Betamethasone Eye Drops

Betamethasone Eye Drops are a sterile solution of Betamethasone Sodium Phosphate in Purified Water. Betamethasone Eye Drops contain not less than 90.0 per cent and not more than 110.0 per cent of the stated amount of betamethasone sodium phosphate, $C_{22}H_{28}FNa_2O_8P$.

Identification

A. Determine by thin-layer chromatography, coating the plate with *silica gel GF254*.

- *Mobile phase*. A mixture of 60 volumes of *butanol*, 20 volumes of *acetic anhydride* and 20 volumes of *water.*
- *Test solution*. Dilute the eye drops suitably with *water* to get a solution containing 0.1 per cent w/v of Betamethasone Sodium Phosphate.
- *Reference solution (a)*. A 0.1 per cent w/v solution of *betamethasone sodium phosphate RS* in *water*.
- *Reference solution (b)*. A mixture of equal volumes of the test solution and reference solution (a).
- *Reference solution (c)*. A mixture of equal volumes of reference solution (a) and 0.1 per cent w/v of *prednisolone sodium phosphate RS* in *water*.

Apply to the plate 10 µl of each solution. Allow the mobile phase to rise 10 cm. Dry the plate in air, heat at 110º for 10 minutes and examine in ultraviolet light at 254 nm. Thechromatograms obtained with the test solution, reference solution (a) and reference solution (b) show single principal spots with similar Rf values. The chromatogram obtained with reference solution (c) shows two principal spots with almost identical Rf values.

B. In the Assay, the principal peak in the chromatogram obtained with the test solution corresponds to the principal peak in the chromatogram obtained with the reference solution.

C. To a volume containing 0.2 mg of Betamethasone Sodium Phosphate, add slowly 1 ml of *sulphuric acid* and allow to stand for 2 minutes. A brownish yellow colour but no red colour or yellowish green fluorescence is produced.

Tests

pH -7.0 to 8.5.

Related substances. Determine by liquid chromatography

Test solution. Dilute the eye drops if necessary to obtain a solution containing 0.1 per cent w/v of Betamethasone Sodium Phosphate.

- *Reference solution (a)*. Dilute 1 volume of the test solution to 50 volumes with *water*.
- *Reference solution (b)*. A solution containing 0.006 per cent w/v each of *betamethasone sodium phosphate RS* and *betamethasone RS*.

Chromatographic system

– a stainless steel column 20 cm x 4.6 mm, packed with octadecylsilyl silica gel (10 µm) (such as Spherisorb ODS 1),

– column temperature. 60º,

– mobile phase: a mixture of 60 volumes of *citrophosphate buffer pH 5.0* and 40 volumes of *methanol,*

– flow rate. 2 ml per minute,

– spectrophotometer set at 241 nm,

– a 20 µl loop injector.

Calculate the content of C22H28FNa2O8P in the eye drops.

Storage. Store protected from light.

Dexamethasone Tablets

Dexamethasone Tablets contain not less than 90.0 per cent and not more than 110.0 per cent of the stated amount of dexamethasone, $C_{22}H_{29}FO_5$.

Identification

Shake a quantity of the powdered tablets containing 20 mg of Dexamethasone with 50 ml of *chloroform* for 30 minutes, filter and evaporate the filtrate to dryness at 105° for 2 hours. The residue complies with the following tests.

A. Determine by infrared absorption spectrophotometry .Compare the spectrum with that obtained with *dexamethasone RS* or with the reference spectrum of dexamethasone.

B. Determine by thin-layer chromatography. coating the plate with a suitable silica gel containing a fluorescent indicator with an optimal intensity at about 254 nm.

- *Mobile phase*. A mixture of 85 volumes of *ether*, 10 volumes of *toluene* and 5 volumes of *1-butanol* saturated with *water*.
- *Test solution*. Dissolve 25 mg of the substance under examination in 10 ml of a mixture of 9 volumes of *chloroform* and 1 volume of *methanol*.
- *Reference solution (a)*. A 0.25 per cent w/v solution of *dexamethasone RS* in the same solvent mixture.
- *Reference solution (b)*. A solution containing 0.125 per cent w/v each of the substance under examination and *dexamethasone RS* in the same solvent mixture.
- *Reference solution (c)*. A solution containing 0.125 per cent w/v each of *dexamethasone RS* and *betamethasone RS* in the same solvent mixture.

