



# DIETARY SUPPLEMENTS- USE OR MISUSE

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# DIETARY SUPPLEMENT

A dietary supplement is a product intended for ingestion that contains a "dietary ingredient" intended to add further nutritional value to (supplement) the diet. A "dietary ingredient" may be one, or any combination, of the following substances:

1. A vitamin
2. A mineral
3. An herb or other botanical
4. An amino acid
5. A dietary substance for use by people to supplement the diet by increasing the total dietary intake
6. A concentrate, metabolite, constituent, or extract

- Dietary supplements may be found in many forms such as

- Tablets,
- Capsules,
- Softgels,
- Gelcaps,
- Liquids,
- Powders.

- Some dietary supplements can help ensure that we get an adequate dietary intake of essential nutrients; others may help us reduce our risk of disease.

# VITAMINS

## The thirteen essential vitamins are ----

- Fat soluble(A,D,E,K)
- Water soluble vitamins vit. C, B<sub>1</sub> (thiamine), B<sub>2</sub> (riboflavin), B<sub>3</sub> (niacin), B<sub>6</sub>, B<sub>12</sub>, pantothenic acid, biotin and folate (folic acid).

- ❑ Fat soluble vitamins are stored in the body for prolonged periods and as a class deal with the regulation of protein synthesis.**
- ❑ Vitamin C and B-complex vitamins are stored to a limited extent (except B12) and frequent consumption is necessary.**
- ❑ B-complex vitamins generally form coenzymes and catalyse the oxidation of small molecules in the production of energy.**
- ❑ Vitamin C is an anti-oxidant and plays a specific role in the hydroxylation of specific compounds.**
- ❑ A well balanced diet is able to provide most vitamins and micronutrients except B12 in strict vegetarians.**

# VITAMIN CONTENT OF COMMON FOOD ITEMS

Vitamin	Thiamine	Riboflavine	Nicotinic Acid	Vitamin C	Vitamin A	CaroteneIU <sup>b</sup>	Vitamin D
(Recommended daily allowance)	(1500) µg	(1700) µg	(19) mg	(60) mg	(1000) IU		(200) IU
Rice, milled, boiled 1 cup	27	11	1.0	-	-	-	-
Wheat chapatti 15g	45	45	0.9	-	-	-	-
Egg medium, boiled 48gms	40	130	1.6	-	550	-	27
Milk, cow, 1 cup	100	360	2.3	4	300	-	8
Bengal gram (chana dal) 1 cup	87	127	1.1	-	-	-	-
Black gram (urad dal) 1 cup	76	92	1.5	-	-	-	-
Lentil (masur dal) 1 cup	81	125	1.0	-	-	-	-
Cabbage, cooked, ½ cup	40	40	-	58	-	-	-
Carrot, raw 1 large	60	60	-	-	-	12000	-
Roast chicken 100 gms	80	180	13	-	-	-	-
Mutton, lean 30 gms	70	95	4.2	-	-	-	-
Ghee 1 teaspoon	-	-	-	-	165	-	5
Butter 1 teaspoon	-	-	-	-	165	-	2

# CANADA'S FOOD RULES APPROVED BY THE CANADIAN COUNCIL ON NUTRITION 1944

Milk.-Adults, 1½ to 1 pint.  
Children 1½ pints to 1 quart.

Fruit.-One serving of citrus fruit or tomatoes or their juices; and one serving of other fruit.

Vegetables.-At least one serving of potatoes; at least two servings of other vegetables, preferably leafy, green or yellow, and frequently raw

