg
Vitamin B6	2 mg
Folate	400 µg
Vitamin B12	6 µg
Biotin	300 µg
Pantothenic acid	10 mg
Calcium	1,000 mg
Iron	18 mg
Sodium	2,400 mg
Potassium	3,500 mg
Phosphorus	1,000 mg
Iodine	150 µg
Magnesium	400 mg
Zinc	15 mg
Selenium	70 µg
Copper	2 mg
Manganese	2 mg
Chromium	120 µg
Molybdenum	75 µg
Chloride	3,400 mg

The nutrient content of the recipes is calculated for each serving. Micronutrients higher than 8% Daily Value are highlighted in the nutritional information. Recommended daily nutrient requirements for Indian population are provided at the end of the book for different age groups and gender.

RECIPES

Precautions

Consumption of high quantities of bitter gourd may not be suitable for:

- * People with low blood glucose levels (hypoglycemia)
- * Pregnant and lactating mothers
- * Young children
- * Diabetes patients on oral drug treatment

Bitter gourd should not be consumed on an empty stomach.

Bitter Gourd Juice

~ A tangy and healthy juice ~

3 Servings

Preparation time: 20 minutes

(Soaking time: 15 minutes)

Ingredients

100 g bitter gourd
1 lemon
1/2 tsp salt
1/2 tsp turmeric powder
250 ml drinking water

Directions

1. Wash the bitter gourd thoroughly and cut it into small pieces. Remove the seeds and inner pith.

2. Soak the cut pieces in water with salt and turmeric powder for 15 minutes. Discard the salt water.

3. Cut the lemon in half and squeeze out the juice. Set aside.

4. Blend the bitter gourd pieces with water using a blender until it becomes a smooth paste.

5. Strain the mix with a strainer, add lemon juice, and serve cold.

Nutritional Information (per serving)		
Calories	12	kcal
		% Daily Value*
Total fat	0	g 0%
Saturated fat	0	g 0%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	393	mg 16%
Total Carbohydrate	3	g 1%
Dietary Fiber	1	g 6%
Sugars	0	g
Protein	1	g
Micronutrient Highlights		
Vitamin C	36	mg 61%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Pavarkai Salad

~ Spicy salad for diabetics ~

2 Servings

Preparation time: 30 minutes

Ingredients

100 g bitter gourd
50 g onion
50 g tomato
2 tbsp lime juice
1/4 tbsp chilli powder
1/2 tbsp pepper powder
Salt to taste
5 g chopped coriander leaves

Directions

1. Wash and finely slice the bitter gourd into rounds and remove the seeds.

2. Apply salt on both sides of the bitter gourd, set aside for 30 minutes and rinse with water twice.

3. Slice onion and tomato; add to the bitter gourd with chilli powder and salt. Mix well.

4. Add the lime juice, coriander and pepper powder to the salad when ready to serve.

Nutritional Information (per serving)		
Calories	37	kcal
		% Daily Value*
Total fat	0	g 1%
Saturated fat	0	g 0%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	70	mg 3%
Total Carbohydrate	8	g 3%
Dietary Fiber	3	g 13%
Sugars	2	g
Protein	2	g
Micronutrient Highlights		
Vitamin A	168	µg RE 34%
Vitamin C	36	mg 93%
Vitamin K	49.1	µg 61%
Folate	55.7	µg 14%
Potassium	371	mg 11%
Manganese	0.3	mg 14%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Amla Bitter Gourd Juice

~ Refreshing drink rich in Vitamin C ~

3 Servings

Preparation time: 10 minutes

Ingredients

- 150 g amla or Indian gooseberry (5 fruits)
- 75 g bitter gourd
- ½ tsp sugar
- ½ tsp salt
- 200 ml drinking water

Directions

1. Cut the amla and bitter gourd into pieces, place in the blender and blend until smooth.

2. Strain the juice.

3. Add sugar and salt to the juice, mix well and serve.

Variation: Honey can be used instead of sugar to sweeten the taste.

