



For the use only of Registered Medical Practitioners or a Hospital or a Laboratory

BECADEXAMIN

Multivitamin Multimineral Capsules

QUALITATIVE AND QUANTITATIVE COMPOSITION

Each Soft Gelatin capsule contains:

Vitamin A	5000 IU (as Vitamin A Concentrate Oil IP)
Vitamin D ₃ (Cholecalciferol IP)	400 IU
Vitamin E (Tocopheryl Acetate IP)	15 mg
Vitamin B ₁ IP	5 mg
Nicotinamide IP	45 mg
D-Panthenol IP	5 mg
Vitamin B ₆ IP	2 mg
Vitamin C IP	75 mg
Folic Acid IP	1000 mcg
Vitamin B ₁₂ IP	5 mcg
Dibasic Calcium Phosphate IP	70 mg
Copper Sulfate Pentahydrate BP	0.01 mg
Manganese Sulfate Monohydrate BP	0.01 mg
Zinc Sulphate Monohydrate IP	28.7 mg (equivalent to 10.4 mg of elemental Zinc)
Potassium Iodide IP	0.025 mg
Light Magnesium Oxide IP	0.15 mg

(Appropriate overages added)

Excipients qs

PHARMACEUTICAL FORM

Capsules for oral administration.

CLINICAL PARTICULARS

Therapeutic Indications

BECADEXAMIN is indicated for the treatment of vitamins and minerals deficiency states in adults which may be associated with the following conditions:

- ∞ Dietary restrictions: in conditions such as obesity, cardiovascular diseases, chronic diarrhoea or dysentery, etc.
- ∞ Malnutrition
- ∞ Infections or recovering from infections
- ∞ Long term antibiotic use
- ∞ Old age

Posology and Method of Administration

Adults and adolescents

One capsule once daily.

In adolescents dosing regimen should be adjusted according to the individual patient's needs.

Duration of treatment depends on the improvement of the deficiency states.

Children

BECADEXAMIN is not recommended for paediatric use.

Renal Impairment

Caution should be exercised when using *BECADEXAMIN* in patients with renal disorders (see section *Special Warnings and Special Precautions for Use*).

Hepatic Impairment

Caution should be exercised when using *BECADEXAMIN* in patients with hepatic disorders (see section *Special Warnings and Special Precautions for Use*).

Contraindications

BECADEXAMIN is contraindicated in:

- ∞ hypersensitivity to any of the components,
- ∞ treatment with retinoids (see section *Interaction with Other Medicaments and Other Forms of Interaction*).

Special Warnings and Special Precautions for Use

Concomitant conditions

Caution should be used in case of the following concomitant conditions:

- ∞ hepatitis or hepatic disorders,
- ∞ kidney disorders,
- ∞ intestinal stricture inflammation,
- ∞ active duodenal or gastric ulcer,
- ∞ diabetes mellitus.

Gastrointestinal symptoms

Patients with ostomies may have altered intestinal transit times.

Cardiac disorders

BECADEXAMIN should be used with caution in the presence of cardiac disease, as it contains vitamin D.

Vision disorders

Cyanocobalamin (vitamin B₁₂) should not be used for Leber's disease or tobacco amblyopia since these optic neuropathies may degenerate further.

Hypercalcaemia

BECADEXAMIN is not recommended for patients with hypercalcaemia or diseases associated with hypercalcaemia such as sarcoidosis and some malignancies, as it contains calcium and vitamin D. It should be given cautiously to these patients.

Effects on the thyroid

Although iodine is required for the production of thyroid hormones, excessive quantities can cause hyperthyroidism, or even paradoxical goitre and hypothyroidism (see section *Undesirable Effects*).

Special populations

Patients over the age of 45 years or with nodular goiter are especially susceptible to hyperthyroidism when given iodine supplementation. Reduced doses should therefore be used and supplementation with iodised oil may not be appropriate.

High dose of nicotinamide should be used with caution in patients with peptic ulcer disease, gastritis, liver disease, gall bladder disease, diabetes and gout.

Investigations

As iodine and iodides can affect the thyroid gland, their use may interfere with tests of thyroid function.

Large doses of riboflavin (vitamin B₂) result in a bright yellow discoloration of the urine that may interfere with certain laboratory tests.

Ascorbic acid, a strong reducing agent, interferes with laboratory tests involving oxidation and reduction reactions. Falsely-elevated or false-negative test results may be obtained from plasma, faeces, or urine samples depending on such factors as the dose of ascorbic acid and specific method used.