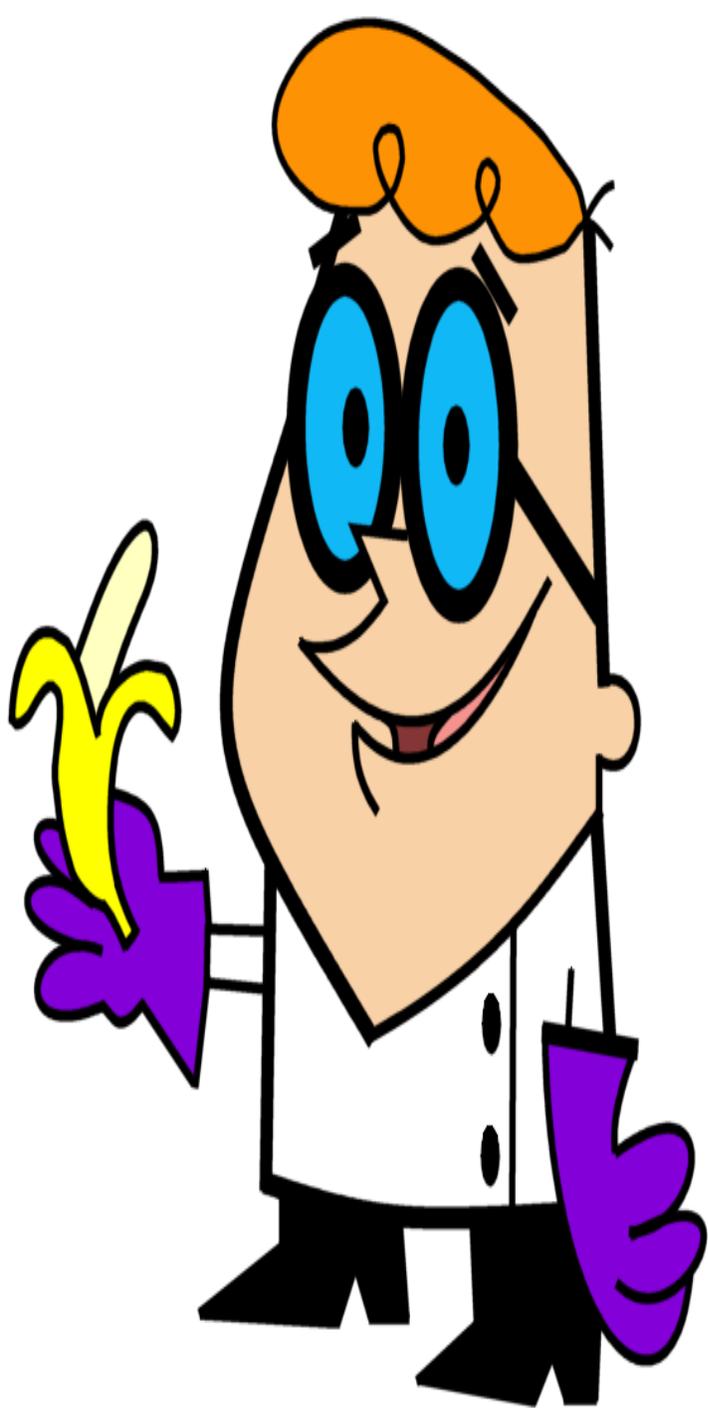
Cereals and bread.-One serving of a whole-grain cereal and at least four slices of Canada Approved Vitamin B bread (whole wheat, brown or white), with butter.

Meat and fish.-One serving of meat, fish, poultry or meat alternatives such as beans, peas, nuts, eggs or cheese.

A fish liver oil, as a source of vitamin D, should be given to children and expectant mothers, and may be advisable for other adults.

Also use eggs and cheese at least three times a week each, liver frequently

Iodized salt is recommended.



**In the absence of organic disease, the individual who consumes a diet, adequate in calories, and consisting of reasonable quantities of milk, fruits, green vegetables, cereals, meat and eggs, does not need additional vitamins.**



# ROLE OF VITAMINS:

On the one hand we must emphasize the importance of vitamins in the maintenance of health and strength. In this connection it is necessary to say that the only way of providing a full vitamin intake is by means of an adequate diet. This is true for many reasons:

Firstly

Because we do not know any chemical diet that will give as good results as one formed of natural foods, so there must be many factors yet undiscovered

Secondly

Many of the vitamins that are available in concentrated form are too expensive to provide in other than food

Thirdly

People get tired or careless about taking pills, while they must always continue to eat foods

# INDICATIONS OF VITAMINS AND MINERALS

Vitamins and minerals in therapeutic amounts (normally 5-10 times, the recommended daily allowance) are indicated for-

- The treatment of deficiency states or ,
- Pathologic conditions in which absorption and utilisation of vitamins is reduced or ,
- When requirements are increased.