Nutritional Information (per serving)		
Calories	29	kcal
		% Daily Value*
Total fat	0	g 1%
Saturated fat	0	g 0%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	392	mg 16%
Total Carbohydrate	7	g 2%
Dietary Fiber	3	g 11%
Sugars	1	g
Protein	1	g
Micronutrient Highlights		
Vitamin C	34.9	mg 58%

*Per cent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Coconut Soup

~ A creamy appetizing delight ~

6 Servings

Preparation time: 20 minutes

Ingredients

- 250 g bitter gourd
- 100 g onion
- 6 pods garlic
- 1 green chilli
- 500 ml water
- 100 ml coconut milk
- ½ tsp pepper powder
- Salt to taste

Directions

1. Cut bitter gourd and onion into small pieces, split the green chilli and crush garlic. Place vegetables in a deep frying pan.

2. Add salt and fry lightly for 3 minutes.

3. Add water and bring to a boil. Continue cooking on medium heat until the bitter gourd is cooked.

4. Add pepper powder and coconut milk and serve hot.

Variation: Water left from washing rice can also be used to prepare this soup.

Nutritional Information (per serving)		
Calories	53	kcal
		% Daily Value*
Total fat	4	g 5%
Saturated fat	3	g 15%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	106	mg 4%
Total Carbohydrate	8	g 3%
Dietary Fiber	3	g 13%
Sugars	2	g
Protein	2	g
Micronutrient Highlights		
Vitamin C	24.8	mg 41%
Manganese	0.3	mg 13%

*Per cent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Pineapple Bitter Gourd Soup

~ A vegan friendly and nutritious soup that warms you up! ~

6 Servings

Preparation time: 25 minutes

Ingredients

100 g pineapple
 100 g bitter gourd
 1 tbsp fresh ginger
 1 green chilli
 500 ml water
 Juice from 2 limes
 1 tbsp vegetable oil
 1/2 tsp cumin seeds
 Salt to taste
 1 tbsp coriander leaves

Directions

1. In a medium-size sauce pan, add water, pineapple, bitter gourd and salt. Place over low heat.
 2. In the ginger and green chilli in a blender or chop finely.
 3. When the water boils, add the ground mixture into the soup and add coriander leaves and remove sauce pan from fire, then add lime juice.
 4. Crush the soup with fried cumin seeds.

Nutritional Information (per serving)		
Calories	40	kcal
		% Daily Value*
Total fat	2	g 4%
Saturated fat	0	g 1%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	201	mg 8%
Total Carbohydrate	5	g 2%
Dietary Fiber	1	g 3%
Sugars	2	g
Protein	1	g
Micronutrient Highlights		
Vitamin C	27.8	mg 46%
Vitamin K	14.3	µg 18%
Manganese	0.2	mg 11%

*Per cent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Lentil Soup

~ A protein-rich vegetable and lentil combination! ~

6 Servings

Preparation time: 30 minutes

Ingredients

50 g red lentils
 50 g onion chopped
 250 g bitter gourd
 1000 ml water
 3 tsp ground coriander leaves
 1 whole garlic pod
 2 red chillies
 1 tsp cumin seeds
 Salt to taste
 1 tsp pepper powder

Directions

1. Cook lentil with 500 ml water and turmeric powder until it becomes soft.
 2. In a large saucepan, dry roast the cumin seed and red chillies, and then add bitter gourd, onion, cooked lentils and salt to taste.
 3. Stir the mixture thoroughly, then add remaining water and bring to a boil. Lower the heat and cover for 10 minutes.
 4. Add ground coriander leaves and pepper powder as seasoning. Serve hot.