Apply to the plate 2 µl of each solution. After development, dry the plate in air, spray with *ethanolic sulphuric acid (20 per cent v/v)*, heat at 120° for 10 minutes or until spots appear, allow to cool and examine in daylight and in ultraviolet light at 365 nm. The principal spot in the chromatogram obtained with the test solution is similar in colour in day-light, fluorescence in ultraviolet light at 365 nm, in position and size to that in the chromatogram obtained with reference solution (a) and the chromatogram obtained with reference solution (b) shows only one spot. The test is not valid unless the chromatogram obtained with reference solution (c) shows two spots that are close to one another but separated.

C. To 2 ml of *sulphuric acid* add 2 mg and shake to dissolve; a faint reddish brown colour is produced within 5 minutes. Add 10 ml of *water* and mix; the colour is discharged.

Tests

Related substances. Determine by liquid chromatography

- *Test solution*. To a weighed quantity of the tablets containing 2.5 mg of Dexamethasone add 10 ml of *acetonitrile*, mix with the aid of ultrasound and filter through a 0.45 µm filter. Dilute 4 ml of the filtrate to 10 ml with *water*.
- *Reference solution (a)*. Dilute 1 ml of the test solution to 100 ml with mobile phase A.
- *Reference solution (b)*. Dissolve 2 mg of *dexamethasone RS* and 2 mg of *methylprednisolone RS* in mobile phase A and dilute to 100 ml with the same solvent.

Chromatographic system

– a stainless steel column 25 cm x 4.6 mm, packed with octadecylsilyl silica gel (5 µm) (such as Hypersil ODS),
– column temperature. 45°,
– mobile phase: A. 15 per cent v/v *acetonitrile*, B. *acetonitrile*,
– flow rate. 2.5 ml per minute,
– a linear gradient programme using the conditions given below,
--spectrophotometer set at 254 nm,
– a 20 µl loop injector.

Inject reference solution (b). When the chromatograms are recorded, the retention times are; methylprednisolone about 13 minutes, and dexamethasone about 16 minutes. The test is not valid unless the resolution between the peaks corresponding to methylprednisolone and dexamethasone is at least 2.8; if necessary, adjust the concentration of acetonitrile in mobile phase A. Inject mobile phase A, the test solution and reference solution (a). In the chromatogram obtained with the test solution, the area of any secondary peak is not greater than 0.5 times the area of the principal peak in the chromatogram obtained with reference solution (a) (0.5 per cent); the sum of the areas of all secondary peaks is not greater than the area of the principal peak in the chromatogram obtained with reference solution (a) (1.0 per cent). Ignore any peak due to mobile phase A and any peak with an area less than 0.05 times the area of the principal peak in the chromatogram obtained with reference solution (a) (0.05 per cent).

Storage. Store protected from light.

Lactose

M.F.-$C_{12}H_{22}O_{11},H_2O$

Mol. Wt. 360.3

Lactose is *O*-β-D-galactopyranosyl-(1 → 4)-α –Dglucopyranose monohydrate.

Description. A white or almost white, crystalline powder; odourless.

Identification

Test A may be omitted if tests B and C are carried out. Tests B and C may be omitted if test A is carried out.

A. Determine by infrared absorption spectrophotometry

Compare the spectrum with that obtained with *lactose RS* or with the reference spectrum of lactose.

B. To 5 ml of a saturated solution add 5 ml of *1 M sodium hydroxide* and gently warm the mixture; the liquid becomes yellow and then brownish-red. Cool to room temperature and add 0.2 ml of *potassium cupri-tartrate solution*; a red precipitate is formed.

C. Heat 5 ml of a 5 per cent w/v solution with 5 ml of *10 M ammonia* in a water-bath at 80° for 10 minutes; a red colour develops.

Tests

Appearance of solution. Dissolve 1.0 g in *water* by heating to 50°, dilute to 10 ml with *water* and allow to cool. The solution is clear, and not more intensely coloured than reference solution BYS7.

