

Introduction to Maternal Infant Young Children Nutrition
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Lecture - 9
Session - 2

Folate

So, today we are going to talk about folate. Folate is one of the vitamin which is extremely important for the formation of neural tube. So, neural tube is basically the beginning of formation of brain and your spinal cord. So, when you do not have folate in your diet, which is in association with vitamin B12 and choline, you will have baby who is born with defect. So, there are several defects that baby can be born with.

You will see it in a tutorial that I am going to show. But also remember that when this molecule is taken in a chemical form, it is called folic acid. And when it is, when it comes from natural food, it is called folate. So, when you take folic acid from chemicals it has to go through one more step in your body to become folate. Because folate is the one which is used in your metabolic functions, in your biochemical reactions.

So, folate is extremely important and I do recommend that any human who is planning to become pregnant should start taking folate while, when she is deciding, when she decides to plan her pregnancy. Do not wait for till you become preg, till a woman become pregnant. Because, a lot of time it takes almost a month, month and a half to realize that woman is pregnant. And by the time, by third week of gestation, neural tube starts forming already.

So it is important that, women have folic acid during pregnancy, but I also recommend food source because, through food source, definitely, mothers can get a good amount of folate. So, that that is important, and let us see, let us see the tutorial.

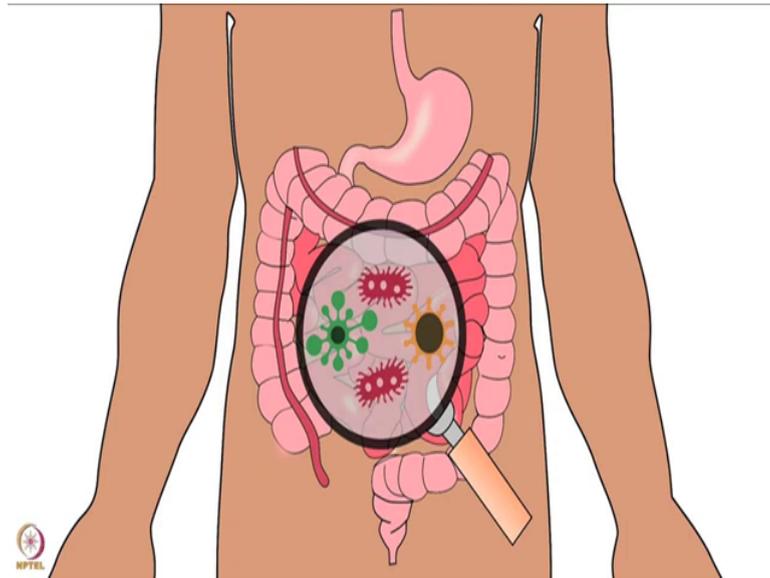
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Misbah Samir - Welcome to the Spoken Tutorial on the importance of folate. In this tutorial, we will learn about role of folate in the body, effects of folate deficiency, requirements or folate for different age groups.

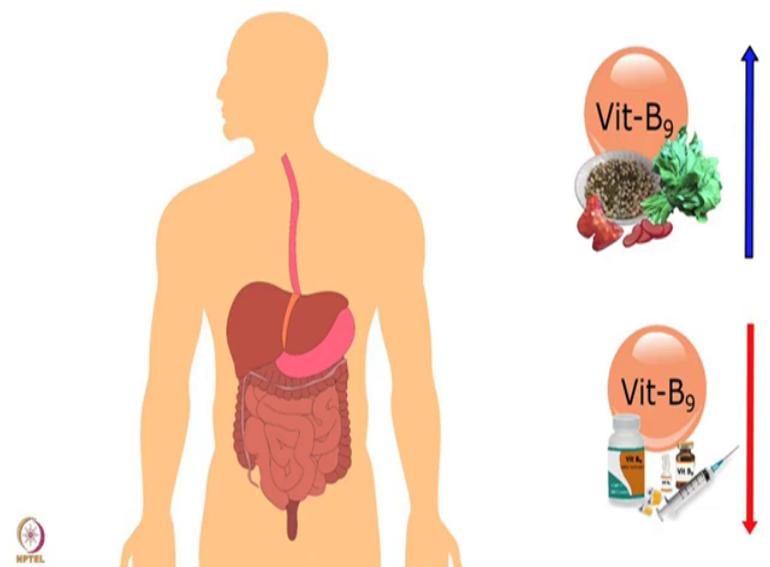
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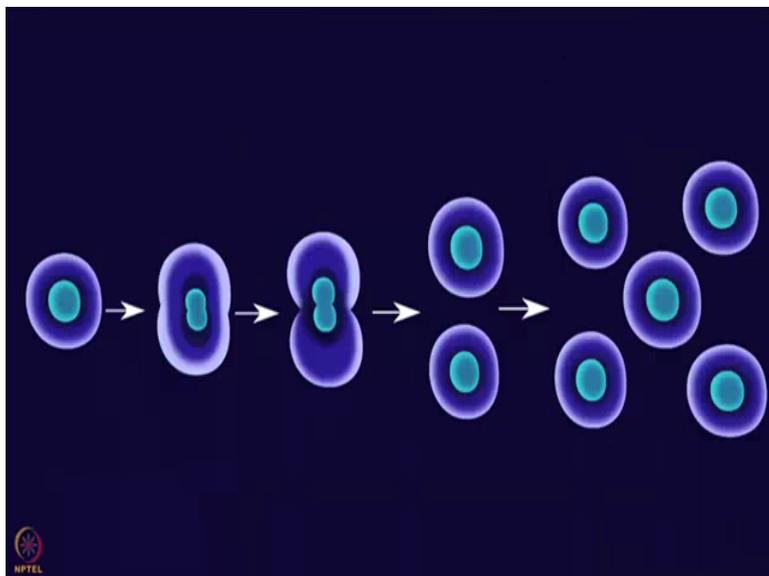
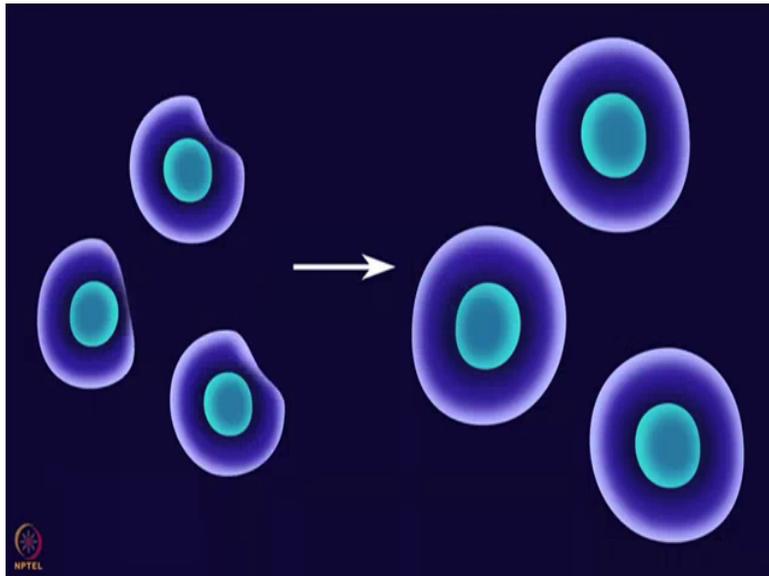




Vitamin B 9 is an important water soluble B vitamin. It has two forms folate and folic acid. Folate is the natural form and is found naturally in foods. Folate is also produced by bacteria in our intestines, whereas folic acid is the synthetic form. It is found in chemically enriched foods or supplements.