Nutritional Information (per serving)		
Calories	48	kcal
		% Daily Value*
Total fat	0	g 1%
Saturated fat	0	g 0%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	204	mg 9%
Total Carbohydrate	10	g 3%
Dietary Fiber	3	g 11%
Sugars	2	g
Protein	3	g
Micronutrient Highlights		
Vitamin C	32.0	mg 53%
Vitamin K	15.4	µg 19%
Folate	58.2	µg 15%
Manganese	0.3	mg 15%

*Per cent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Stuffed Karela

~ Spicy, nutritious and mouthwatering recipe ~

3 Servings

Preparation time: 30 minutes

Ingredients

200 g bitter gourd (4 small-sized)
 50 g onion, finely chopped
 50 g tomato, finely chopped
 ½ tsp ginger, grated
 ½ tsp garlic, crushed
 1 tsp red chilli powder
 1 tsp coriander powder
 ¼ tsp turmeric powder
 75 g peanuts, crushed
 ¼ tsp cumin seeds
 2 tbs vegetable oil
 Salt to taste

Directions

1. Peel bitter gourds lightly and slit lengthwise along each gourd. Remove seeds and pulp.
 2. Chop bitter gourds thoroughly with salt and keep aside for 1 hour. Then, wash the bitter gourd well under running water. Pat dry on kitchen towel.
 3. Heat cumin seeds. Once it crackles, add onions and cook until translucent in color.
 4. Add ginger, garlic paste and mix well. Then add tomatoes, all dry powders, salt and fry well.
 5. Cover and cook until the stuffing thickens, then add ground peanuts.
 6. Fill each bitter gourd with the stuffing.
 7. Heat a small amount of oil, shallow fry bitter gourd until crispy and golden brown. The dish is ready to be served.

Nutritional Information (per serving)		
Calories	255	kcal
		% Daily Value*
Total fat	22	g 34%
Saturated fat	2	g 12%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	211	mg 9%
Total Carbohydrate	12	g 4%
Dietary Fiber	4	g 16%
Sugars	4	g
Protein	7	g
Micronutrient Highlights		
Vitamin C	28.6	mg 48%
Vitamin E	3.7	mg 19%
Vitamin K	13.3	µg 17%
Thiamin	0.2	mg 11%
Niacin	3.8	mg 19%
Folate	76.3	µg 19%
Iron	1.4	mg 8%
Magnesium	62.1	mg 16%
Phosphorus	130	mg 13%
Potassium	478	mg 14%
Zinc	1.5	mg 10%
Manganese	0.3	mg 13%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Karela Roll

~ A hearty wheat roll for any meal of the day ~

3 Servings

Preparation time: 30 minutes

Ingredients

For Roti

100 g wheat flour
 ½ tsp salt
 Water to knead the dough

For Filling

250 g bitter gourd
 50 g onion
 50 g tomato
 ½ tsp chilli powder
 ½ tsp garam masala powder
 1 tbsp oil
 Water as needed
 Salt to taste

Directions

For Roti

1. Mix flour and salt together, gradually add water to form soft yet firm dough. Cover and let the dough rest.

2. Roll dough balls of even size (lemon sized). Dust the working surface with flour and roll out the dough into flat circles.

3. Heat a frying pan, place the flattened dough and let it cook lightly on both sides until cooked.

4. Prepare all the rotis and place them in a casserole to keep soft before serving.

For Filling

1. Cut bitter gourds lengthwise and remove seeds and pulp. Then, cut the rest into small pieces.

2. In a frying pan, heat oil and fry onion until it turns light brown. Then add the ginger and garlic paste. Finally, add tomato and cook well.

3. When the filling is thoroughly cooked, add salt, chilli powder and garam masala. Mix well and add cooked bitter gourd.

4. Place 3-4 tablespoons bitter gourd filling in the middle of the roti and roll the roti tightly to form a roll. Serve hot. Enjoy!

Nutritional Information (per serving)		
Calories	219	kcal
		% Daily Value*
Total fat	8	g 12%
Saturated fat	1	g 4%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	455	mg 19%
Total Carbohydrate	32	g 11%
Dietary Fiber	2	g 9%
Sugars	3	g
Protein	6	g
Micronutrient Highlights		
Vitamin C	32.4	mg 54%
Vitamin K	8.2	µg 10%
Folate	47.6	µg 12%
Calcium	124	mg 12%
Iron	2.1	mg 12%
Potassium	357	mg 10%
Manganese	0.3	mg 15%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Finger Chips

~ Excellent low-fat and low-carbohydrate crunchy treat for diabetics and kids ~

3 Servings

Preparation time: 25 minutes

Ingredients

300 g bitter gourd
1 fresh green chilli, cut in half
3 tsp vinegar
1/4 tsp chilli powder
1 tbsp vegetable oil
Salt to taste

Directions

1. Cut bitter gourd lengthwise, remove seeds and cut into thin pieces.
2. Add vinegar, salt, chilli powder and green chilli. Mix well and set aside for 15 minutes. Drain excess liquid.