Acidity or alkalinity. Dissolve 6 g in 25 ml of *carbon dioxidefree water* by boiling, cool and add 0.3 ml of *phenolphthalein solution*. The solution is colourless and not more than 0.4 ml of *0.1 M sodium hydroxide* is required to change the colour of the solution to pink.

Specific optical rotation . +54.4°to +55.9°, determined in a solution obtained by dissolving 10.0 g in 80 ml of *water* by heating to 50°, allowing to cool, adding 0.2 ml of *6 M ammonia*, allowing to stand for 30 minutes and diluting to 100.0 ml with *water*..

Light absorption Dissolve 1.0 g in boiling *water* and dilute to 10 ml with the same solvent (solution A). Absorbance of solution A measured at the maximum at about 400 nm, not more than 0.04.
Dilute 1 ml of solution A to 10 ml with *water*. When examined in the range 210 nm to 300 nm, absorbance is not more than 0.25 in the range 210 nm to 220 nm and not more than 0.07 in the range 270 nm to 300 nm.

Arsenic. Dissolve 10.0 g in 50 ml of *water* and add 10 ml of *stannated hydrochloric acid AsT*; the resulting solution complies with the limit test for arsenic (1 ppm).

Heavy metals. Dissolve 4.0 g in 20 ml of warm *water*, 1.0 ml of *0.1 M hydrochloric acid* and sufficient *water* to produce 25 ml. The solution complies with the limit test for heavy metals, Method A (5 ppm).

Microbial contamination . Total microbial count not more than 100 per g; 1 g is free from *Escherichia coli* and salmonellae.

Sulphated ash. Not more than 0.1 per cent, determined in the following manner. To 1.0 g add 1 ml of *sulphuric acid*, evaporate to dryness on a water-bath and ignite to constant weight.

Water .4.5 to 5.5 per cent, determined on 0.5 g.

Storage. Store protected from moisture.

PARACETAMOL

Acetaminophen

Mol. Formula C8H9NO2

Mol. Wt. 151.2

Paracetamol is 4-hydroxyacetanilide.

Paracetamol contains not less than 99.0 per cent and not more than 101.0 per cent of C8H9NO2, calculated on the dried basis.

Description. White crystals or a white, crystalline powder.

Identification

Test A may be omitted if tests B C and D are carried out. Tests B, C and D may be omitted if test A is carried out.

A. Determine by infrared absorption spectrophotometry. Compare the spectrum with that obtained with *paracetamol RS* or with the reference spectrum of paracetamol.

B. Dissolve 50 mg in sufficient *methanol* to produce 100 ml. To 1 ml of this solution add 0.5 ml of *0.1 M hydrochloric acid* and dilute to 100 ml with *methanol*. Protect the resulting solution from bright light and immediately measure the absorbance at the maximum at about 249 nm; absorbance at 249 nm, about 0.44.

C. Boil 0.1 g in 1 ml of *hydrochloric acid* for 3 minutes, add 10 ml of *water* and cool; no precipitate is produced. Add 0.05 ml of *0.0167 M potassium dichromate*; a violet colour develops which does not turn red.

D. Gives the reaction of acetyl groups.

Tests

4-Aminophenol. Dissolve 0.5 g in sufficient *methanol (50 percent)* to produce 10 ml. Add 0.2 ml of freshly prepared *alkaline sodium nitroprusside solution*, mix and allow to stand for 30 minutes. Any blue colour in the solution is not more intense than that in 10 ml of a solution prepared at the same time and in the same manner containing 0.5 g of *4-aminophenol-free paracetamol* and 0.5 ml of a 0.005 per cent w/v solution of *4-aminophenol* in *methanol (50 per cent)* (50 ppm).

Related substances. Determine by thin layer chromatograpy , coating the plate with *silica gel GF254*.

Mobile phase. A mixture of 65 volumes of *chloroform*, 25 volumes of *acetone* and 10 volumes of *toluene.*

Test solution (a). Transfer 1 g of the substance under examination, finely powdered, to a ground-glass stoppered 15-ml centrifuge tube, add 5 ml of *peroxide-free ether*, shake mechanically for 30 minutes and centrifuge at 1000 rpm for 15 minutes or until a clear supernatant liquid is obtained.

Test solution (b). Dilute 1 ml of the test solution to 10 ml with *ethanol (95 per cent)*.