## **1. Pregnant women or women who may become pregnant:**

- a) Folic Acid
- b) Iron
- c) A prenatal vitamin may contain both folic acid and iron, as well as other important vitamins and minerals both mother and baby need for proper nutrition

## **2. Vegetarians and vegans:**

This population should ensure adequate intake of vitamin B12, vitamin D, calcium, iron, and zinc.

## **3. Women with heavy menstrual bleeding:**

This population should consume extra iron, which acts to replace that which is lost due to blood loss.

## **4. Those with a restrictive diet (1,600 calories per day or less):**

Supply all of the necessary vitamins and nutrients to meet the body's needs—and these individuals should consume a multivitamin and/ or multimineral supplement.

**5. Older adults (50+), menopausal, and postmenopausal women:**

These individuals should consume vitamin B12, calcium, and a vitamin D supplement.

**6. Partially breastfed infants:**

Since human milk is a poor source of vitamin D, infants who are solely breastfed or drink less than 1 quart per day of vitamin D-fortified formula or milk should receive a supplemental form of vitamin D.

**7. Limited milk intake and sunlight exposure:**

Dairy products and sunlight exposure are two primary means of obtaining vitamin D, therefore if either is limited, a supplemental form may be necessary.

**8. Health conditions that may limit nutrient use and absorption:**

Those with health conditions that may affect digestion, appetite, and limit nutrient absorption, may not be receiving adequate nutrients from diet alone (examples include those with food allergies, physical trauma, and gluten intolerance).

**9. In addition, they are also recommended for the treatment of nonnutritional disease in which a large dose has a unique effect independent of nutritive activity—**

- Alcoholic neuritis and wernicke's syndrome (thiamine)
- Hyperlipoproteinaemias (niacin)
- To prevent neuropathy in those on isoniazid (pyridoxine)
- Sideroblastic anemia (pyridoxine)
- Infantile seborrhea (biotin)
- Acute promyelocytic leukaemia (all-trans-retinoic acid)

HILARY CLINTON SAID---

I take vitamins .

CATHERINE BELL SAID---

I take lots of vitamin and powders to  
remain healthy

Alyssa milano ,the famous actress said---

I take vitamins ,I work out  
everyday

ROBERT ATKINS, THE FAMOUS AMERICAN  
NUTRITIONIST SAID

You take the healthiest diet in the world, if you gave those people vitamins, they would be twice as healthy. So vitamins are valuable.

# RUFFIN' HAS SAID,

- "It is a physician's personal responsibility to prevent his patients from becoming victims of needless and expensive vitamin therapy, and to point out that vitamins are not a panacea for all human ills".

- The term multivitamin came into vogue sixty years ago when Miles Laboratory, United States marketed a combination of Vit A, Vit D,  $\beta$ -carotene, B-vitamins and micronutrients (iron, calcium etc). Since then a number of combinations have been marketed as multivitamins.
- The National Health and Nutrition Examination Survey (NHANES) USA, defines multivitamin as a formulation containing three or more vitamins with or without minerals .
- These may be marketed as specialised products such as multivitamin for men, senior women, menopausal women, persons with diabetes, for energy, for hair growth and so on.

## MULTIVITAMIN AS HEALTH PROMOTER: IS IT EVIDENCE BASED ?

Both observational studies and randomised controlled trials (RCT's) have been conducted for studying effect of single nutrient supplementation or multivitamins in healthy individuals---

Antioxidants—

- vitamin C,
- vitamin E and
- $\beta$  carotenes found in vitamin A preparation

They scavenge free radicals and other reactive oxygen species that damage cellular membranes, organelles and macromolecules.

There has been an interest in assessing the role of antioxidants in cardiovascular disease and cancer.

Several studies have shown that---

# VITAMIN E

- vitamin E in doses higher than recommended daily allowance had cardio protective effect.
- Low density lipoprotein concentration decreased significantly in blood taken from subjects receiving vit. E >200 IU a day.
- A significant decrease in non-fatal myocardial infarction in high risk subjects consuming either 400 or 800 IU vitamin E/day as supplement.
- Vitamin E was also shown to be effective in prevention of cancer .
- ❖ However, Lee et al, in a randomised controlled trial (Women's Health Study) using vitamin E 600 IU on alternate days in women >45 years, found no overall benefit for prevention of major cardiovascular diseases or cancer. The strength of the study lies in the fact that it involved a large population (39,876) studied over a long duration (10.1 years) of time.