3. Heat a pan and fry the bitter gourds until they are cooked inside and crispy outside. Let it become cool before serving.

Variation: Lemon juice could be used instead of vinegar.

Nutritional Information (per serving)		
Calories	68	kcal
		% Daily Value*
Total fat	5	g 8%
Saturated fat	0	g 2%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	74	mg 3%
Total Carbohydrate	6	g 2%
Dietary Fiber	2	g 9%
Sugars	3	g
Protein	1	g
Micronutrient Highlights		
Vitamin C	69.5	mg 116%
Vitamin K	10.5	µg 13%
Folate	54.7	µg 14%
Potassium	374	mg 11%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Fried Rice

~ Delicious and nutritious recipe ~

4 Servings

Preparation time: 20 minutes

Ingredients

250 g bitter gourd, chopped
1 tbsp vegetable oil
50 g tomato
½ tsp mustard seeds
Curry leaves - a few
1 tsp chilli powder
½ tsp coriander powder
½ tsp garam masala powder
200 g steamed rice with cumin seeds
2 tbsp coriander leaves, chopped

Directions

1. Heat oil in a kadhai (deep frying pan or wok) and add mustard seeds. Add curry leaves when the seeds begin to crackle and cook for a few seconds.
2. Add the chopped bitter gourds and tomato, fry for a few more seconds.
3. Add the chilli powder, coriander powder and garam masala powder. Mix well and cook on medium heat until the bitter gourd becomes soft.
4. Add cooked rice, mix thoroughly and cook for one minute. Serve hot.

Nutritional Information (per serving)		
Calories	118	kcal
		% Daily Value*
Total fat	4	g 6%
Saturated fat	0	g 2%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	14	mg 1%
Total Carbohydrate	19	g 6%
Dietary Fiber	2	g 8%
Sugars	2	g
Protein	2	g
Micronutrient Highlights		
Vitamin C	24.5	mg 41%
Vitamin K	8.9	µg 11%
Folate	65.1	µg 16%
Iron	1.6	mg 9%
Manganese	0.4	mg 19%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Noodle

~ A nutritious and filling dish for the whole family ~

3 Servings

Preparation time: 15 minutes

Ingredients

- 150 g bitter gourd
- 1 packet of noodles
- 25 g cabbage
- 50 g carrot
- 50 g green pepper, sliced
- 20 g tomato
- 2 tsp tomato sauce (optional)
- ½ tsp soya sauce (optional)
- Salt to taste
- 1 tbsp vegetable oil

Directions

1. Cut bitter gourd into thin slices and remove the seeds.
2. Heat a frying pan and fry the bitter gourd slices. Set aside.
3. In a small saucepan, cook the noodles as directed on the noodle pack.
4. Heat a frying pan and on medium heat, stir-fry all the vegetables for 3 minutes.
5. Add tomato sauce, soya sauce, salt, noodles and fried bitter gourd. Mix thoroughly and serve hot.

Nutritional Information (per serving)			
Calories	205	kcal	
			% Daily Value*
Total fat	13	g	20%
Saturated fat	2	g	8%
Trans Fat	0	g	
Cholesterol	0	mg	0%
Sodium	161	mg	7%
Total Carbohydrate	21	g	7%
Dietary Fiber	3	g	12%
Sugars	3	g	
Protein	3	g	
Micronutrient Highlights			
Vitamin A	303	µg RE	61%
Vitamin C	34.6	mg	58%
Vitamin E	2.1	mg	11%
Vitamin K	20.7	µg	26%
Thiamin	0.2	mg	14%
Folate	58.3	µg	15%
Iron	1.7	mg	9%
Manganese	0.5	mg	24%
Selenium	11.8	µg	17%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Pachadi