Reference solution (a). A 0.005 per cent w/v solution of *4-chloroacetanilide* in *ethanol (95 per cent)*.

Reference solution (b). Dissolve 0.25 g of *4-chloroacetanilide* and 0.1 g of the substance under examination in sufficient *ethanol (95 per cent)* to produce 100 ml.

Apply to the plate 200 µl of test solution (a) and 40 µl of each of test solution (b) and reference solutions (a) and (b). After development, dry the plate in a current of warm air and examine in ultraviolet light at 254 nm. Any spot corresponding to 4-chloroacetanilide in the chromatogram obtained with test solution (a) is not more intense than the spot in the chromatogram obtained with reference solution (a). Any other secondary spot in the chromatogram obtained with test solution (b) is not more intense than the spot in the chromatogram obtained with reference solution (a). The chromatogram obtained with reference solution (b) shows two clearly separated spots, the spot corresponding to paracetamol having the lower Rf value.

Heavy metals 2.0 g complies with the limit test for heavy metals, Method B (10 ppm).

Sulphated ash. Not more than 0.1 per cent.

Loss on drying. Not more than 0.5 per cent, determined on 1.0 g by drying in an oven at 105º.

Assay. Weigh accurately about 0.5 g, dissolve in a mixture of 10 ml of *water* and 50 ml of *1 M sulphuric acid*. Boil under a reflux condenser for 1 hour, cool and dilute to 100.0 ml with *water*. To 20.0 ml of the solution add 40 ml of *water*, 40 g of *water* in the form of ice, 15 ml of *2 M hydrochloric acid* and 0.1 ml of *ferroin solution* and titrate with *0.1 M ceric ammonium sulphate* until a yellow colour is produced. Carry out a blank titration 1 ml of *0.1 M ceric ammonium sulphate* is equivalent to 0.00756 g of C8H9No2.

Storage. Store protected from light and moisture.

Vaccines : General Requirements

Vaccines are preparations of antigenic substances that are administered for the purpose of inducing in the recipient a specific and active immunity against the infective agent or toxin produced by it.

Vaccines may contain living micro-organisms suitably treated to attenuate their virulence but retain their antigenic potency or they may consist of pathogenic organisms which have been killed or inactivated. Some vaccines consist of antigenic fractions or substances produced by the same pathogenic organisms but rendered harmless whilst retaining their antigenic efficiency. Vaccines may be prepared from one species only or from a mixture of two or more species.

Vaccines may be prepared by the method described in the individual monographs or by the general methods given below or in any other manner provided the identity of the antigens is maintained and the vaccines are free from microbial contamination and extraneous agents. Unless otherwise indicated in the monograph, the final vaccine may be filled into single dose or multiple dose containers but vaccines in multiple dose containers must invariably contain a bactericide.

Bacterial Vaccines. Bacterial vaccines are either sterile suspensions of live or killed bacteria or sterile extracts of derivatives of bacteria. They may be simple vaccines prepared from one species or may be mixed vaccines prepared by blending two or more simple vaccines from different species or strains.

Bacterial vaccines may be prepared from cultures grown on suitable solid or liquid media. The whole culture or parts of it may be used in preparing the vaccine. The identity, antigenic potency and purity of each bacterial culture must be carefully controlled.

Bacterial toxoids. Bacterial toxoids are toxins or material derived therefrom, the toxicity of which has been reduced to a very low level or completely eliminated by chemical or physical means without destroying their immunizing potency. The toxins are obtained from selected strains of specific micro-organisms, grown in media free from ingredients known to cause toxic, allergic or other undesirable immunological reactions in humans. Toxoids produced by the action of formaldehyde are known as formol toxoids.

Viral and rickettsial vaccines. Viral and rickettsial vaccines are suspensions of viruses or rickettsiae and are prepared from infected tissues or blood obtained from artificially infected animals, from cultures in fertile eggs, or from cell or tissue culture. Viral vaccines may be live or killed and they may be freeze-dried. Live vaccines are usually prepared using attenuated strains of the specific organisms. Killed vaccines may be inactivated by suitable chemical or physical means.

Mixed Vaccines. Mixed vaccines are mixtures of two or more vaccines. A suitable antibacterial substance may be added to inactivated or live viral and rickettsial vaccines provided that it has no action against the specific organisms.