## B CAROTENE

- People with high intake of  $\beta$  carotene or high blood concentration of this nutrient have reduced risk of various diseases including cancer and heart disease.
- The effect has been attributed to antioxidant properties of  $\beta$  carotene.
- However when a RCT used  $\beta$  carotene and  $\alpha$  tocopherol in Finnish smokers to test this hypothesis, there was an increase rather than decrease in the incidence of lung cancer in the  $\beta$  carotene group .

## FOLATE AND VITAMIN B6

- Higher intake of folate has been inversely associated with coronary heart disease (CHD), possibly due to decrease in homocysteine levels.
  - The Nurses Health Study, a prospective cohort study of 1,21,700 nurses in the United States suggested that intake of folate and vitamin B6 above the recommended dietary allowance may be beneficial for primary prevention of CHD among women.
  - The primary sources of folate in this study were multivitamin and diet.
- ❖ However a recent RCT has come up with contradictory evidence. A combination pill of folic acid (2.5mg), Vit B6 (50 mg) and Vit B12 failed to reduce cardiovascular events among high risk women despite reduction in homocysteine levels .

## SELENIUM

Selenium in doses of 200  $\mu\text{g}$  (thrice the recommended daily intake) was used in a multi centre double blind, placebo controlled trial to determine whether it decreased the incidence of cancer and after a follow up of 6.4 years they found—

- There was a significant reduction in cancer mortality, incidence of --
  1. Carcinoma of lung
  2. Prostate carcinoma
  3. Colorectal carcinoma
- There was no decrease in the incidence of --
  1. Squamous cell carcinoma
  2. Basal cell carcinoma

### Nutrient content of “Standard” multivitamin tablet\*

1. Vitamin A	2500 IU	11. Vitamin K	10 µg	21. Chromium	25 µg
2. Thiamine mononitrate	1 mg	12. Zinc	15 mg	22. Molybdenum	25 µg
3. Vitamin B <sub>2</sub>	1.5 µg	13. Potassium iodide	0.15 mg	23. Selenium	30 µg
4. Vitamin B <sub>12</sub>	1 mg	14. Ferrous fumarate	10 mg	24. Nickel	5 µg
5. Vitamin C	50 mg	15. Magnesium	100 mg	25. Tin	10 µg
6. Vitamin D	200 mg	16. Manganese	2.5 mg	26. Silicon	2 mg
7. Alpha tocopherol	7.5 mg	17. Copper	2 mg	27. Vanadium	10 µg
8. Calcium pantothenate	5 mg	18. Calcium	162 mg	28. Boron	150 µg
9. Folic acid	15 mg	19. Potassium chloride	40 mg		
10. Nicotinamide	20 mg	20. Chloride	36.3 mg		

\* Branded multivitamin tablet available at service hospital

# Do Vitamin and Mineral Supplements Pose a Health Risk?

- 📊 Large doses of either single-nutrient supplements or high potency vitamin mineral combinations may be harmful.
- 📊 These megavitamins may contain 10 to over 100 times the Dietary Reference Intake (DRI) for a vitamin or mineral and can act like drugs with potentially serious results.
- 📊 Very high doses of many supplements, especially vitamins A, D, C, and B6, can cause serious health problems if taken regularly.
- 📊 Excess of one nutrient may cause nutritional imbalances or increase the need for other nutrients.
- 📊 Severe side effects such as kidney stones, liver or nerve damage, birth defects, and even death can occur from 10 to over 100 times of the DRI.

🏗️ Taken in high amounts, some supplements may produce undesirable effects such as fatigue, diarrhea and hair loss.

🏗️ Others may cause more severe side effects such as kidney stones, liver or nerve damage, birth defects, or even death.

🏗️ At high levels, single-nutrient supplements function as a drug in the body and not as a nutrient.

🏗️ Fat-soluble vitamins such as vitamins A and D are harmful in high doses.

🏗️ Vitamin E may act as a blood thinner and should not be taken for at least one week prior to surgery.

