

Anti-nutritional Factors

- Definition- Natural or artificial compounds that interfere with the absorption of nutrients
- 3 groups
- 1.Generated in the natural feed stuffs as the normal metabolism of the species
- 2.Artificial substance – pesticides , herbicides etc
- 3.Natural contaminants – fungus ,bacteria etc

- Group 1

- Substance depressing protein digestion

- 1. Protease inhibitor – in legumes

- Growth decreased – slow release of methionine

- Some species release of all aminoacids inhibited

- Prevention- Autoclaving ,extrusion cooking ,infrared cooking

- 2. Haemagglutinin – in legumes
- Inactivated by pepsin ,cooking ,autoclaving and micronization.

- 3. Saponin – complexes with cholesterol
- Interact with cellular and membrane compounds

- Substance reducing solubility of minerals

1. Phytic acid - Complexes with Zn, Mn, Cu, Mo, Ca and Mg. Lowers its dietary availability

Protein digestibility affected

2. Oxalic acid – complexes with Ca

Sources – Spinach, sesame seed

Reduction in Ca retention

- 3Glucosinolates – binds with iodine
- Reduce incorporation of iodine into the precursors of thyroxin as well as interfering with its secretion .
- Sources –Mustard ,rapeseed
- 4. Gossypol – Cotton seed ,lipid deposition in liver ,anorexia

– Substance inactivating vitamins

1. Anti-thiamine –rice bran, mustard seed ,cotton seed , raw fish. Inactivated by heat
2. Anti-nicotinic acid – maize .Combines with nicotinic acid and it become resistant to digestion
3. Pyridoxin antagonist –linseed meal , autoclaving
4. Anti-vit.B12- Raw soybean , autoclaving
5. Anti.vit. A- Raw soybean ,contain lipoxigenase which destroy carotene and lowers vit.A level .Heating for 15 mts .

6. Anti.vit. D- Soybean ,autoclaving

7. Anti-vit-C –Kidney beans

8. Alkaloids – growth depression and mortality in rainbow trout

9. Cyanogens – Grasses ,pulses ,root crops

10. Algal and marine toxins - Streptomyces and actinomyces –cause muddy flavour to channel cat fish .

Gonyaulax and *Gymnodinium breve* – eaten by mollusc

- Group –II
- Mycotoxins
- Aflatoxin- Aspergillus species ,liver toxin ,carcinogen .Carcinogenic nature increased by gossypol and cyclopropeonic fattyacid
- Ochratoxin- Aspergillus species and Penicillium species .Damage kidney
- Zearalenone – Produced by Fusarium ,affect reproductive system.
- Tricothecenes –Fusarium

- Group III
- Chemical contaminants
- Heavy metals –safelevel of mercury -0.5ppm
- Cadmium accumulated by seaweeds and mollusc
- Selenium have protective effect against the toxicity of methyl mercury
- Cu – mortality in juvenile lobster ,retarded growth and impaired pigmentation in cohosalmon

- Polychlorinated biphenyls
- Liver enlargement , alteration in liver structure , induction of hepatic ,microsomal enzymes
- Increase thyroid activity

Pesticides and herbicides –Sterility of gonads ,weakness ,nervous disorders ,loss of appetite and death