Production

General provisions. Requirements for production including in-process testing are included in individual monographs.

Where justified and authorized, certain tests may be omitted where it can be demonstrated, for example by validation studies, that the production process consistently ensures compliance with the test.

Unless otherwise justified and authorized, vaccines are produced using a seed-lot system. The methods of preparation are designed to maintain adequate immunogenic properties, to render the preparation harmless and to prevent contamination with extraneous agents.

Substrates for propagation. Substrates for propagation comply with the relevant requirements of the Pharmacopoeia or in the absence of such requirements with those of the competent authority. Serum and trypsin used in the preparation of cell suspensions shall be shown to be free from extraneous agents.

Seed lot. The strain of bacterium or virus used in a master seed lot is identified by historical records that include information on the origin of the strain and its subsequent manipulation.

Culture media. Culture media are as far as possible free from ingredients known to cause toxic, allergic or other undesirable reactions in man; if inclusion of such ingredients is necessary, it shall be demonstrated that the amount present in the final lot is reduced to such a level as to render the product safe.

Control cells. For vaccines produced in cell cultures, control cells are maintained and tested as prescribed. In order to provide a valid control, these

cells must be maintained in conditions that are rigorously identical with those used for the production cell cultures, including use of the same batches
of media and media changes.

Control eggs. For live vaccines produced in eggs, control eggs are incubated and tested as prescribed in the monograph.

Purification. Where applicable, validated purification procedures may be applied.

Intermediates. Where applicable, the stability of intermediates in given storage conditions shall be evaluated and a period of validity established.

Final bulk. The final bulk is prepared by aseptically blending the ingredients of the vaccine.

Adsorbents. Vaccines may be adsorbed on *aluminium hydroxide, aluminium phosphate, calcium phosphate*

Antimicrobial preservative. A suitable antimicrobial preservative may be included in sterile and inactivated vaccines and is invariably added if these preparations are issued in multidose containers, unless otherwise stated

Final lot. For vaccines for parenteral administration, the final lot is prepared by aseptically distributing the final bulk into sterile tamper-proof containers which, after freeze-drying where applicable, are closed so as to exclude contamination. For vaccines for administration by a non-parenteral route, the final lot is prepared by distributing the final bulk under suitable conditions into sterile, tamper-proof containers.

Stability. Maintenance of potency of the final lot throughout the period of validity shall be demonstrated by validation studies; the loss of potency in the recommended storage conditions is assessed and excessive loss even within the limits of acceptable potency may indicate that the vaccine is unacceptable.

Degree of adsorption. During development of an adsorbed vaccine, the degree of adsorption is evaluated as part of the consistency testing.

Tests

Vaccines, reconstituted where necessary, comply with the following requirements unless otherwise stated in the individual monograph.

Phenol (*If present*) . Not more than 0.25 per cent w/v.

Thiomersal (*If present*). Between 0.005 per cent w/v and 0.02 per cent w/v.

Free formaldehyde (*If present*). Maximum 0.02 g/l.

Aluminium (*If present*) . Not more than 1.25 mg per dose.

Sterility

Herbs and Herbal Products

Herbs and products containing herb(s) have been in trade and commerce and are currently used for a variety of purposes. As a country, India has a rich history of use of herbs, processed herbs and formulations containing herbs both from traditional wisdom as well as cultural usage. Herbs and herbals products are also regulated by various laws. For the purposes of pharmacopoeial standards various considerations have been given. This monograph provides a general outline and policies towards the same.

Crude Herbs

This term means, unless specified otherwise, mainly whole, fragmented or cut, plants, parts of plants, algae, fungi, and lichen in a form which is not processed. Herbs are usually in dried form, but sometimes, when specified, may also be in a fresh form. In specific cases exudates which have not been processed further also are covered under the term herbs.

Processing, does not include, normally expected value addition steps like grading, sizing, removal of weeds or parts of plants other than those specified herb and removal of adulterants. The term herbs, though botanically generally refer to plants of specified height and nature, for the purposes of pharmacopoeial reference, shall mean and include plants and parts of plants not necessarily from herbs and shrubs, but cover the entire range namely creepers, climbers, trees etc.

