

VEGETARIANISM

- The general definition of a vegetarian is “someone who lives on a diet of grains, pulses, legumes, nuts, seeds, vegetables, fruits, fungi, algae, yeast and/or some other non-animal based foods (eg) : salt, with or without dairy products, honey, eggs – no animal flesh”

REASONS PEOPLE BECOME VEGETARIAN

1 : RELIGIOUS BELIEFS

- Many people choose to cut out meat from their diet due to their religion (eg) : The Hindu religion considers the cow to be sacred and most of its followers do not eat meat.

2 : CRUELTY TO ANIMALS

- Concern for the welfare of animals is a reason some people become vegetarians. They may be opposed to killing animals for food.
- They might oppose battery/intensive animal farming or animals living in cages.



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3 : HEALTH REASONS

- Diets rich in plant foods like grains, beans, fruits and vegetables can reduce the risk of many chronic disease.
- Saturates fats mainly present in animal food (ie) : red meat, eggs, cheese, cream, if eaten in excess can lead to obesity, heart disease etc.

4 : ECONOMIC RESOURCES

- Many animal products are expensive compared with foods of plant origin (eg) : beans, grains are less expensive than meat.
- As a result, people do not eat meat as they cannot afford it (eg) : bean chili versus chili beef.

5 : DISLIKE MEAT ! (AVERSION)

- Many people dislike the texture of meat, even the taste of it!
- NOTE : In recent years, the influence of “vegetarian celebrities” (eg) : actors, musicians has particularly influenced young people becoming vegetarian.



DIFFERENT TYPES OF VEGETARIANS EXIST

1 : LACTO VEGETARIAN

- Do not eat meat, fish, poultry but consume some animal and dairy products (ie) : cheese, milk, yoghurt, butter, cream.
- In addition to, fruits, vegetables, nuts, grains, seeds, roots, fungi, kefir (a fermented milk drink).

2 : OVO VEGETARIAN

- Allow for the consumption of eggs in their diet but not dairy products.
- 'An egg a day is okay!' (Bord Bia), although avoid too many eggs.

3 : LACTO-OVO VEGETARIAN

- A combination of dairy products and eggs, seeds, grains, fungi, nuts, vegetables, fruit but no animal flesh/seafood in diet.

4 : VEGAN

- Eat no animal products.
- As well as following a strict diet, vegans will not use animal products (leather), avoid cosmetics tested on animals.
- A way of life, not just a diet!

5 : RAW VEGANISM

- A vegan who will not eat food cooked above 48°C.
- They eat raw vegetables, raw fruit, nuts, pulses, herbs, mushrooms, fresh juices, plant oils.

6 : FRUITARIAN

- A diet that consists entirely or primarily (75%) of fruits, nuts, seeds.

7 : MACROBIOTIC DIET

- Whole grains, vegetables and beans are the main foods in the diet.
- Those following this diet follow an Asian Yin-Yong philosophy of finding balance in life for health and vitality.

8 : PESCO-VEGETARIAN

- Follow a diet that includes fish or other seafood but not the flesh of other animals (also called pescatarians)

NOTE : Google : Flexitarian, not a true vegetarian !

- Vegans and Lacto-Ovo vegetarians are the most common vegetarians.
- Vegans eat no animal produce. As a result, their diet may be deficient in :
 - Iron (Haem/Ferrous iron)
 - Calcium
 - Animal Protein (HBV protein)
 - Vitamin B12 – Cobalmin.



- **NOTE** : Vitamin B12 is necessary for red blood cell formation. It works with Iron, B12 and folic acid. This vitamin is often lacking in the vegan diet as it is mainly found in animal foods therefore vegans must take Vitamin B12 supplements on a daily basis.
- Lacto – Ovo vegetarians eat animal products like cheese, eggs, milk, which contain animal protein (HBV protein), calcium and Vitamin B12.
- Iron is the main nutritional inadequacy which can be made up by eating :
 - Green leafy vegetables
 - Nuts
 - Pulse vegetables (peas, beans, lentils)
 - Whole cereals
 - Brown bread



NB : PLANNING VEGETARIAN DIETS

- Include :
 - **Pulse Vegetables** (eg) : Peas, Beans, Lentils (Protein, Iron)
 - **Nuts** (protein content 25%)
 - **Whole Cereals** (eg) : Brown Rice, Brown Bread (Iron, Calcium, Vitamin B)
 - **Green Leafy Vegetables** (eg) : Kale, Cabbage (Iron, Calcium)
 - **Ensure carbohydrate intake is adequate so that proteins are spared.**