🏗️ Many factors influence toxicity.

- i. Supplement potency,
- ii. dose (number and frequency),
- iii. body size, and
- iv. how long the supplement is taken

## Vitamin A (retinol)

- Hepatotoxic effects, visual changes, hair and skin changes, teratogenic effects at intake >1000-1500 IU/day;
- Potential increased risk of hip fracture at intake >5000 IU/day

## Beta carotene (provitamin A)

- Risk of lung cancer among smokers and people with asbestosis at intake >3000 IU/day;
- Yellowing of skin,
- Diarrhea and
- Arthralgias

## Vitamin C (ascorbic acid)

- Diarrhea, gastric upset at intake >2000mg/day

# Vitamin D

(at intake >2000 IU/day)

- Soft tissue calcification
- Hypercalcemia

# Vitamin E

(at intake  
> 800IU/day)

- Nausea, vomiting, diarrhoea,
- Possible antiplatelet effects,
- Headache,
- Fatigue and
- Blurred vision

# Vitamin B6 (pyridoxine)

(Regular intake >200 mg/day)

- Sensory neuropathy
- ataxia

## Niacin (vitamin B)

(at intake > 3000 mg/day)

- Vasodilatation,
- Gastrointestinal upset
- Hyperglycemia
- Potential interactions with statins, antihypertensive drugs
- Hepatotoxic effects may occur

## Vitamin B

(cyanocobalamin)

- No upper limit known.

<b>Myth</b>	<b>Fact</b>	<b>Healthy Suggestion</b>
<b>“Vitamin and mineral supplements can make up for an unhealthy diet.”</b>	<b>Supplements supply only a fraction of the nutrients needed daily, and are not a quick fix for suboptimal food choices.</b>	<b>Consuming whole foods will provide these components naturally, in much higher levels.</b>
<b>“Consuming large quantities of supplements will lead to optimal health.”</b>	<b>The body will only use the vitamins and minerals that it needs. Any extra will be excreted or may pose a risk for toxicity.</b>	<b>Consult a doctor or dietitian before consuming any supplement, and avoid consuming large quantities of supplements.</b>

<b>Myth</b>	<b>Fact</b>	<b>Healthy Suggestion</b>
“More expensive vitamin and mineral supplements are worth the extra cost.”	The cost of the vitamin does not necessarily translate to quality.	Consider purchasing your vitamins from well-known retailers that restock frequently.
“Taking supplements that contain antioxidants such as vitamin A, E, and C will prevent cancer and heart disease.”	Antioxidant supplements do not offer protection against cancer or heart disease, and may even do some harm.	Consuming foods rich in antioxidants, such as green vegetables, citrus fruits, deep-orange colored product, and other fruits and vegetables have many cancer and disease fighting properties.
“Osteoporosis can be prevented by consuming calcium supplements.”	Many factors such as calcium, estrogen levels, exercise, gender, body size, smoking, race, and genes, contribute to the development of osteoporosis.	While calcium consumption from foods such as milk and yogurt is the best way to meet daily needs, a daily calcium supplement with vitamin D may be beneficial if calcium intake is below recommended levels.

<b>Myth</b>	<b>Fact</b>	<b>Healthy suggestions</b>
<b>“Supplements with added enzymes are easier to digest.”</b>	<b>The body makes its’ own digestive enzymes to breakdown and absorb supplements.</b>	<b>Added enzymes are unnecessary</b>
<b>“Those who are sick or stressed will benefit from vitamins.”</b>	<b>Emotional stress does not increase nutrient needs. Physiological stress such as burns, trauma, and surgery, do increase nutrient needs, and a supplement may be prescribed.</b>	<b>Individuals who are sick or stressed should aim for a healthful balanced diet with adequate intake of all recommended vitamins and nutrients.</b>