Each monograph of a herb in the pharmacopoeia shall specify the botanical scientific name according the binomial system specifying the genus, species, variety and author.

Monograph of a herb in the pharmacopoeia is to provide qualitative and quantitative standards of quality for the herb for its use either as a food item or food ingredient or food supplement/ nutraceuticals, as a drug, and / or as an ingredient in cosmetics. Each such use would need to comply with applicable regulations. Each herb is regarded as one active substance, irrespective of the knowledge about the active constituents of the herb is available of not.

* Ayurvedic Pharmacopeia of India, Vol. 1-6, Ministry of Health and Family Welfare, Govt. of India.

Herbs may be exposed to low dose gamma radiation for purposes of reducing their microbial contamination. Herbstreated with low dose gamma radiation shall meet nationallaws related to such treatment and shall be labeled as per law.

Processed Herbs

Processed herbs means preparations obtained by subjecting herbs to treatment such as extraction, distillation, expression, fractionation, purification, concentration and partial or full fermentation. Processing may also be done by way of powdering herbs, preparing tincture, preparing extract, distilling to get essential oils, fatty oils (either expressed or solvent extracted or a blend of both) expressed juices, extracted exudates, gums and oleo resins, liquid extract where the solvent is evaporated to yield concentrated semi solid mass or dried mass. Extraction may be performed by means of appropriate technology such as infusion, maceration, soxhleting, boiling under ambient or higher pressure, with or without specified enzymes, with or without agitation and combination thereof. Drying of liquid extracts for removal of the solvent may be done by using various appropriate technologies like air drying, sun drying, drying under vacuum or with forced air circulation, drying at low temperature with air circulation, by way of lyophilization or freeze drying.

Extracts of herbs may also be prepared by using carbon dioxide as a solvent-super critical fluid extraction.

Extracts may be liquid extracts and tinctures, semi solid (soft extracts) or solid dry extracts of known consistency obtained from herbs.

Herbal Formulations

Herbal formulation shall mean a dosage form consisting of one or more herbs or processed herb(s) in specified quantities to provide specific nutritional, cosmetic benefits, and/or other benefits meant for use to diagnose treat, mitigate diseases of human beings or animals and/or to alter the structure or physiology of human beings or animals. Dosage forms commonly employed for food or cosmetic or pharmaceuticals may be employed to formulate one or more herb or processed

herbs. Dosage forms known in traditional medicines may also be adopted for preparing herbal formulations, either for external use or for internal administration.

Herbal formulation shall be labeled to comply with relevant labelling requirements under food or drug or cosmetics laws as applicable. Additionally, adequate information shall be provided on label of such formulations to include the name of the herb, parts used, nature and type of extract or processed herb used, extraction ratios, quantity per unit dose or per serving, name (s) of inert excipients used and any preservatives added shall be provided on the label.

BIOTECHNOLOGY PRODUCTS

General Monographs

r-DNA Biotechnology Products of Therapeutic Value This monograph states the general requirements for the manufacture of products of recombinant DNA technology that are produced by genetic modification in which the DNA coding for the required product is introduced into a suitable cell line or microorganism by means of a plasmid or viral vector. The DNA is expressed and translated into protein of interest in the genetically modified organism. Therapeutic proteins are derived from several processes. One of them is the recombinant DNA technology, the products of which are often referred to as r-DNA products. The process involves isolation of a specific active gene and inserting into a host cell.

The host cell expresses the protein encoded in the transferred gene. The host cell could be a microorganism or an animal cell. Large-scale propagation yields large quantities of crude protein. Purification of the crude protein using multiple techniques derives a safe, pure and biologically active product.

The product being a protein may cause immunological sensitization in the recipients and therefore needs a high degree of characterization

Recombinant DNA technology products are produced by genetic manipulation of a cell line or microorganism usually through a plasmid transfer or viral vector.

The cell or microorganism used for expressing the protein is referred to as the host cell and the transformed cell after the gene insertion is referred to as the host-vector system.

The host cells could be Prokaryotic or Eukaryotic cells.