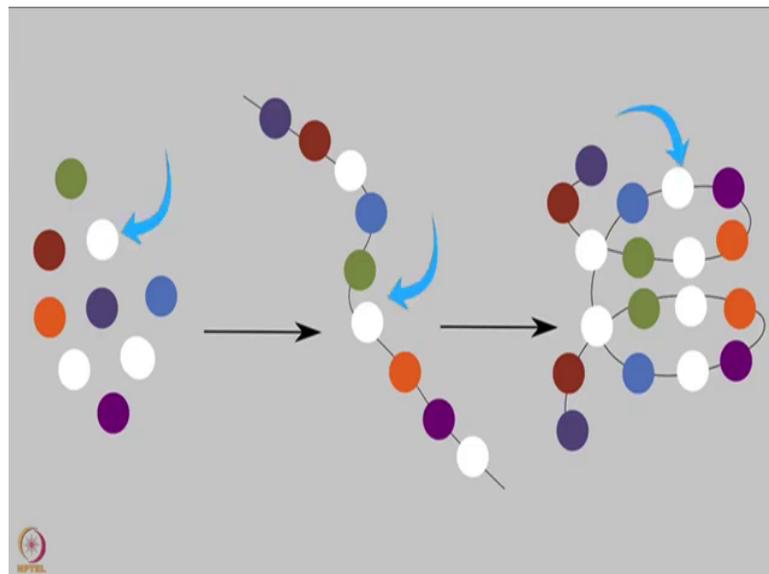
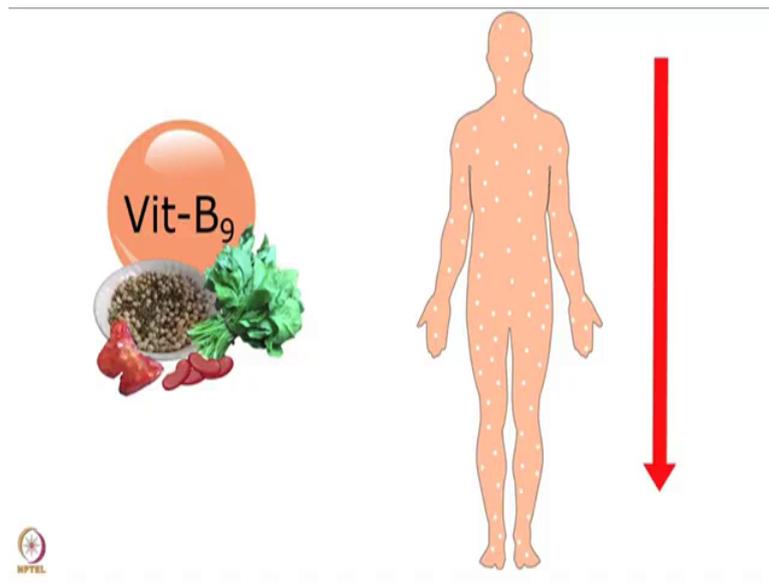
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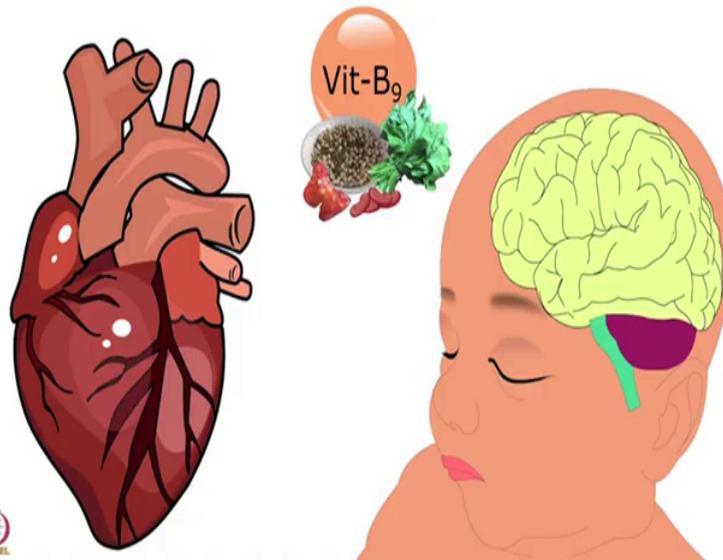
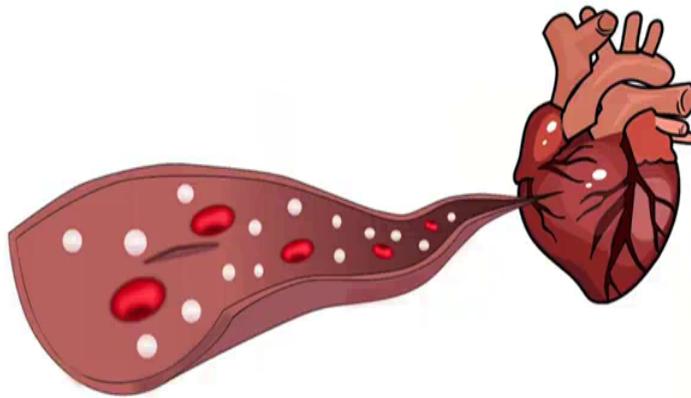




Folate is easily absorbed in our body as compared to folic acid. We will now see the role of folate in our body and the effect of its deficiency. Folate is essential for various functions in our body. Our body needs it for growth, repair, division and production of new cells.

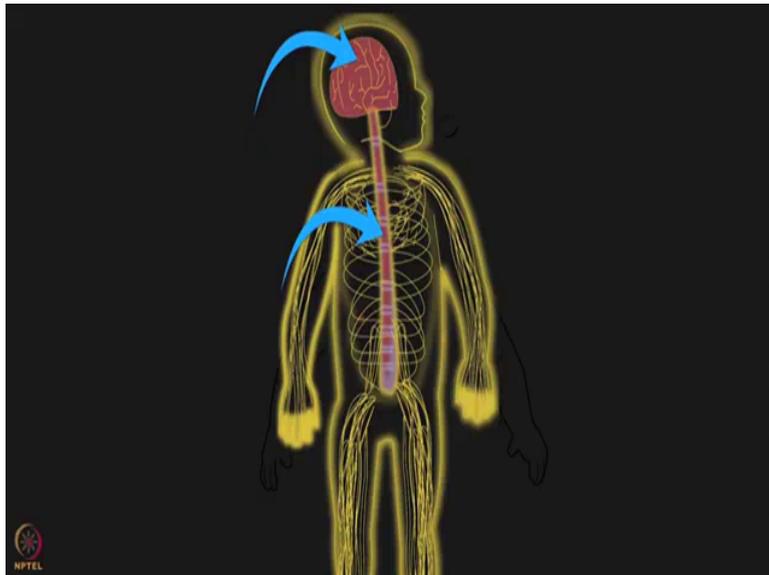
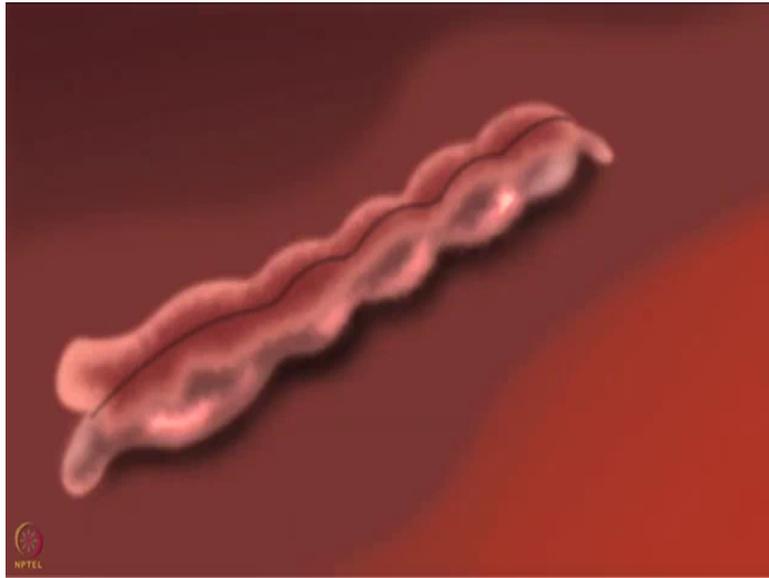
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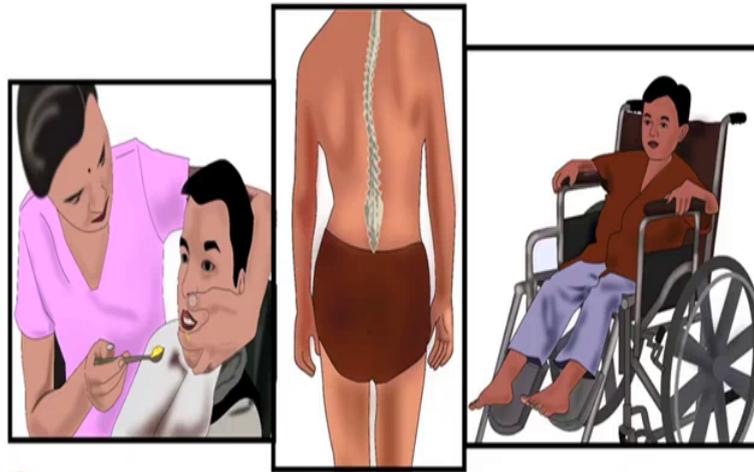
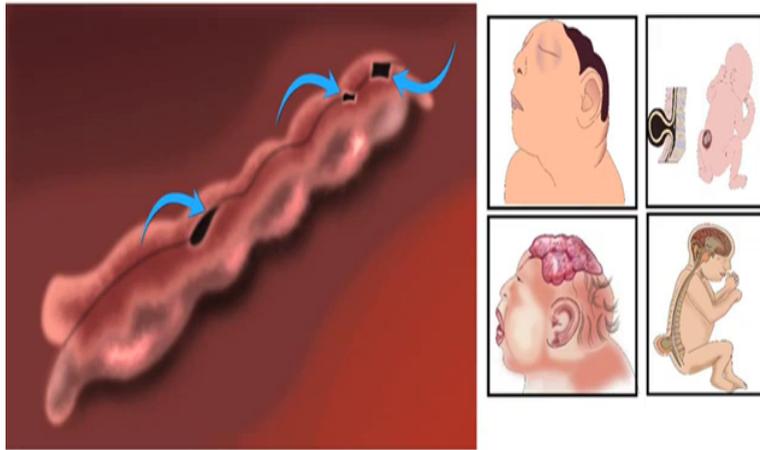




Folate helps in lowering the homocysteine levels. Homocysteine is a type of amino acid used to make protein. High homocysteine levels impairs cognitive function. It also damages the blood vessels of the heart. This increases the risk of heart diseases. Thus, folate helps in maintaining heart and cognitive function.

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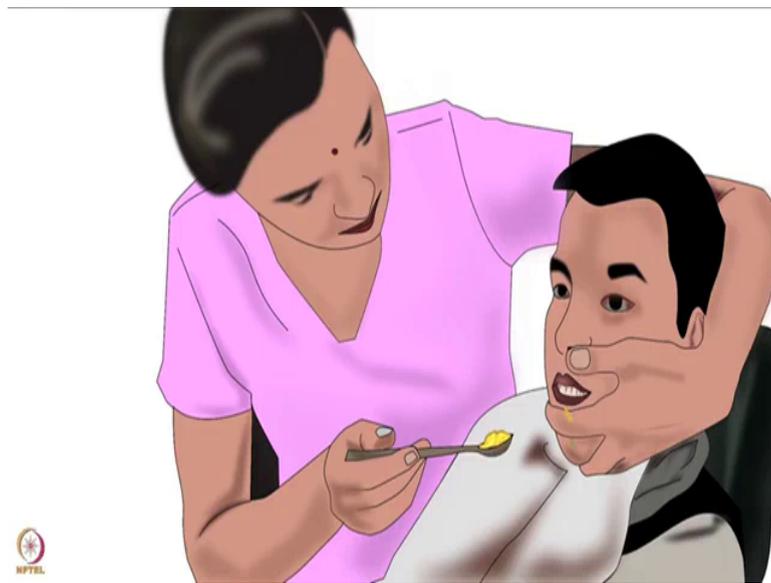


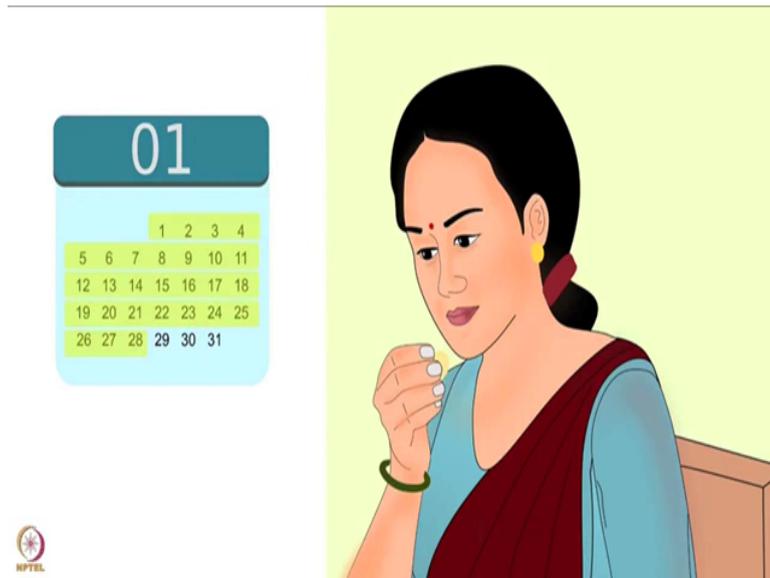


It is also required for a healthy pregnancy and for closure of the neural tube. The neural tube develops into the brain and spinal cord of the baby. Failure in closure of neural tubes may result in neural tube defects. Neural tube defects are the birth defects of the brain and spinal cord. The two most common neural tube defects are anencephaly and spina bifida.