VEGAN DIETS

- All of the above points plus :
 - Vitamin B12 supplements (one tablet taken daily).
 - Soya milk, soya flour, tofu.
 - Textured Vegetable Protein (TVP) – 74% HBV.
 - Quinoa should be included (a complete protein food even though of plant origin) (ie) : it contains all 10 essential amino acids.
 - Use Aquafaba instead of egg white (Aquafaba is the thick liquid that results from soaking or cooking legumes like chickpeas in water for an extended period of time) (ie) : the liquid in a tin of chickpeas.
 - Seitan (wheat gluten) can be used instead of meat (it has been used for many centuries in China, Japan and other neighbouring countries instead of meat/fish)



NOVEL PROTEIN FOODS

- These foods were initially developed to replace expensive animal protein during times of world food shortage (1940's – 1960's).
- It is now appreciated that the world food problem is one of a lack of food rather than a lack of protein and that most mixed diets provide an adequate supply of protein.
- However animal protein is still quite expensive and there is an increasing number of vegetarians therefore novel protein foods still have a role in :
 - **Textured Vegetable Protein (TVP)**
 - **Quorn** (mycoprotein), contains egg white.
 - **Tofu** (soya bean curd).
 - **Seitan** (wheat gluten).

TEXTURED VEGETABLE PROTEIN (TVP)

MANUFACTURE

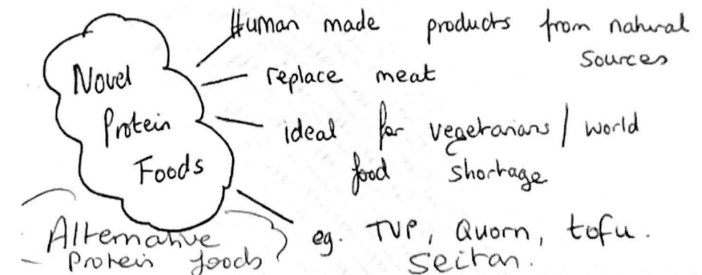
- Soya beans are harvested. Soya oil is extracted from the beans. The oil is refined.
- The beans have their outer seed coat removed. They are then crushed into flakes before being ground into soya flour (70% - 90% protein).
- Carbohydrate is removed by washing, protein powder is left.
- The flour is converted to a dough by adding vegetable oils, seasonings, Vitamin B12 and methionine.
- This dough is then heated under pressure above 100°C and extruded through a nozzle into atmospheric or reduce pressure.
- The sudden drop in pressure causes the material to expand and achieve the desired texture.
- The material is cut into chunks or minced and dried.
- **NOTE** : The final produce is known as TVP.

RECONSTITUTION OF TVP

- Steep TVP in twice its volume of cold water for 30 minutes.
- Steep TVP in hot water for 5-10 minutes.
- **NOTE** : TVP chunks take longer to soften than mince.

USES OF TVP

- Used as a meat extender (75% meat, 25% TVP)
- As TVP has a strong bean flavour, flavourings are usually added. Then TVP is used in stews, pies, burgers and curries.
- The texture of TVP is not recognizable in the above dishes if a 3:1 ratio is used (ie) meat : TVP.
- However, beyond 25% content TVP the different texture becomes recognizable.



ADVANTAGES OF TVP

- No shrinkage or waste.
- A source of HBV protein (74%).
- Slightly cheaper than meat.
- Has a long shelf life – 1 year.
- Ideal for vegetarians.
- Good meat extender.
- Little preparation needed.
- Good for world food shortage.

DISADVANTAGES OF TVP

- Many ingredients are required to flavour TVP.
- Some people dislike the smell, taste and texture.
- As TVP is only available in mince and chunks, there is a limited number of dishes it can be used in.

COMPOSITION PER 100G

NUTRIENT	T.V.P	MEAT
Protein	16-20%	18-25%
Lipid	1-10% P.U.F.A	16%
Carbohydrate	5-10%	0%
Minerals	Iron + calcium	Iron
Vitamins	B vitamins	B vitamins
Water	61-70%	60-66%



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- **NOTE** : TVP lacks one essential acid → methionine. Many manufacturers add this amino acid in addition to Vitamin B12 and Iron.