Monoclonal antibodies are derived from a single clone of B lymphocyte .They differs from polyclonal antibodies that are a mixture of antibodies of several antigenic epitopes. Blymphocytes have a short life span and hence need to be immortalized if they are to be used for production for a long period.

r-DNA products are produced in Prokaryotic or Eukaryotic systems. The choice of the system primarily depends upon the size of the protein and the extent of glycosylation required to make them biologically active. The choice of bacteria in the Prokaryotic system is E.Coli due to the extensive information available of this bacterium.

The disadvantages in use of the organism are:

1) The proteins are produced in the reduced state.

2) Need to remove the N formyl methionine sequence.

3) Product degradation during the production process due to the presence of protease enzyme.

4) Need for endotoxin removal step.

VETERINARY PRODUCTS

General Monographs

Dip Concentrates ....
Intramammary Infusions ....
Premixes ....
Veterinary Aerosols ....
Veterinary Diagnostics ....
Veterinary Oral Liquids ....
Veterinary Oral Powders ....
Veterinary Parenteral Preparations ....
Veterinary Tablets ....

Dip Concentrates

Dip concentrates are preparations for the prevention and treatment of ectoparasitic infestations of animals. They contain one or more medicaments, usually in the form of wettable powders, pastes or solutions from which diluted suspensions or emulsions are prepared by appropriate dilution with the recommended liquid.

Intramammary Infusions

Intramammary Infusions for Veterinary Use; Intramammary Injections.

Intramammary Infusions are sterile products intended for injection into the mammary gland through the teat canal. They are solutions, emulsions or suspensions or semi-solid preparations containing one or more active ingredients in a suitable vehicle. They may contain stabilizing, emulsifying, suspending and thickening agents. If a sediment is formed in a suspension, it is readily dispersible on shaking. In emulsions, phase separation may occur but this is readily miscible on shaking.

There are two main types of Intramammary Infusions. One is intended for administration to lactating animals as qualified by the term Lactating Cow/Buffalo and the other, qualified as Non-lactating or Dry Cow/Buffalo, is intended for administration to animals at the end of lactation or during the non-lactating period for the prevention or treatment of infection during the dry period

Containers. Intramammary Infusions are usually supplied in single dose containers for administration into a single teat canal of an animal

Premixes

Premixes are mixtures of one or more active ingredients with suitable bases intended for mixing with feedstuffs before administration to the animals. They are used to dilute medicament(s) with the feed and are usually issued as pellets, granules or powders.

Veterinary Aerosols

Veterinary Sprays

Veterinary Aerosols are solutions, suspensions or emulsions of one or more active ingredients intended for use by external application. They may contain auxiliary substances such as solvents, solubilising agents, emulsifying agents and suspending agents. They are delivered in the form of an aerosol by the actuation of an appropriate valve or by means of a suitable atomizing device that is either an integral part of the container or is supplied separately.

Veterinary Oral Liquids

Veterinary oral liquids intended for administration in large animals may also be called Drenches.

Veterinary Oral Powders

Veterinary Oral Powders are intended for oral administration, usually after dilution in drinking water or the feed. They may be in the form of soluble or wettable powders.

Labelling. The label states (1) for single dose containers, the name and quantity of active medicament(s) per container; (2) for multiple dose containers, the name and quantity of active medicament(s) by weight; (3) the name of any added antimicrobial preservative(s); (4) the directions for use of the preparation.

Veterinary Parenteral Preparations

Veterinary Parenteral Preparations prepared with oily vehicles are not meant for intravenous administration but are suitable for intramuscular or subcutaneous use. Veterinary Parenteral Preparations comply with the appropriate requirements for Parenteral Preparations (Injections) .

Veterinary Tablets

Veterinary tablets are usually solid, circular cylinders the end surfaces of which are flat or biconvex and the edges of which are bevelled except that those weighing 5 g of more may be elongated or biconical

Veterinary Vaccines

Vaccines for Veterinary Use Vaccines are a heterogeneous class of medicinal products containing immunogenic substances capable of inducing specific, active and protective host immunity against infectious diseases. They may be prepared from bacteria, viruses, parasites or other organisms or their toxins. Vaccines may contain live attenuated or avirulent microorganisms or these may consist of killed or inactivated microorganisms.

Some vaccines consist of antigenic fractions or substances produced by the same pathogenic organisms but rendered harmless whilst retaining their immunogenecity. Vaccines may be prepared from one species or from two or more species of microorganisms.