~ This classic dish is a yummy way to get some calcium into your diet ~

2 Servings

Preparation time: 15 minutes

Ingredients

- 150 g bitter gourd
- 1 cup curd/yogurt
- 1 tbsp vegetable oil
- 1 tsp mustard powder
- A pinch of asafoetida
- A few curry leaves
- 1 dried red chilli
- Salt to taste

Directions

1. Cut bitter melon into small pieces and remove the seeds.
2. Heat a frying pan and cook bitter gourd until light brown in colour. Then, add the bitter gourd into the curd.
3. Daily, season with mustard, asafoetida, curry leaves and dried red chilli. Serve this pachadi with rice.

Nutritional Information (per serving)			
Calories	143	kcal	
			% Daily Value*
Total fat	8	g	12%
Saturated fat	2	g	11%
Trans Fat	0	g	
Cholesterol	11	mg	4%
Sodium	303	mg	13%
Total Carbohydrate	15	g	5%
Dietary Fiber	5	g	19%
Sugars	10	g	
Protein	5	g	
Micronutrient Highlights			
Vitamin A	351	µg RE	70%
Vitamin C	20.9	mg	35%
Vitamin K	19.1	µg	24%
Riboflavin	0.3	mg	17%
Folate	39.2	µg	10%
Calcium	126	mg	13%
Phosphorus	118	mg	12%
Potassium	519	mg	15%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Bitter Gourd Tomato Curry

~ Colorful recipe loaded with vitamins ~

4 Servings

Preparation time: 30 minutes

Ingredients

250 g bitter gourd
100 g tomato
50 g onion
3-4 tbsp tomato paste
1 tbsp vegetable oil
3 green chillies, cut in half
½ tsp mustard powder
A few curry leaves
1 tsp chilli powder
1 tsp cumin powder
1 tsp coriander powder
1 small bunch of coriander leaves
Salt to taste
50 ml water

Directions

1. Cut bitter gourd crosswise into circles, remove the seeds and wash them with saltwater to remove excess bitterness.
2. Chop onions into small pieces and cut chillies into halves.
3. Heat a deep frying pan, add mustard and allow it to crackle.
4. Add onions, green chillies, curry leaves and cook until onions turn slightly brown in colour.
5. Add bitter gourd pieces, all powders and salt. Mix well and evenly coat all the ingredients.
6. Sprinkle water and cover the deep frying pan with a lid to steam the bitter gourd for 10-15 minutes. Stir intermittently and add more water if required.
7. Once bitter gourd is almost cooked, add the tomato puree and mix well.
8. Cook the mixture until the bitter gourd absorbs the tomato flavour.
9. Add finely chopped coriander leaves just before removing from heat. Serve this with hot rice, dhal curry, or any other fried vegetables.

Nutritional Information (per serving)		
Calories	92	kcal
		% Daily Value*
Total fat	5	g 7%
Saturated fat	0	g 2%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	329	mg 14%
Total Carbohydrate	12	g 4%
Dietary Fiber	3	g 14%
Sugars	4	g
Protein	2	g
Micronutrient Highlights		
Vitamin A	96	µgRE 19%
Vitamin C	39.8	mg 66%
Vitamin K	17.5	µg 22%
Folate	55.8	µg 14%
Iron	1.9	mg 11%
Potassium	514	mg 15%
Manganese	0.2	mg 11%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Mixed Vegetable Curry

~ A healthy and easy to make spicy vegetable dish ~

3 Servings

Preparation time: 30 minutes

Ingredients

100 g bitter gourd
50 g carrot
50 g green peas
50 g cauliflower
100 g onion
100 g tomato
2 tbsp vegetable oil
1 tsp red chilli powder
1 tsp coriander powder
1 tsp ginger paste
2 tsp garlic paste
½ tsp turmeric powder
5 g green chillies
½ tsp cumin seeds
A few coriander leaves
Salt to taste

Directions

1. Cut bitter gourds lengthwise and remove seeds.
2. Chop carrots, beans, bitter gourds and cauliflower.
3. Chop onion, green chillies, coriander and puree the tomato.
4. Heat a frying pan and add cumin seeds.
5. Add green chillies and onion once the cumin seeds crackle and fry the onion to a golden brown colour.
6. Add ginger garlic paste along with the powdered spices. Mix thoroughly.
7. Cook on high heat until the curry bubbles, then turn to low heat and simmer for one minute.
8. Then add tomato and other vegetables. Continue simmering until the oil comes out from the gravy.
9. Garnish with coriander and serve along with paratha or chappati.