In anencephaly, parts of a baby's brain and skull do not form correctly. In spina bifida, the baby's spine does not develop properly. Thus, the baby can have physical disabilities. This they may develop muscle weakness of the legs and paralysis, curved spine and loss of urinary bladder control are other symptoms.

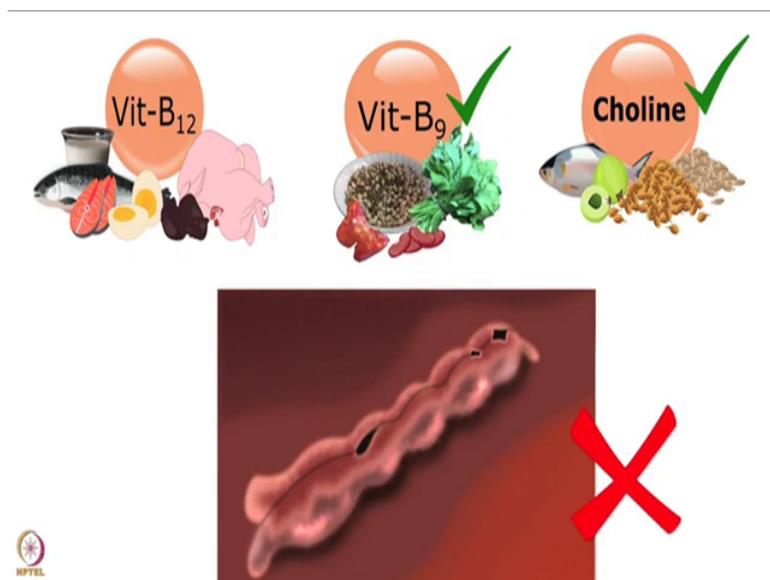
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Difficulty in eating and swallowing is also common. They may also have difficulty in learning and paying attention. Closure of the neural tube takes place within 28 days of conception. Until this time, the woman might not even know that she is pregnant. By the time she knows, it might be too late to prevent these defects.

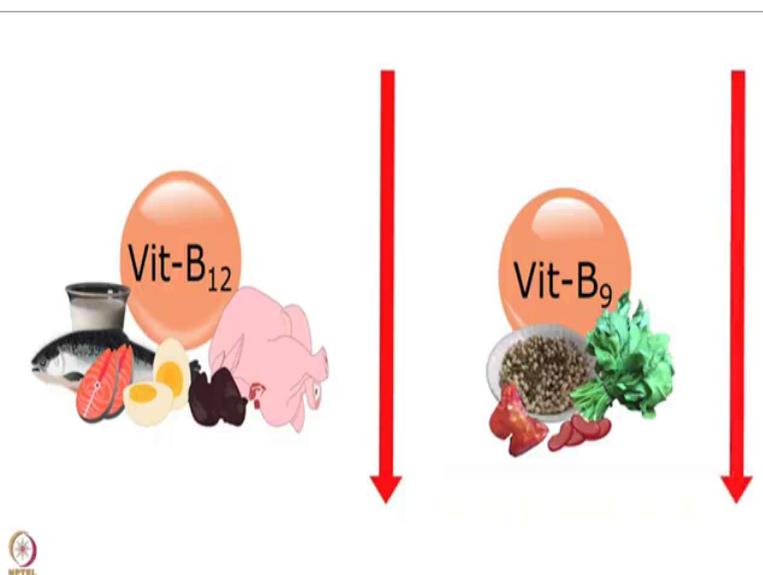
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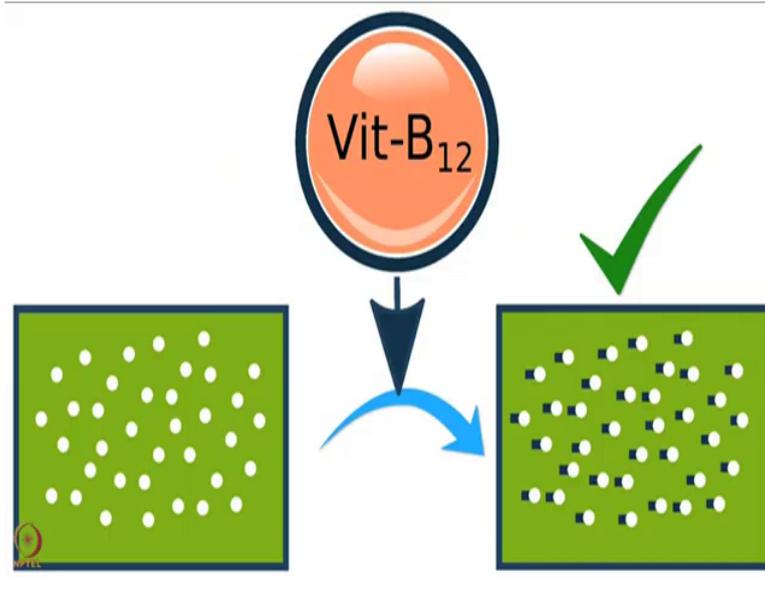




All women, especially of reproductive age, should take adequate folate rich food. Along with folate, other nutrients are important to prevent neural tube defects. For example, vitamin B12, and choline. During pregnancy, the requirements of folate increases. Inadequate intake during this time can result in folate deficiency. Poor absorption of folate by the body can result in deficiency. Even excess of alcohol intake results in the same.

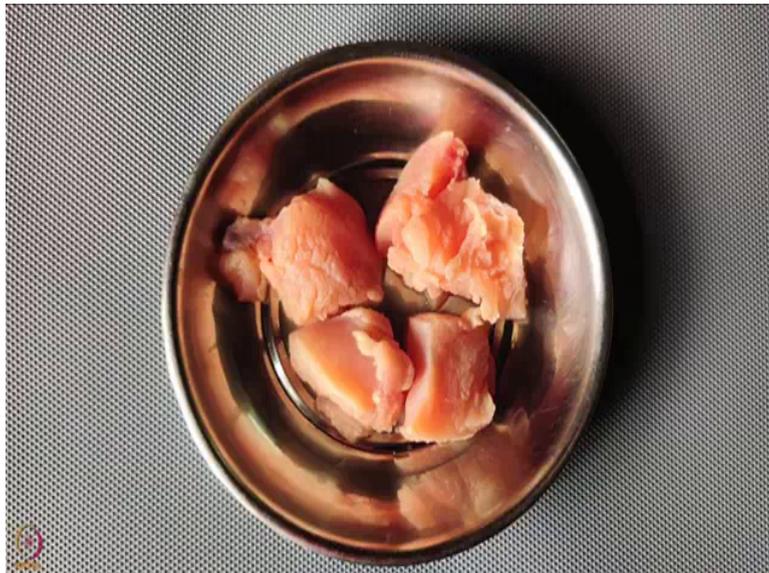
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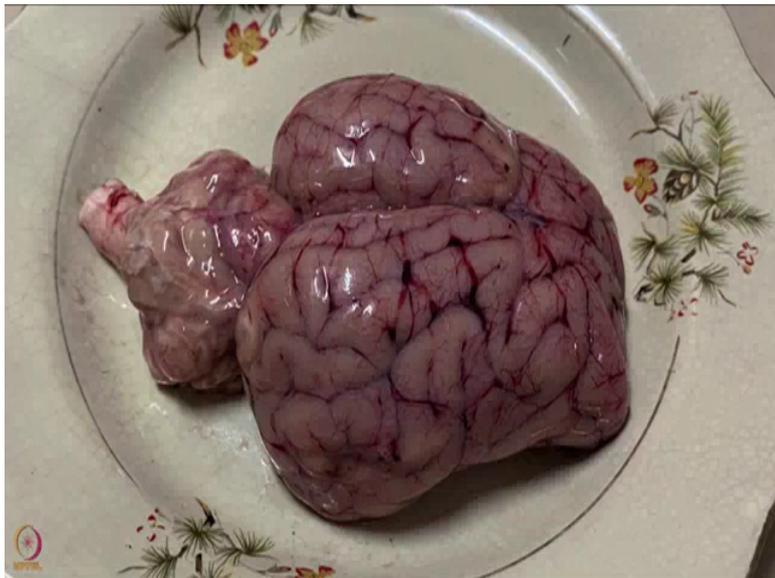
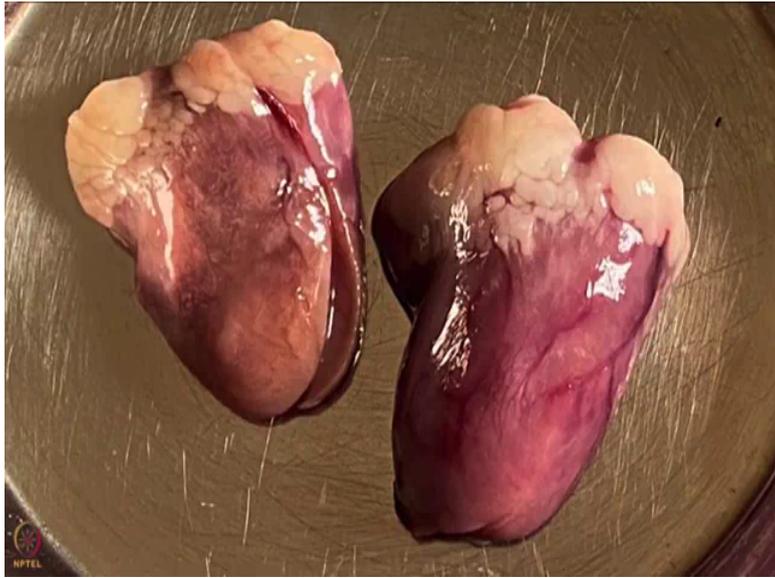


A deficiency of vitamin B 12 can indirectly lead to folate deficiency. Even if folate is present in our body, it will not be able to perform its function. This is because vitamin B 12 is required to convert folate into its active form. Thus, adequate intake of vitamin B 12 along with folate is important.