# FDA Actions

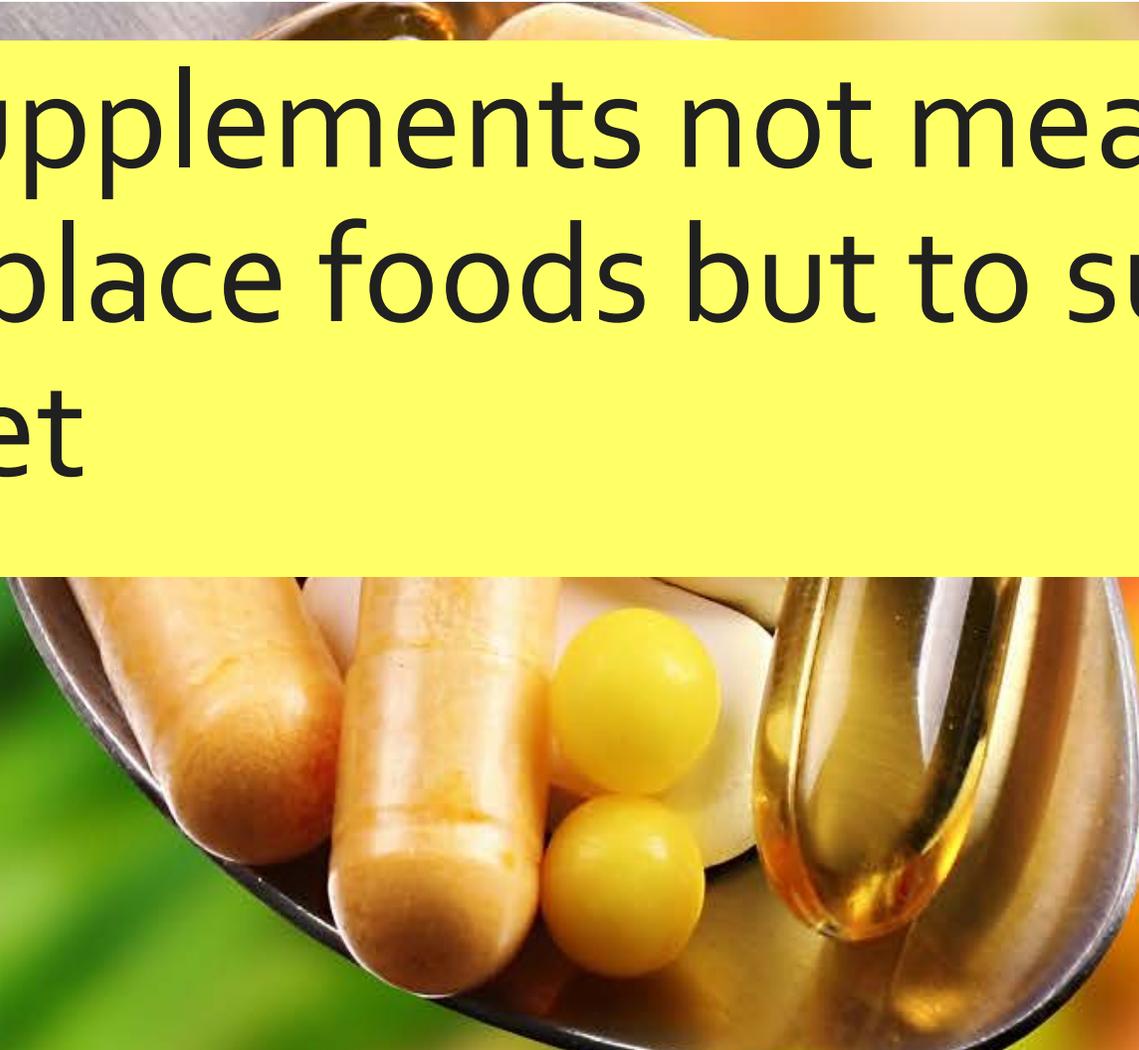
FDA regulates both finished dietary supplement products and dietary ingredients. FDA regulates dietary supplements under a different set of regulations than those covering "conventional" foods and drug products. Under the Dietary Supplement Health and Education Act of 1994 (DSHEA):