Long-term treatment

Caution is necessary if preparations containing iodine or iodides are taken for long periods.

Long-term use of large doses of pyridoxine (vitamin B₆) is associated with the development of severe peripheral neuropathies; the dose at which these occur is not established.

The use of excessive amounts of vitamin A substances over long periods can lead to toxicity (see section *Overdose*).

Risk of overdose

Other medicinal product containing vitamin A should not be used while taking *BECADEXAMIN* as it may cause overdose symptoms (see sections *Interaction with Other Medicaments and Other Forms of Interaction; Overdose*).

Overdose symptoms may occur as a result of prolonged (several weeks or months) administration of doses starting from 10 000 IU daily, in patients with liver or kidney impairment, low body weight, hypoproteinaemia and alcohol abuse (see section *Overdose*).

Other medicinal product containing vitamin E should not be used while taking this product as it may cause overdose symptoms (see section *Overdose*).

Treatment preparation and monitoring

BECADEXAMIN should, if possible, not be given to patients with suspected vitamin B₁₂ deficiency without first confirming the diagnosis.

Plasma phosphate concentrations should be controlled during vitamin D therapy to reduce the risk of ectopic calcification.

Tolerance

Tolerance may be induced with prolonged use of large doses of vitamin C, resulting in symptoms of deficiency when intake is reduced to normal.

Interaction with Other Medicaments and Other Forms of Interaction

Diuretics

As *BECADEXAMIN* contains calcium and vitamin D, hypercalcaemia may occur when it is given with thiazide diuretics.

Thiazide diuretics decrease urinary excretion of calcium. Plasma-calcium concentrations should be monitored in patients receiving the drugs together.

Corticosteroids

Corticosteroids reduce calcium absorption.

Corticosteroids may counteract the effect of vitamin D.

Cardiac glycosides

Calcium enhances the effects of digitalis glycosides on the heart and may precipitate digitalis intoxication.

Antibiotics

Tetracycline antibiotics, other than doxycycline also decrease zinc absorption, they should therefore be administered 2 hours before or 3 hours after the administration of *BECADEXAMIN*, in those cases where concomitant use is necessary.

Penicillamine (a chelating agent) may reduce the absorption of zinc.

Penicillamine and antituberculous drugs (such as isoniazid), warfarin, indanediones) may increase the requirements for folic acid and pyridoxine (vitamin B₆).

Neomycin used orally may reduce the absorption of vitamin A, vitamin B₁₂ and vitamin E.

Rifampicin and isoniazid may reduce the effectiveness of vitamin D.

Bisphosphonates

As *BECADEXAMIN* contains calcium and magnesium salts, it reduces the absorption of bisphosphonates, therefore doses should be separated by at least 3 hours.

Folic acid antagonists

Folate deficiency states may be produced by folic acid antagonists such as methotrexate, pyrimethamine, triamterene, trimethoprim and sulfonamides.

Amiodarone

The effects of iodine and iodides on the thyroid may be altered by other compounds including amiodarone.

Cholestyramine, colestipol and mineral oils

Cholestyramine, colestipol and mineral oils used orally may reduce the absorption of vitamin A and vitamin E.

Retinoids

Combined treatment with retinoids (isotretinoin, etretinate, bexarotene) and vitamin A in doses exceeding 4000-5000 IU daily may induce vitamin A overdose symptoms (see sections *Special Warnings and Special Precautions for Use; Overdose*). Thus, the use of *BECADEXAMIN* is contraindicated during the treatment with retinoids (see section *Contraindications*).

Oral contraceptives

Oral contraceptives may increase vitamin A plasma concentration.

Serum concentration of vitamin B₆, vitamin B₁₂ and folic acid may be decreased by use of oral contraceptives.

Large supplements of vitamin C have been reported to increase serum ethinylestradiol concentrations in women taking oral contraceptives, but a further study showed no effect on either ethinylestradiol or levonorgestrel.

Levodopa

BECADEXAMIN contains vitamin B₆ which reduces the effects of levodopa, but this does not occur if a dopa decarboxylase inhibitor is also given.

Altrexamine

BECADEXAMIN contains vitamin B₆ which reduces the activity of altrexamine.

Lithium

The effects of iodine and iodides on the thyroid may be altered by other compounds including lithium.

Antiepileptics

Vitamin B₆ and folic acid has been reported to decrease serum concentrations of phenobarbital and phenytoin.

Some antiepileptics (e.g. carbamazepine, phenobarbital, phenytoin, and primidone) may increase vitamin D requirements.

Antiepileptics may produce folate deficiency states.