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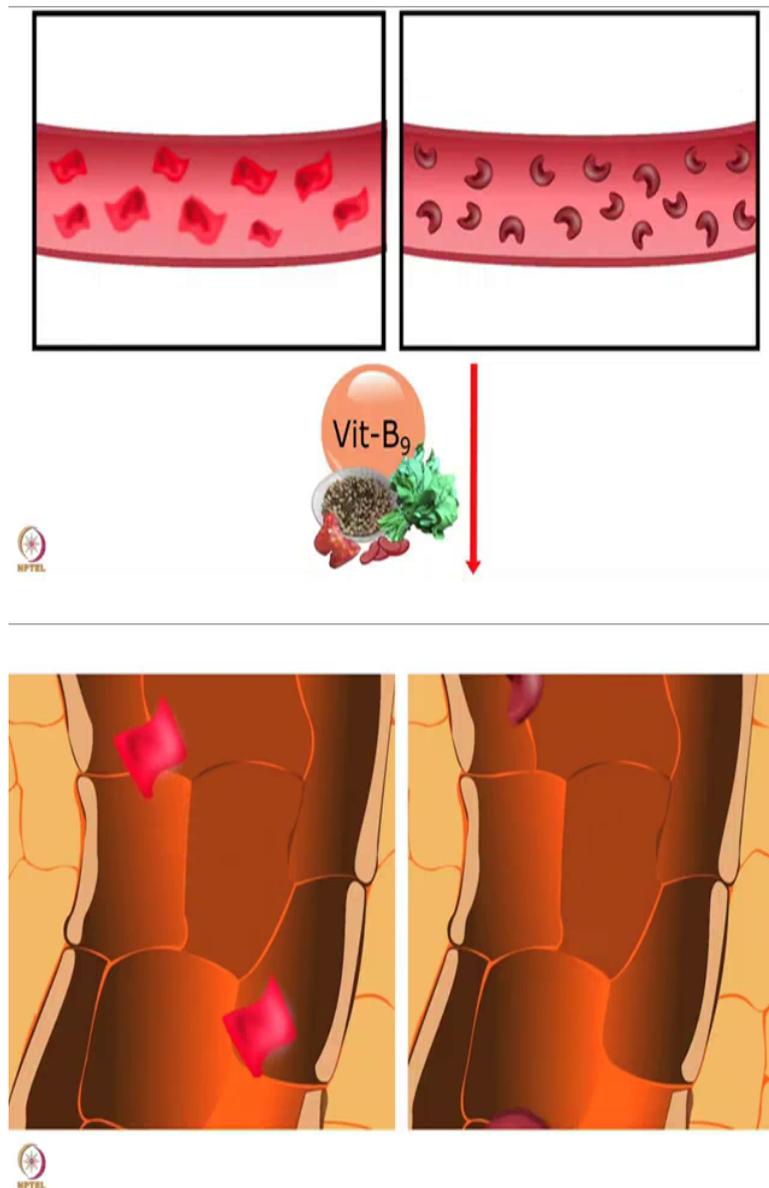






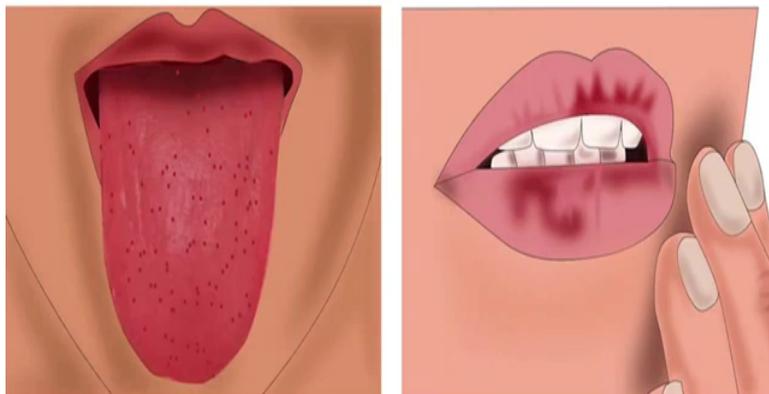
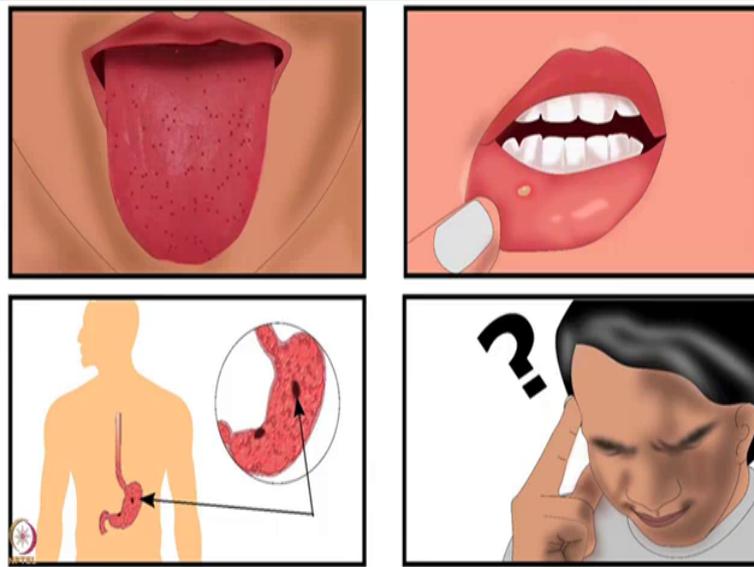
Eggs, chicken, meat and milk products are good sources of vitamin B12. Shellfish, liver, heart, kidneys brain are other examples.

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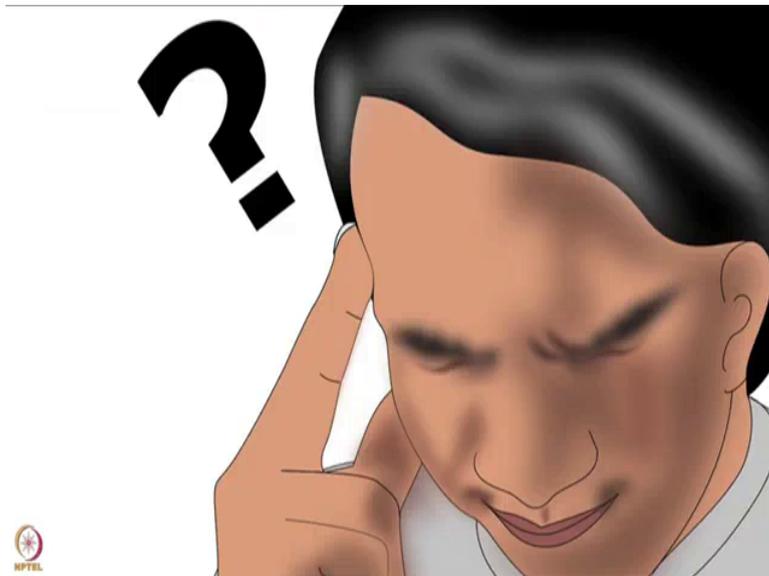


Individuals with genetic anaemia can be at a risk of folate deficiency. Examples of genetic anaemia are sickle cell anaemia and thalassemia. In these conditions, red blood cells are destroyed faster than they can be created. Thus, adequate intake of folate is recommended during these conditions. Please consult your doctor before taking any supplement.