Nutritional Information (per serving)		
Calories	157	kcal
		% Daily Value*
Total fat	10	g 16%
Saturated fat	1	g 5%
Trans Fat	0	g
Cholesterol	0	mg 0%
Sodium	295	mg 12%
Total Carbohydrate	15	g 5%
Dietary Fiber	4	g 17%
Sugars	4	g
Protein	3	g
Micronutrient Highlights		
Vitamin A	374	µgRE 75%
Vitamin C	35.0	mg 58%
Vitamin E	2.2	mg 11%
Vitamin K	43.9	µg 55%
Folate	51.9	µg 13%
Iron	2.0	mg 11%
Potassium	445	mg 13%
Manganese	0.4	mg 21%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Braised Dishes

Bitter Gourd Paruppusili

~ A side dish filled with protein ~

2 Servings

Preparation time: 30 minutes

Ingredients

- 100g bitter gourd
- 100g toor dal (pigeon pea)
- 1/2 tsp chilli powder
- 50 ml water
- 2 tbsp vegetable oil (1 tbsp for cooking pigeon pea and 1 tbsp for tempering spices)
- 2 dried red chillies
- Salt to taste
- 1 tsp mustard seeds
- 1 tsp cumin seeds
- A few curry leaves (optional)
- A few coriander leaves (optional)

Directions

1. Soak the toor dal and red chillies in water for 1-2 hours. Drain and grind into a thick paste.
2. Shape the paste into balls and steam them for 10 minutes and set aside.
3. Dice the bitter gourd lengthwise and remove the seeds. Then, dice the bitter gourds.
4. Heat 1 tbsp of oil in a pan; add the diced bitter gourd, water, chilli powder, and salt. Cover and simmer until the bitter gourd is cooked, but not mushy.
5. Prepare the tempering, heat oil in a non-stick pan and add the mustard seeds. When mustard seeds pop, add the cumin seeds and curry leaves.
6. Add the toor dal balls to the pan and stir-fry until the dal becomes crispy and golden.
7. Add the cooked bitter gourd to the pan, stir well. Add salt to taste and serve hot.

Nutritional Information (per serving)			
Calories	204	kcal	
			% Daily Value*
Total fat	15	g	22%
Saturated fat	1	g	6%
Trans Fat	0	g	
Cholesterol	0	mg	0%
Sodium	112	mg	5%
Total Carbohydrate	15	g	5%
Dietary Fiber	5	g	20%
Sugars	1	g	
Protein	5	g	
Micronutrient Highlights			
Vitamin C	17.2	mg	29%
Vitamin E	2.7	mg	14%
Vitamin K	13.4	µg	17%
Folate	83.2	µg	21%
Iron	1.7	mg	9%
Magnesium	41.3	mg	10%
Phosphorus	98.8	mg	10%
Potassium	445	mg	13%
Manganese	0.4	mg	19%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your caloric needs.