Replacement therapy with folic acid or folic acid may become necessary during antiepileptic therapy in order to prevent development of megaloblastic anaemia.

Concomitant nicotinamide and carbamazepine may decrease carbamazepine clearance.

Hydralazine

Hydralazine may increase the requirements for pyridoxine.

Omeprazole

Omeprazole has been reported to impair the bioavailability of vitamin B₁₂ and dietary vitamin C.

Anticoagulants

As *BECADEXAMIN* contains vitamin E, caution should be used during concomitant administration of anticoagulants (dicoumarol, warfarin, indanediones) due to the risk of their efficacy reduction, hypoprothrombinaemia and bleeding. During prolonged administration of vitamin E, the prothrombin time should be monitored on a regular basis.

Cyclosporine

Vitamin E may increase the absorption of cyclosporine.

Calcium, vitamin D

There is an increased risk of hypercalcaemia if vitamin D is given with calcium. Vitamin D increases the gastrointestinal absorption of calcium. Plasma-calcium concentrations should be monitored in such situations.

Fluoride

As *BECADEXAMIN* contains calcium, it reduces the absorption of fluoride; therefore doses should be separated by at least 3 hours.

Phosphates

As *BECADEXAMIN* contains vitamin D, there is an increased risk of hypercalcaemia if it is given with phosphate. Plasma-calcium concentrations should be monitored in such situations.

Phosphorus-containing preparations may reduce the absorption of zinc.

Iron supplements

The absorption of zinc may be reduced by additionally taken iron supplements.

Calcium in *BECADEXAMIN* may reduce iron absorption when administered concomitantly with iron supplements. Zinc plays a major role in the immune system. It takes within 1 hour before or 2 hours after taking *BECADEXAMIN*.

Zinc supplements

Additionally taken zinc supplements reduce the absorption of copper.

Vitamin C

As *BECADEXAMIN* contains vitamin C, it may increase the absorption of iron in iron-deficiency states.

Alcohol

Alcohol enhances the toxic effect of vitamin A and may produce folate deficiency states.

Pregnancy

BECADEXAMIN should be used by pregnant women only after consultation with a physician.

Lactation

BECADEXAMIN should be used by lactating women only after consultation with a physician.

Undesirable Effects

Multivitamins are generally well tolerated when used within the recommended dose. The following adverse events have been reported with use of ingredients of *BECADEXAMIN*.

The frequency of most of these events cannot be estimated from the available data.

Adverse drug reactions (ADRs) are listed below by MedDRA system organ class and by frequency. Frequencies are defined as:

Very common $\geq 1/10$

Common $\geq 1/100$ to $<1/10$

Uncommon $\geq 1/1000$ to $<1/100$

Rare $\geq 1/10000$ to $<1/1000$

Very rare $<1/10000$

Not known (cannot be estimated from the available data).

Immune system disorders

Not Known: Hypersensitivity reactions (see *Skin and subcutaneous tissue disorders*), anaphylactic reaction

Gastrointestinal disorders

Not Known: Abdominal pain, nausea, vomiting, diarrhoea, constipation, gastrointestinal disturbances, black faeces.

Psychiatric disorders

Not Known: Sleep disturbances.

Nervous system disorders

Not Known: Headache, dizziness

Skin and subcutaneous tissue disorders

Not Known: Rash

Metabolic disorders

Very Rare: Diabetogenic effects

Overdose

Overdose of *BECADEXAMIN* can lead to the following symptoms and signs.

Symptoms and signs

Symptoms include: gastrointestinal disturbances (abdominal pain, nausea, vomiting, diarrhoea, constipation, taste disturbances, thirst), cardiac arrhythmias (tachycardia, bradycardia), hypotension, cardiac arrest, renal impairment, polyuria, nocturia, muscle weakness, headache, drowsiness, dizziness/vertigo, irritability, sweating, lassitude, somnolence, confusion, shock, coma, thirst, elevations in liver tests and liver damage, including jaundice and parenchymal liver cell injury.

Treatment

The treatment consists of its withdrawal and symptomatic treatment, if necessary.

Further management should be as clinically indicated or as recommended by the national poisons centre, where available.

PHARMACOLOGICAL PROPERTIES

Pharmacodynamic Properties

Pharmacotherapeutic group: Multivitamins and other minerals, including combinations, ATC Code A11AA03.

Mechanism of action and Pharmacodynamic Effects

BECADEXAMIN contains active substances with synergistic, therapeutic actions, necessary for maintenance and/or improvement of functional activities of the body.