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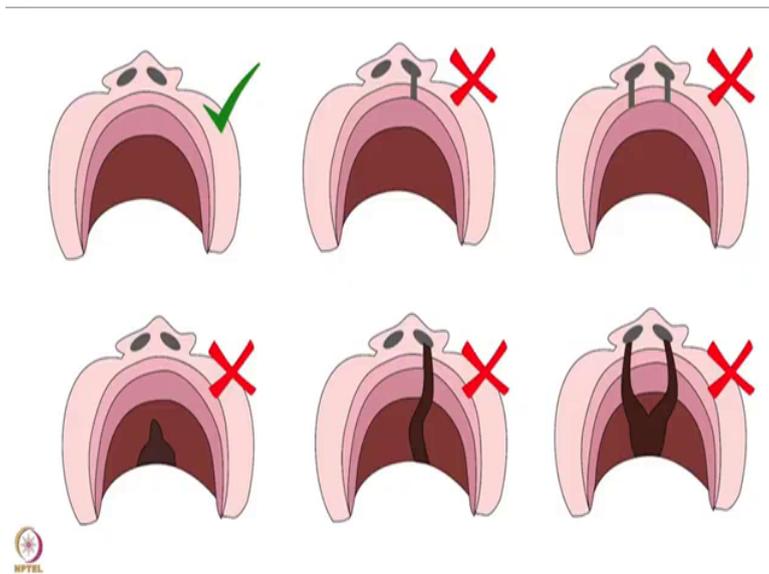
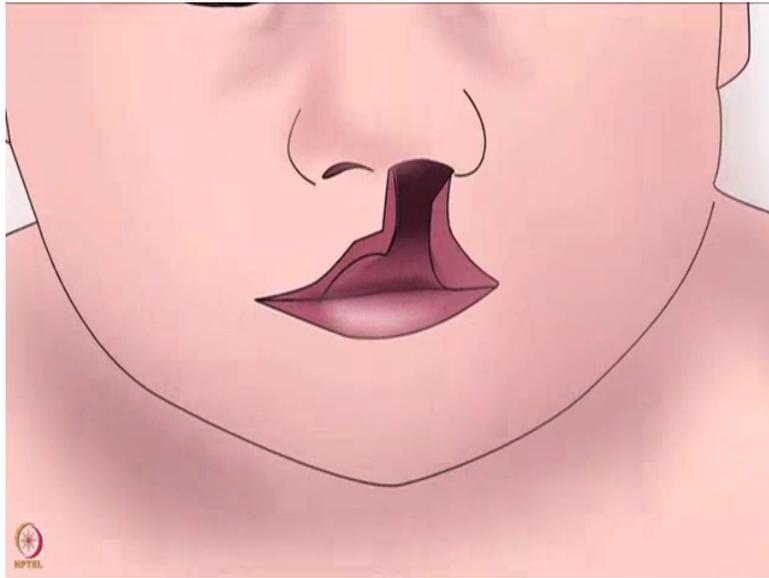


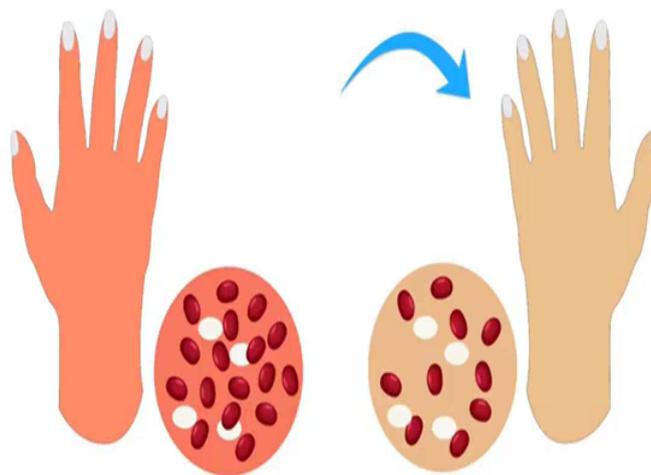
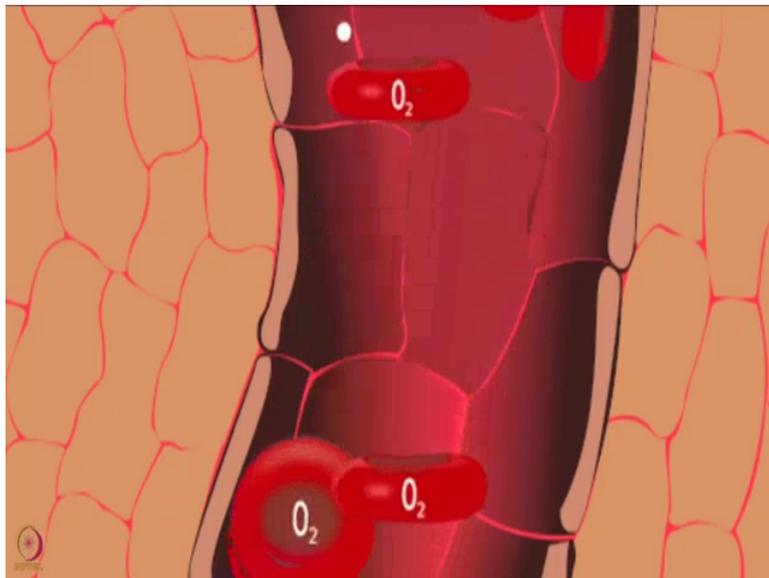
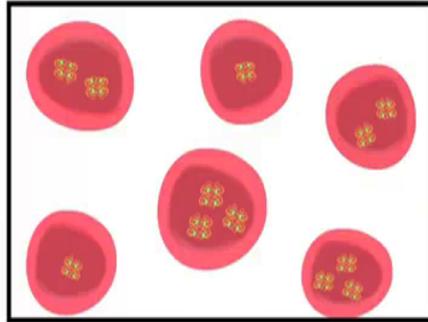
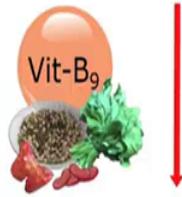




Next, let us look at the symptoms of folate deficiency. These symptoms can be seen in both men and women. Some of the early signs are soreness and redness of the tongue and lips. Other symptoms are fatigue, irritability, sleep disturbances and depression. Ulcers in the mouth or stomach can also occur. Long term deficiency can reduce memory and attention span.

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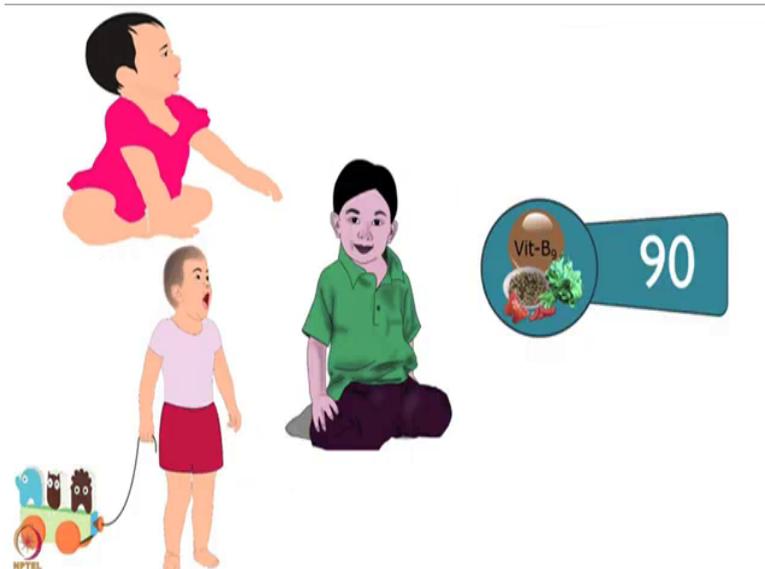




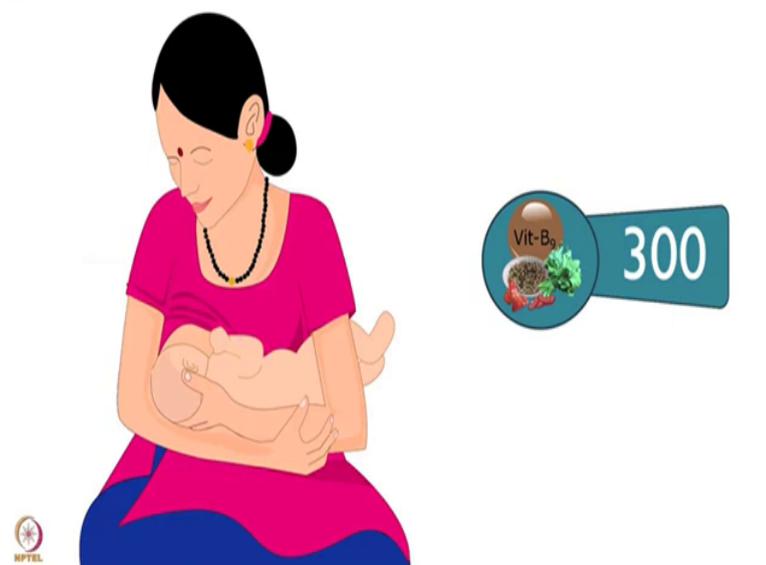
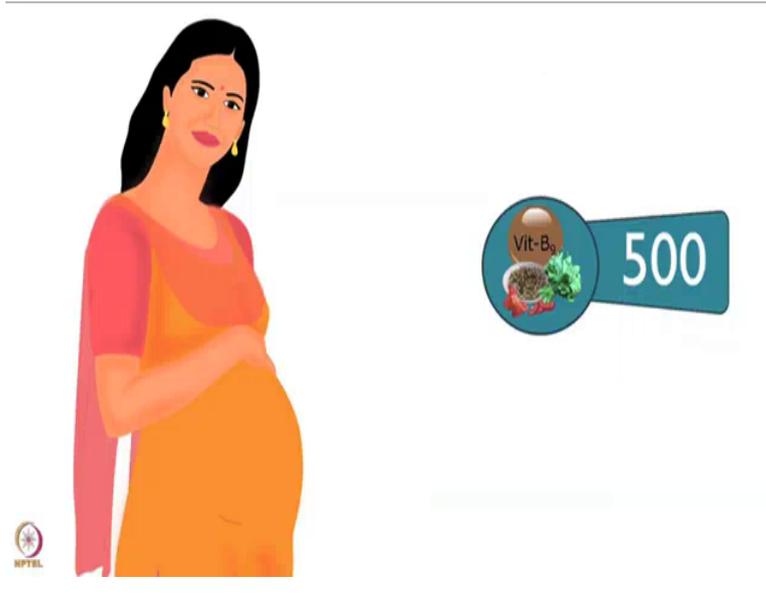
Folate deficiency in pregnant women may have a bad effect on the babies. For example, neural tube defects and cleft lip and palate in babies. A cleft is a gap or split in the upper lip or roof of the mouth. This occurs when the tissues do not fuse together during growth in the womb. Folate or vitamin B 12 deficiency results in macrocytic anaemia. Let me explain to you how this occurs.

Both these nutrients are required for normal cell growth and division. In case of their deficiency, the red blood cells do not mature or divide properly. As a result, large immature red blood cells are formed which are few in number. These have very low haemoglobin in them and are unable to function properly. Haemoglobin helps to transport oxygen to other tissues and cells. Thus, low haemoglobin levels can cause anaemia.

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Let us look at the per day recommendations of folate for different age groups. For 1 to 3 year old children, 90 micrograms is required. For 4 to 9 year old children, it is 110 to 142 micrograms. For 10 to 15 year old adolescents, it is 180 to 204 micrograms.