QUORN

- Also known as mycoprotein (glucose, egg white and fungus).
- Novel protein food.
- Developed by McDougall/McVities.
- Flour, egg white and nutritive additives are the main ingredients.
- **NB** : A fungus from the group Fusarium (Venenatum) feeds off the ingredients and produces Quorn (hyphae resemble meat fibres).
- It resembles chicken in texture.
- Easy to flavour unlike TVP.
- Quorn is available on its own (vacuum packed).
- It can also be used in pies, casseroles (eg) : 'Linda McCartney' range of vegetarian food products.
- It is a source of HBV protein, calcium and carbohydrate.
- Little saturated fat or cholesterol present.

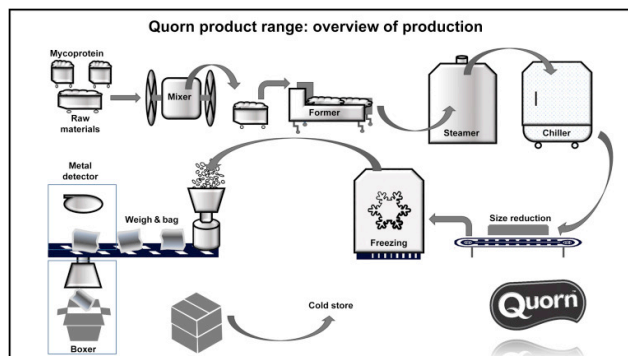
ORGANIC VEGETABLES

- Vegetables grown without the use of chemical sprays or pesticides.
- The ground used to grow organic vegetables must be free of pesticides for a period of years.
- There has been an increase in consumer demand for these vegetables, possible reasons include :
 - Health concerns about GM foods and the possible ill effects on the body of pesticides.
 - Organic vegetables are usually sweeter/nicer in flavour,
 - **NOTE** : see handout on 'Fruit and Vegetables'.

PRODUCTION OF MYCOPROTEIN (QUORN)

ALTERNATIVE/NOVEL PROTEIN FOOD

- **1** : Mycoprotein is made in 40m high fermenters which run continuously for 5 weeks at a time. The fermenter is sterilized and fitted with a water and glucose solution. A batch of fungi called *Fusarium Venenatum* is then added.
- **2** : The fungi start to grow and a continuous supply of nutrients is fed into the fermenter (potassium, magnesium, phosphate and others). The pH balance, temperature and oxygen are constantly adjusted to achieve optimum growth.
- **3** : The organism (fungus) and nutrients combine to form mycoprotein solids. These solids are then removed every 5 – 6 hours from the fermenter. Once removed, they are heated to 65°C to break down nucleic acid.
- **4** : Mycoprotein is put in a centrifuge to remove water producing a “pastry dough mixture”.
- **5** : Mycoprotein is then mixed with egg white and steam cooked for 30 minutes, then chilled.
- **6** : It is chopped into pieces or mince and then frozen (the ice crystals help push the fibres together)



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VEGETARIAN FOODS

QUORN (MYCOPROTEIN)

- Contains egg white.

VEGAN QUORN

- Contains potato protein, pea fibre, gluten (wheat), stabilisers (carrageen, sodium alginate) and mycoprotein (88%).

TOFU

- Also called bean curd. It is made by coagulating soy milk and pressing the curds into blocks (amino acids, iron, calcium).

QUINOA

- Complete protein food (ie) : contains all essential amino acids.
- Gluten free, high fibre, iron, potassium, calcium.
- See “Cereals” handout.

PLANT BASED MILKS

- Example : oat, almond.

HUMMUS

- Made from chickpeas/tahini.
- Blended to a paste.



CHIA SEEDS

- Contain 9 essential amino acids, omega 3 fatty acids.

SEITAN

- Wheat gluten (eg) : vegan steak.

SOYA BEANS

- HBV protein 74%, soya milk, soya yoghurts.

AMARANTH

- Porridge like texture when cooked.
- Gluten free, high in iron, high in calcium.

BUCKWHEAT

- High in magnesium, high in fibre, high in protein.

OTHER

- Sun dried tomatoes, guava, beans, lentils, almonds, nut butter, pumpkin seeds, cashews.