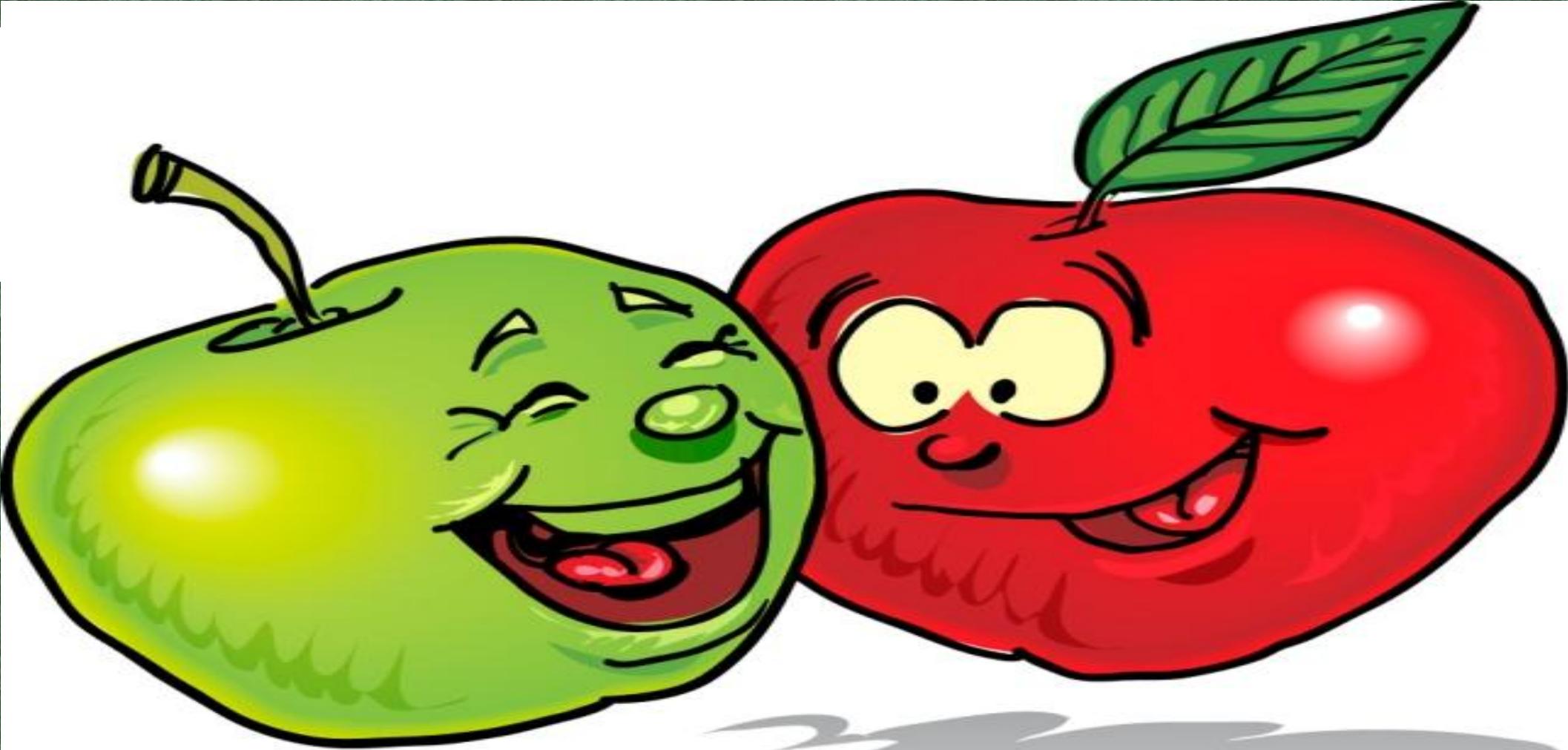
- Manufacturers and distributors of dietary supplements and dietary ingredients are prohibited from marketing products that are adulterated or misbranded. That means that these firms are responsible for evaluating the safety and labeling of their products before marketing to ensure that they meet all the requirements of DSHEA and FDA regulations.
- FDA is responsible for taking action against any adulterated or misbranded dietary supplement product after it reaches the market.

- Though the FDA is not authorized to require product approval before a manufacturer sells vitamins, it can limit the sale of vitamins if it finds a product is unsafe.
- Manufacturers have to be sure that the product is safe, and if the manufacturer receives any reports of harmful health effects from people using its product, it has to report those to the FDA.
- The FDA can then investigate these claims and issue a recall if it concludes a product is unsafe.

# CONCLUSION

- Supplements not meant to replace foods but to supplement diet





THANK YOU