More than 200 micrograms per day for adolescence above 16 years is recommended. For adult females and males it is 200 to 250 micrograms. Pregnant women should have about 500 micrograms, for breastfeeding mothers it is 300 micrograms.

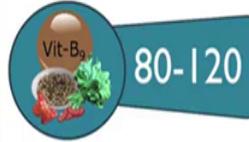
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The requirements of folate are higher for women with a history of birth defects. They should take 500 micrograms before conception and throughout pregnancy. Adequate folate intake is also recommended for women who are planning pregnancy.

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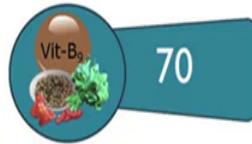




The requirements of folate can be met through diet. Beans are excellent source of folate. 30 grams or half cup of uncooked beans gives about 80 to 120 micrograms of folate. Cowpea, kidney beans, moth beans soya beans are a few examples.

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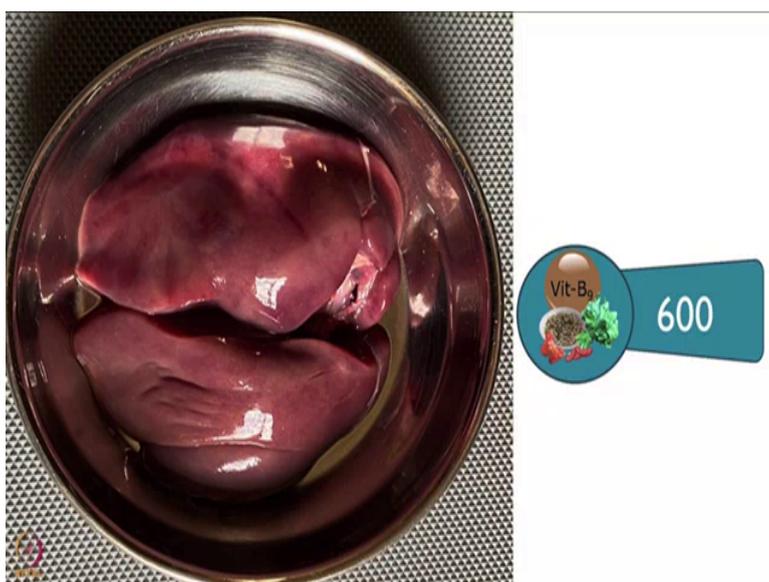




Even Bengal gram, field beans, horse gram dry peas are good sources. Green leafy vegetables are also rich in folate. For example, spinach, amaranth leaves, colocasia leaves. Aghati leaves. 50 grams or one cup of uncooked spinach will give about 70 micrograms of folate. One teaspoon of powdered drumstick leaves gives about 10 micrograms of folate.

Other vegetables rich in folate are tender field beans, French beans and beetroot. Even cauliflower. Ladies finger and drumsticks have moderate amounts of folate. sunflower seeds, mustard seeds and Niger seeds have little amount of folate. One tablespoon of these powdered seeds have about 15 to 20 micrograms of folate.

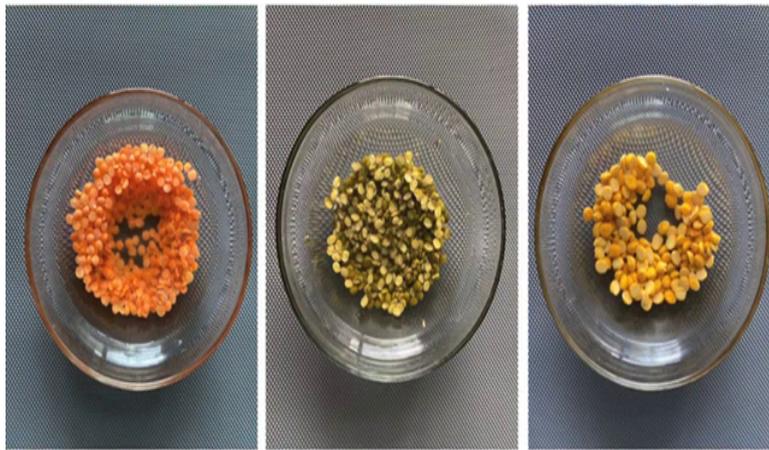
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Among non-vegetarian foods, chicken liver and all seafood are excellent sources. One chicken liver of 60 grams will give about 600 micrograms of folate. 100 grams of any seafood will give more than 700 micrograms. Please note that excessive heat and water decreases folate content. Therefore, avoid overcooking and repetitive reheating of food. Vegetables can be sorted or steamed instead of boiling.

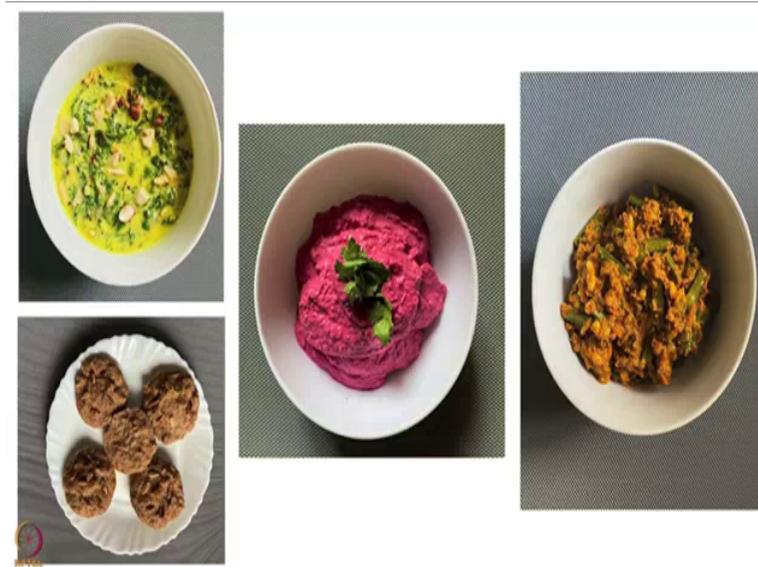
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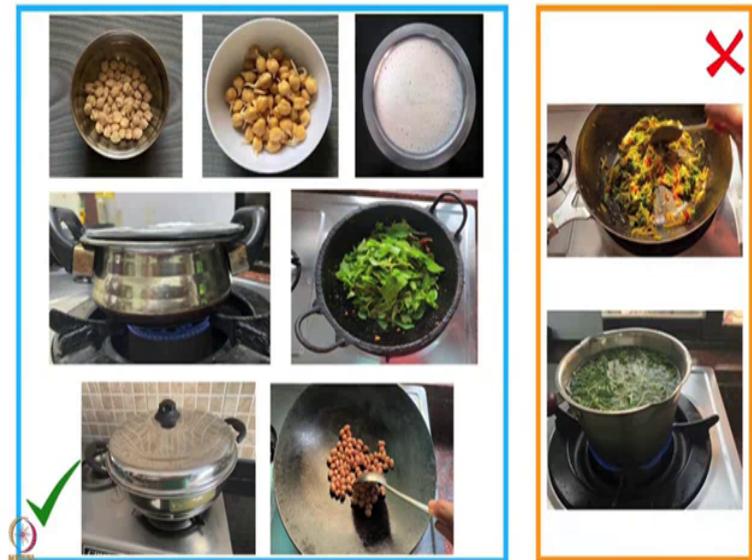




Pulses should always be soaked overnight before cooking. Sprouting and cooking of whole beans enhances its nutrient content, fermentation and roasting will also help to improve the absorption of folate. Adequate intake of folate is very important for our good health. This brings us to the end of the tutorial.

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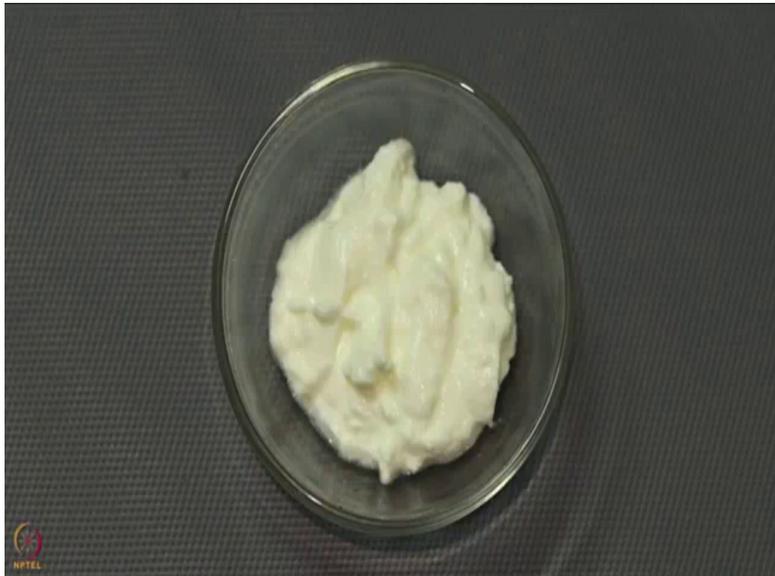
Welcome to the Spoken Tutorial on folate-rich vegetarian recipes. In this tutorial, we will learn about food sources rich in folate preparation of a few vegetarian recipes, ways to prevent the loss of folate from food. First we will understand what is folate and its role in our body. Folate is one of the important B vitamins.

It is required for various functions in the body. Let us see a few examples. Folate is essential for cell growth and repair. It is also required for a healthy pregnancy. This has been explained in detail in another tutorial. Please visit our website for more details. Next, let us look at food sources rich in folate. Beans and pulses are excellent sources.

Green leafy vegetables are also rich in folate. For example spinach, amaranth leaves, Colocasia leaves and Aghati leaves. Some vegetables like cauliflower, drumsticks and lady's finger also have folate. Let us look at the preparation of the recipes now.