ALTERNATIVE PROTEIN FOODS (NOVEL PROTEIN FOODS)

1 : TEXTURED VEGETABLE PROTEIN (TVP)

- Made from plant origin (ie) : soya beans.

ADVANTAGES

- An excellent source of HBV protein (soya beans HBV 74%).
- Easy to prepare (just reconstitute with water).
- Long shelf life (up to 1 year).
- No waste.

DISADVANTAGES

- Many dislike the smell, taste and texture.
- A lot of flavourings needed to reduce “cereal” taste.
- Not very versatile in cookery (ie) : chunks or mince.

2 : QUORN (MYCOPROTEIN)

- Made using microorganisms (ie) : Fusarium Venenatum (fungus).

ADVANTAGES

- Easily flavoured as mycoprotein picks up flavours easily.
- Excellent source of fibre so helps reduce constipation.
- Contains low amounts of saturated fat and no cholesterol.
- Versatile : numerous quorn products on the market, mince, chunks, sausages etc.



DISADVANTAGES

- Texture is softer than meat so should be added near end of cooking time for a sauce or it will disintegrate.
- Some quorn contains egg white therefore unsuitable for vegans.
- Some people may be allergic to mycoprotein (rare).

VEGETARIAN DIETS

ADVANTAGES

- Can help reduce the risk of type 2 diabetes as the diet has a positive effect on blood sugar and insulin levels.
- High in fibre therefore reduces the risk of bowel related disorders.
- Can help reduce risk of cancer (fruit and vegetables) containing antioxidants.
- Less saturated fat therefore helps reduce the risk of coronary heart disease.

PLANNING MENUS FOR VEGETARIANS

VEGETARIAN FOOD PYRAMID

Food group	Vegan	LACTO Vegetarian
Nuts Legumes/ Cereals	10+	6+
Fruit	2+	2+
Vegetables	4+	3+
Dairy products	—	2+

- Food groups for vegetarians :
 - Grains, nuts, legumes.
 - Vegetables.
 - Fruit.
 - Dairy produce.
- **NOTE** : The above table refers to servings of each food group per day.



PAST QUESTIONS

2008 Q1(B) HIGHER LEVEL (50 MARKS)

2. Vegetarian diets are a popular choice with many individuals and families.
- (a) In relation to vegetarian diets discuss:
- classes / types
 - specific dietary requirements
 - benefits of a vegetarian diet. (30)
- (b) Name and describe **two** novel (alternative) protein foods that can be used in vegetarian diets. (8)
- (c) Outline the manufacture / production of **one** novel (alternative) protein food. (12)

(A)

CLASSES/TYPES

- **Vegan** : Eats nothing from an animal, diet is totally plant based (no eggs, milk, cheese, milk products, fish).
- **Lacto – Ovo** : Exclude fish and meat from their diet but include milk, dairy products (yoghurt) and eggs.
- **Pesco – Vegetarians** : Exclude meat, milk, eggs, dairy products from their diet, include fish (from animal origin).



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SPECIFIC DIETARY REQUIREMENTS

- **1** : Include nuts (25% protein) pulse vegetables (peas, beans, lentils) particularly soya beans and cereals for protein and quinoa.
- **2** : Replace animal fats, when cooking with vegetable oils (eg) : butter, when baking cakes (eg) : coconut oil, when frying (eg) : sunflower oil.
- **3** : Include green leafy vegetables (kale, broccoli, cabbage), oranges, mangoes, soya beans for calcium.
- **4** : Nuts, whole cereals, brown rice, green leafy vegetables, beans, fortified cereals for iron.
- **NOTE** : All vegans should take Vitamin B12 supplements.

BENEFITS OF A VEGETARIAN DIET

- Vegetarian diets are high in fibre therefore reduce the risk of piles, constipation, diverticulitis and reduce the risk of colon cancer in the long term.
- Reduces the risk of type 2 diabetes as the high level of vegetables (fibre) regulate blood sugar levels.
- Reduces the risk of obesity and vegetarians are less likely to gain weight as they eat a very wholesome diet, devoid of processed, refined foods.

(B)

- **Soya Milk** : Made from soaking soya beans in water, this mixture is then blended to a “milk”.
- **Textured Vegetable Protein (TVP)** : Made from soya beans that are ground to a flour, a dough like mixture is produced, chopped to pieces or minced and dried.
- **Others** : Tofu, Soya Yoghurt, Miso Paste, Tempeh.

(C)

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