Vitamins, their precursors, minerals and trace elements are included to treat deficiencies. Many of those act as co-factors for various metabolic functions.

Vitamin A

Retinol is an essential nutrient needed in small amounts by humans for the normal functioning of the visual system, growth and development and maintenance of epithelial cellular integrity, immune function and reproduction.

Vitamin D (cholecalciferol)

Vitamin D is required to maintain normal blood levels of calcium and phosphate, which are in turn needed for the normal mineralization of bone, muscle contraction, nerve conduction and general cellular function in all cells of the body.

Vitamin E (α-tocopherol acetate)

Vitamin E is the major lipid-soluble antioxidant in the cell antioxidant defence system acts and maintains the integrity of the vascular endothelium.

Vitamin B₁ (thiamine mononitrate)

Vitamin B₁ is an essential co-enzyme in oxidative metabolism of α -ketoacids and increases the activity of acetylcholine in nerve endings.

Vitamin B₂ (riboflavin)

Vitamin B₂ is an essential component in function of certain co-enzymes important for energy production taking part in numerous oxidation and reduction reactions. It has also an important role in maintaining a healthy skin.

Nicotinamide

Nicotinamide is involved in a large number of processes such as production of energy, synthesis of fatty acids, cholesterol, steroids, signal transduction and the maintenance of integrity of genome.

D-Panthenol

D-Panthenol (Dexpanthenol) is the synthetic alcohol form of pantothenic acid. It is converted to pantothenic acid in the body and therefore, can be considered a provitamin form of pantothenic acid. Pantothenic acid is a precursor of co-enzyme A, necessary for energy production, involved in fatty acid metabolism, formation of acetylcholine and improvement of epithelization and wound healing. It is also necessary for folic acid and carbohydrate metabolism.

Vitamin B₆ (pyridoxine hydrochloride)

It takes part in formation of some important co-enzymes involved in protein metabolism and HEM biosynthesis. As a coenzyme it functions in metabolism of amino acids, glycogen and sphingoid bases.

Vitamin C (ascorbic acid)

Vitamin C is an electron donor (reducing agent or antioxidant) for I I enzymes. It has a role in hydroxylation of certain compounds. It helps in maintenance of intracellular skeleton of cartilages, bones and teeth. It is essential in maintenance of capillary wall integrity and regulation of capillary permeability. Vitamin C promotes absorption of soluble non-haem iron.

Folic acid

It is essential for erythropoiesis, maturation of red blood cells and biosynthesis of the DNA.

Vitamin B₁₂ (cyanocobalamin)

It is essential for erythropoiesis, formation of myelin sheath and synthesis of the DNA.

Calcium

It activates certain enzymes. It maintains the normal excitability of the myocardium and nerves and helps in maintenance of capillary wall integrity. It is essential in the structure of bones and teeth, for muscular contraction and many metabolic processes.

Copper

It is essential for synthesis of hemoglobin, formation of bone and myelin, for the activity of certain enzymes, such as cytochrome oxidases (tissue oxidation).

Manganese

It is a co-factor in many enzyme reactions, which involve phosphorylation and synthesis of cholesterol and fatty acids.

Zinc

Zinc is an essential component of a large number (> 300) of enzymes participating in the synthesis and degradation of carbohydrates, lipids, proteins, and nucleic acids as well as in the metabolism of other micronutrients. Zinc plays a major role in the immune system. It also acts as an antioxidant. It is important for normal growth, wound healing and sexual maturation, for crystallization and release of insulin (the pancreas of diabetic individuals contains only half of the normal quantity of zinc).

Iodine

It has a role in the synthesis of thyroid hormones.

Magnesium

Magnesium functions as a co-factor of many enzymes involved in energy metabolism, protein synthesis, RNA and DNA synthesis, maintenance of the electrical potential of nervous tissues, cell membrane stabilizing action and muscle contraction.

PHARMACEUTICAL PARTICULARS

List of Excipients

Lecithin soyabean, partially hydrogenated vegetable oil, yellow beeswax, arachis oil, purified water.

Capsule shell contains gelatin, glycerin, ethyl vanillin, methyl hydroxybenzoate, ethyl hydroxybenzoate, propyl hydroxybenzoate, sunset yellow FCF, brilliant blue FCF, erythrosine, ponceau 4R, titanium dioxide and purified water.

Shelf Life

The expiry date is indicated on the label and packaging.

Special Precautions for Storage

Store at temperature not exceeding 30° C protected from direct sunlight.

Keep out of reach of children.

Nature and Specification of Container

Capsules in an amber glass bottle.