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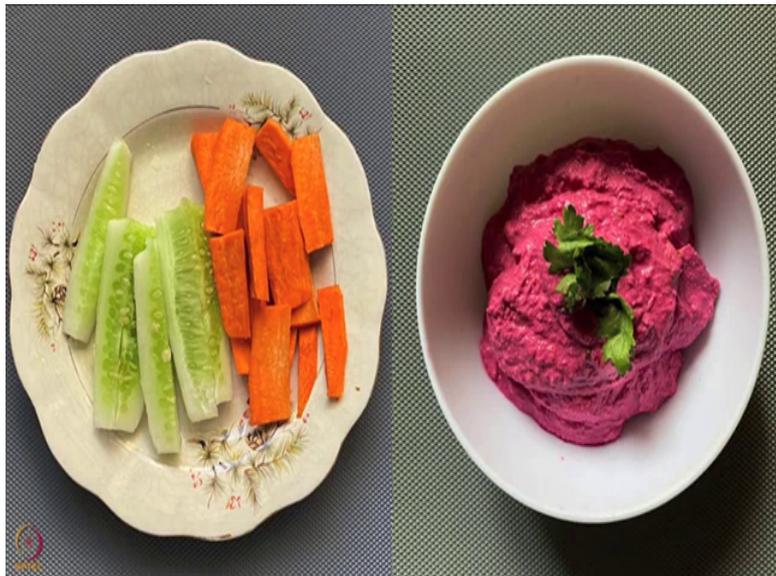
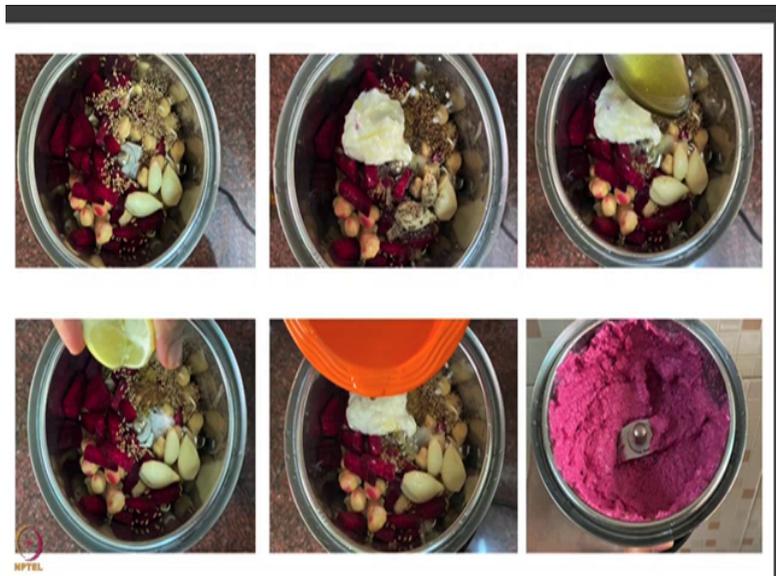




The first recipe is chickpeas dip. To make this recipe you will need two tablespoons of sprouted chickpeas, one teaspoon roasted sesame seeds, one fourth beetroot one tablespoon curd, juice of one lemon, 2 to 3 cloves of garlic, one-fourth teaspoon cumin powder. You will also require one tablespoon of oil and salt according to your taste.

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I will first explain the procedure for sprouting. Wash and soak chickpeas in water overnight, later rinse and drain the water and keep the chickpeas on a strainer to sprout. Keep the chickpeas covered. You can even tie them in a clean cotton or a muslin cloth. It may take one to two days for the sprouts to appear. Once the sprouts appear pressure cook them with half cup of water. Cook on medium flame for 3 to 4 whistles.

Let the pressure release on its own and then open the cooker. Put the sprouted chickpeas in a mixer. Add the rest of the ingredients and make a smooth paste chickpeas dip is ready. You can have this one to two times a day along with your meals. You can even dip sliced carrots, cucumbers in it and eat it one-fourth cup of this dip will give you about 148 micrograms of folate.

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The second recipe is Bengal gram idli. Ingredients required are one-fourth cup or 50 grams of Bengal gram, one-fourth cup or 30 grams of split black gram one tablespoon sunflower seeds, half teaspoon fenugreek seeds, one teaspoon oil or ghee, salt to taste you will also need 2 tablespoons of sprouted finger millet powder.

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To prepare it first sprout the finger millet and then dry it. For drying, roast it or keep it in the sunlight. Finally, grind it to make a powder. I will now tell you the procedure to make the idlies. Wash and soak Bengal gram in a bowl overnight. In a separate bowl, soak the split black gram and fenugreek seeds together. Next morning, rinse and drain off the excess water.

Grind bengal gram, split black gram and fenugreek seeds in a mixer. Make a smooth paste. If needed add 2 to 3 tablespoons of water while grinding. Add sprouted finger millet powder salt and mix it well. Using a spoon. Cover and allow the batter to ferment by keeping it for 6 to 8 hours. It should be kept in a warm place.

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Once the batter rises with clean hands, grease the idli plates with some oil. Pour the batter into the plates. Garnish with some roasted sunflower seeds on top of the batter, placed the plates in a steamer and cook for 10 to 15 minutes. If you do not have a steamer you can also use a cooker without the whistle, fill one-fourth of the cooker or steamer with water and steam the idlies, bengal gram idlies are ready. You can have it with coconut or peanut dip. 5 medium sized idlies will give you about 103 micrograms of folate.

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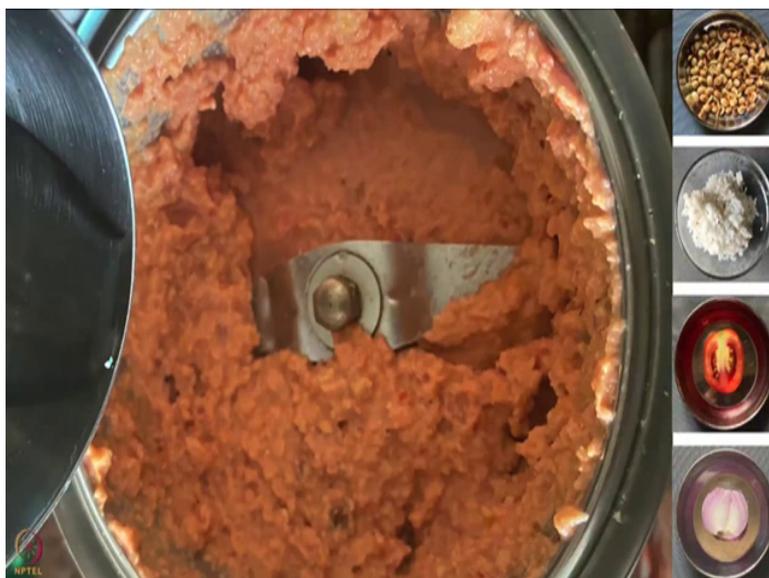




Let us now make cluster beans and sprouted moth bean curry. The ingredients required are 50 grams or a handful of cluster beans, 20 grams or two tablespoons of sprouted moth bean, two tablespoons of roasted peanuts, one tablespoon of grated coconut, half tomato, half onion, half teaspoon of cumin seeds.

Spices required are half teaspoon red chili powder, half teaspoon turmeric powder, half teaspoon cumin powder you will also need one tablespoon of oil or ghee and salt to taste.

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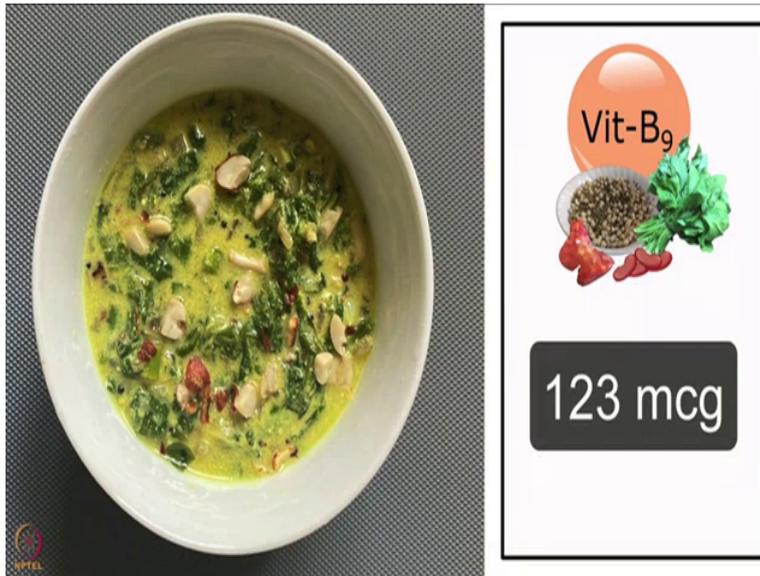
The procedure for sprouting has been explained earlier in this tutorial. Begin with making a paste of roasted peanuts, coconut, tomato and onion. Heat oil in a pan and add cumin seeds once they crackle add the prepared paste. Let the paste cook well until the raw onion smell goes away. Then add the spices and salt in it. Mix it well and let it cook for 3 to 5 minutes.

Next add the chopped cluster beans and sprouted moth beans. Mix everything well and add half cup of water, cover the pan and let it cook on low flame for about 10 to 15 minutes. Cluster beans and sprouted Moth bean curry is ready. A bowl of this recipe will give you about 100 micrograms of folate. You can also make this recipe with sprouts of green gram instead of moth beans. French beans can also be used instead of cluster beans.

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The last recipe is spinach and yogurt curry. For this recipe ingredients required are how half bundle or 100 grams of spinach, three tablespoons of curd, one tablespoon of roasted peanuts, half onion, one teaspoon roasted gram flour, one green chili, one sprig of curry leaves. Spices needed are half teaspoon turmeric powder one-fourth teaspoon cumin powder, one-fourth teaspoon mustard seeds, take two teaspoons of oil and salt according to your taste.

Procedure: Wash the spinach leaves thoroughly and remove its stems. Now steam the spinach leaves. Fill one fourth of a vessel with water. Place a stand in the center of the vessel. Take spinach leaves in a steel plate and place it on the stand, cover the vessel and cook on medium flame for two minutes. Remove the steamed spinach, let it cool and then chop it finally.