Conversion Factors for Measurements

	Metric Exact Conversion	Metric Standard Measure
SPOONS		
1/4 teaspoon (tsp)	1.2 milliliter (ml)	1 ml
1/2 tsp	2.4 ml	2 ml
1 tsp	4.7 ml	5 ml
2 tsp	9.4 ml	10 ml
1 tablespoon (tbsp)	14.2 ml	15 ml
CUPS		
1/4 cup (4 tbsp)	56.8 ml	50 ml
1/3 cup (5 1/3 tbsp)	75.6 ml	75 ml
1/2 cup (8 tbsp)	113.7 ml	125 ml
2/3 cup (10 2/3 tbsp)	151.2 ml	150 ml
3/4 cup (12 tbsp)	170.5 ml	175 ml
1 cup (16 tbsp)	227.3 ml	250 ml
4 1/2 cups	1022.9 ml	1000 ml (1 L)
DRY MEASUREMENTS		
1 ounces (oz)	28.3 grams (g)	30 g
2 oz	56.7 g	55 g
3 oz	85.0 g	85 g
4 oz	113.4 g	125 g
5 oz	141.7 g	140 g
6 oz	170.1 g	170 g
7 oz	198.4 g	200 g
8 oz	226.8 g	250 g
16 oz	453.6 g	500 g
32 oz	907.2 g	1000 g (1 kg)



Nutrient Requirements for Indians

Recommended Dietary Allowances: Macronutrients

Group	Particulars	Body weight kg	Energy kcal/day	Protein g/day	Fat g/day
Men	Sedentary work	60	2320	60	25
	Moderate work		2730		30
	Heavy work		3490		40
Women	Sedentary work	55	1900	55	20
	Moderate work		2230		25
	Heavy work		2850		30
Children	1-3 years	12.9	1060	16.7	27
	4-6 years	18	1350	20.1	25
	7-9 years	25.1	1690	29.5	30
Boys	10-12 years	34.3	2190	39.9	35
	13-15 years	47.6	2010	40.4	45
	16-17 years	55.4	2750	54.3	50
Girls	10-12 years	35.0	2330	51.9	35
	13-15 years	46.6	3020	61.5	40
	16-17 years	52.1	2440	55.5	35

Source:

National Institute of Nutrition. Dietary Guidelines for Indians: A Manual. National Institute of Nutrition, Indian Council of Medical Research, 2010.



Recommended Dietary Allowances: Vitamins

Group	Particulars	Vit. A µg/d		Thi-amin mg/d	Ribo-flavin mg/d	Niacin equivalent mg/d	Pyri-doxin mg/d	Ascor-bic acid mg/d	Dietary folate µg/d	Vit. B12 µg/d
		Reti-nol	B-carotene							
Men	Sedentary work	600	4800	1.2	1.4	16	2.0	40	200	1
	Moderate work				1.6	18				
	Heavy work				2.1	21				
Wom-en	Sedentary work	600	4800	1	1.1	12	2.0	40	200	1
	Moderate work				1.3	14				
	Heavy work				1.7	16				
Chil-dren	1-3 years	400	3200	0.5	0.6	8	0.9	40	80	0.2-1.0
	4-6 years			0.7	0.8	11			100	
	7-9 years			600	4800	0.8			1.0	
Boys	10-12 years	600	4800	2.0	1.1	1.3	15	1.6	40	140
	13-15 years				1.4	1.6	13			150
	16-17 years				1.5	1.8	16			200
Girls	10-12 years	600	4800	2.0	1.0	1.2	14	1.6	40	140
	13-15 years				1.2	1.4	17			150
	16-17 years				1.0	1.2	14			200

Source:

National Institute of Nutrition. Dietary Guidelines for Indians: A Manual. National Institute of Nutrition, Indian Council of Medical Research, 2010.



Recommended Dietary Allowances: Minerals

Group	Particulars	Calcium mg/d	Iron mg/d	Magnesium mg/d	Zinc mg/d
Men	Sedentary work	600	17	340	12
	Moderate work				
	Heavy work				
Women	Sedentary work	600	21	310	10
	Moderate work				
	Heavy work				
Children	1-3 years	600	9	50	5
	4-6 years		13	70	7
	7-9 years		16	100	8
Boys	10-12 years	800	21	120	9
	13-15 years		32	165	11
	16-17 years		28	195	12
Girls	10-12 years		27	160	9
	13-15 years		27	210	11
	16-17 years		26	235	12

Source:
National Institute of Nutrition. Dietary Guidelines for Indians: A Manual. National Institute of Nutrition, Indian Council of Medical Research, 2010.



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Annexure – III
Training Certificate