In another bowl take curd. Add salt turmeric powder roasted Gram Flour. Whisk it well. Next heat oil in a pan and add mustard seeds and curry leaves, then add chopped garlic onions green chili and sauté well. Once the onions turn pink, add the whisked curd to it. Add cumin powder and cook for two to three minutes. Add one-fourth cup of water and bring the curry to a boil. Switch off the flame and then add chopped steamed spinach.

Garnish with crushed roasted peanuts, spinach and yogurt curry is ready. One bowl of this curry will give you about 123 micrograms of folate. Instead of spinach, you can also use Colocasia leaves or amaranth leaves. As folate is sensitive to heat, some amount of it gets destroyed while cooking. So, based on the raw ingredients folate content of these recipes is calculated. There are many ways by which loss of folate while cooking can be reduced.

Cook on low to medium flame, avoid repetitive heating of food, soak pulses and beans overnight before cooking. This will reduce the cooking duration. For absorption of folate, fermentation and roasting will help. Folate is also sensitive to water, thus steam or sauté vegetables instead of boiling. Sprouting and cooking of whole beans will enhance its folate content to ensure adequate folate intake in your diet. Remember these few points. This brings us to the end of this tutorial.

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Welcome to the Spoken Tutorial on folate rich non vegetarian recipes. In this tutorial, we will learn about food sources rich in folate, preparation of a few non vegetarian recipes. First we will understand what is folate and its role in our body. Folate is one of the important B vitamins. It is required for various functions in the body. Let us see a few examples.

Folate is essential for cell growth and repair. It is also needed for a healthy pregnancy. Folate helps in the prevention of neural tube defects in babies. Neural tube defects are the birth defects of the brain and spinal cord. Benefits of folate have been explained in detail in another tutorial. Please visit our website for more details.

Next, let us look at food sources rich in folate. Beans and pulses are excellent sources. Green leafy vegetables are also rich in folate. Among non-vegetarian foods, fish and sea foods are excellent sources. For example, pomfret, Bombay, duck, Solomon, mackerel, etcetera. Prawns, crabs, lobsters, clams, and fish eggs are also included. Even eggs, chicken or mutton liver are good sources of folate. Let us now begin with the preparation of the recipes.

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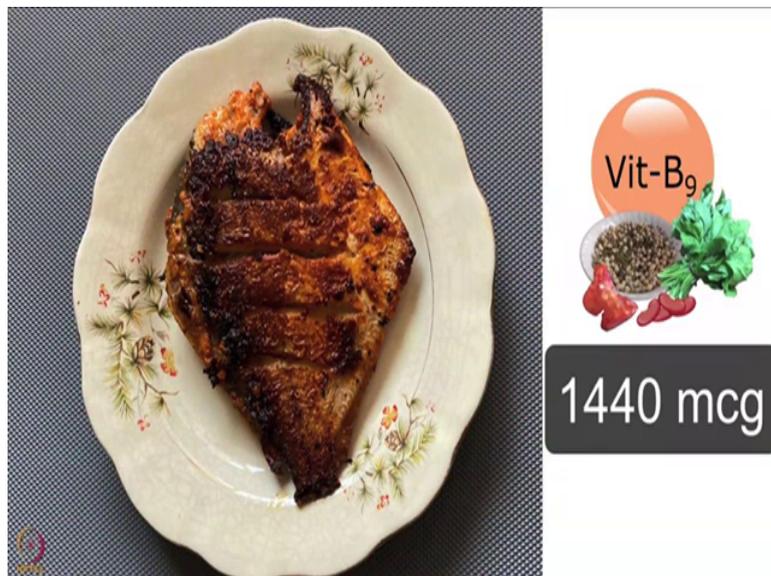
The first recipe is stuffed egg omelette. To make this recipe you will need two eggs handful or 50 grams of spinach, half onion, two tablespoons of milk, two greens chilies, one-fourth teaspoon black pepper powder, half teaspoon cumin seeds, take salt according to your taste and two teaspoons of oil, ghee or butter.

Procedure: wash and chop the spinach leaves finely. Heat oil in a pan and add cumin seeds. Once they crackle add sliced onions and saute it. When the onions turn light pink add green chilies and chopped spinach, sprinkle some salt on it, saute it for 1 to 2 minutes on medium flame and then keep it aside. Meanwhile, crack the eggs in a bowl. Add salt and black pepper powder. Next, add milk into it.

Beat the eggs with the help of a spoon or a fork. Heat oil in a pan. Pour the beaten eggs on the pan. Cook for a minute and flip the omelette. Place the prepared spinach mixture on one half of the omelette for the omelette on to the other half. Stuffed egg omelette is ready. This recipe will give around 290 micrograms of folate. Instead of spinach leaves you can also use other green leafy vegetables. For example, amaranth leaves and agathi leaves.

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The next recipe is fish fry. To make this recipe you can use 150 grams of any fish. I will be making this recipe with Pomfret. Other ingredients required are two tablespoons of curd, one tablespoon of lemon juice, one teaspoon roasted bengal gram flour, one teaspoon ginger garlic paste, half teaspoon cumin seeds powder, half teaspoon red chili powder, half teaspoon garam masala powder.

You will also need salt to taste and one tablespoon of oil, ghee or butter. Procedure: first wash and clean the fish thoroughly make slits on its body. Next take curd in a bowl, add all the ingredients in it except the fish and oil. Mix it well. Apply the prepared paste on the fish and keep it for about an hour. Heat oil in a pan.

Place the fish pieces on the pan and let it cook on low flame on both sides. You can even bake or steam the fish. Fish fry is ready. This recipe has about 1440 micrograms of folate.

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The next recipe is chicken liver masala dry. Ingredients required are 60 grams or 1 chicken liver. One tablespoon of curd, one small onion, half tomato, half capsicum, half teaspoon ginger garlic paste, 5 grams or handful of washed coriander leaves. Spices needed are half teaspoon cumin seeds powder, half teaspoon coriander powder, half teaspoon garam masala powder, half teaspoon red chili powder.

You will also need one tablespoon of oil or ghee and salt to taste. For garnishing you will require juice of half a lemon. Procedure: wash the chicken liver and cut into medium size pieces. Apply ginger garlic paste and curd on it. Add salt and rest of the spices. Mix everything well and keep it for about an hour. Next heat oil in a pan, saute chopped onions in it until they turn light golden.

Then add chopped tomato and capsicum, add the chicken liver and mix everything well. To it add half cup of water. Cover and cook on low flame for 5 to 7 minutes. Garnish it with lemon juice and coriander leaves. Chicken liver masala dry is ready. One bowl of this recipe will give about 610 micrograms of folate.

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Vit-B₉

650 mcg

Our last recipe is prawn curry. For this recipe ingredients required are 50 grams of prawns, half fresh coconut, one small onion, one small tomato, half teaspoon ginger garlic paste, one sprig of curry leaves, half teaspoon mustard seeds. Spices needed are half teaspoon red chili powder, half teaspoon cumin seeds powder, half teaspoon turmeric powder, half teaspoon coriander powder. Take salt according to taste and one tablespoon of oil or ghee.

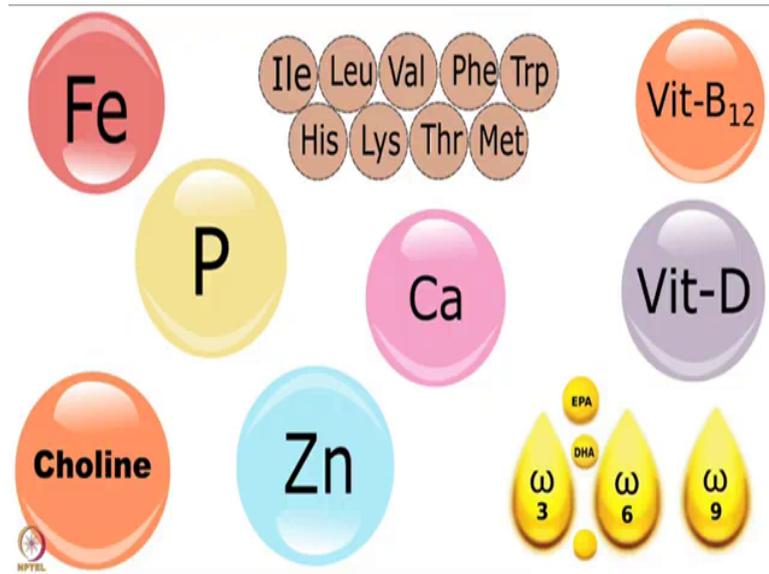
For garnishing you will need one tablespoon of lemon juice and 5 grams or handful of washed coriander leaves. Procedure: first clean and wash the prawns properly. Remove the head and tail of the prawns. Use a knife to carefully make a small slit along the back of the prawn. Then pull out the vein with the tip of the knife or your fingers and discard it. Do this on the others side as well.

Put salt and lemon juice on the prawns. Keep it aside for 15 to 30 minutes. Now I will tell you how to prepare coconut milk. Grind coconut pieces with half cup of lukewarm water. Strain the grounded coconut in a sieve. Then, collect the coconut milk in a bowl. Squeeze the coconut residues with clean hands to extract maximum milk.

Put back the coconut residue in the mixer, add half cup of lukewarm water and grind it again. Strain it and collect the coconut milk for the second time. Repeat the procedure one more time. Keep the collected coconut milk aside for later use. Heat oil in a pan and add mustard seeds and curry leaves. Once they splutter, add chopped onion and saute it for 2 to 3 minutes.

Next add ginger garlic paste, chopped tomato, salt and all the spices. Mix everything well and cook for a few minutes until the tomatoes become soft. Then add prawns into it. Add the extracted coconut milk and cook on low flame for 2 minutes. Garnish with coriander leaves. Prawn curry is ready. One bowl of this curry will give about 650 micrograms of folate.

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All these recipes are rich in others nutrients as well, for example protein, iron, vitamin B 12, choline and omega 3 fatty acid. It also contains zinc, phosphorus, vitamin D and calcium. Please include folate-rich food in your diet for good health. This brings us to the end of the tutorial. Thanks for joining.