SECTION IV

TOXICOLOGY

(A) A GUIDELINE FOR ATTENDING POISONING CASES

Whenever cases suspected for Toxicity are reported to a Veterinarian, it is necessary to follow a certain line of action to tackle the problem from all possible angles.

The diagnosis of poisoning cases is many times very difficult. There is no single test by which laboratory can identify all types of poisons. Therefore while requesting for toxicological analysis, the details of circumstantial, symptomatic and pathological evidences along with suitable material on suitable preservative can give some clue to the Toxicology Laboratory for arranging the specific diagnostic tests.

(I) Historical or circumstantial evidences:— On reaching the actual site of exposure one should critically observe the premises and collect history on following, points:

(i) No. and kind of animals (i.e. Species, Sex, Age group, stall fed/grazing) affected and died, whether animals belonging to one owner or different owners, whether from one locality or from different localities of the village are affected.

(ii) Source of feed fodder and drinking water (Collect the samples for analysis if doubt arises). It should also be noted whether all affected animals have a common source of feed/fodder/water.

(iii) Presence of poisonous plants (names) in the vicinity or grazing area and history of consuming such plants (Collect sample).

(iv) History of use of any Insecticide/Pesticide/Rhodenticide etc. in the animal house, premises in the pasture or crop field.

(v) History of use of Chemical Fertilizers in the nearby field, fodder plot or their chances of mixing in the food or water,

(vi) Findings of empties (Tins/Bags) of insecticides, Chemicals, paints, fertilizers, medicines etc. near the site of poisoning.

(vii) History of spraying, dusting, deworming, vaccination or treatment undertaken recently in the affected animals.

(viii) Presence of any industry in the vicinity of place of exposure which is likely to pollute the source of drinking water, pasture or atmosphere.

(II) Symptomatic Evidence:— The close observations of the ailing animals may give some clue to diagnosis. This should include:

(i) Incubation period i.e. time taken for exhibition of symptoms from the time of exposure.

(ii) Whether symptoms developed immediately after-consumption of feed/fodder or water.

(iii) Severity of symptoms acute/sub-acute/chronic.

(iv) Body temperature.

(v) Smell of breath/froth.

(vi) Any discoloration of visible mucous Membranes (m.m.).

(vii) Discoloration of urine.

(viii) Symptoms like salivation, lacrimation, nasal discharge, contraction/dilation of pupils.

(ix) Presence of constipation, diarrhoea, blood, mucous in the faeces.

(x) Buccal lesions if any.

(xi) Skin condition i.e. change in the body coat, oedematous swellings, necrosis sloughing of skin.

(xii) Various symptoms indicating disturbances in digestive (e.g. colic), respiratory (e.g. Dyspnoea), Cardiovascular (Pulse, oedematous swelling) and nervous system (e.g. convulsions/shivering, spasms).

(xiii) Abnormality of teeth, bones, joint etc.

The following material should be collected from the ailing animals for toxicological as well as for Pathological/ Bacteriological/Parasitological investigations:

(1) Whole blood (citrated) in sterile vial on ice at least 5 ml.

(2) Blood serum at least 2 ml.

(3) Blood smears on clean slides-two.

(4) Urine available.

(5) Faecal sample.
(III) Pathological Evidence:— Whenever carcase is available post-mortem examination should be invariably performed, after obtaining requisition letter. Even delayed post-mortem material can be useful for Toxicological Investigations. The detailed post-mortem findings should be recorded carefully and the copy of the post-mortem report should be sent with the material collected. For toxicological investigations the collection of stomach/rumen content, intestinal content, liver and kidney in sufficient quantity on common salt is a must. If hydrocynic acid poisoning is suspected a muscle piece in 1 per cent mercuric chloride solution is useful.

Along with this, the formaline preserved tissue from important organs should be sent for histopathological examination. Similarly, to rule out the bacterial/viral infection suitable material should be sent on ice in sterile container (i.e. heart blood, lymphnodes, important organ, tissues).

Preventive Measures:— To prevent further exposure to the poison, measures like removal of animals from the place of exposure, change of source of feed, fodder and water should be advised.

Treatment of ailing cases:— If the nature of poison could be known the specific antidote can be used to treat the ailing cases. But in absence of it, symptomatic treatment and supportive treatment (e.g. fluid therapy, anti-histaminic drugs, liver stimulants) can be useful to save the life of ailing animal. Adequate fluid therapy will also help in elimination of the toxin from the body through urine.

An universal oral antidote can be prepared as below:—

(i) Activated charcoal .. 2 Parts
(ii) Magnesium oxide .. 2 Parts
(iii) Tannic acid .. 1 Part
(iv) Kaoline .. 1 Part

Dose.
Cattle/Horse 250 gms 2 to 3 times a day
Calves 30 gms. — Do —
Sheep/Goat/Pig. 15 gms. — Do —
Dog 30 gms. shaken up with 300 ml. of water and administered during 24 hours.

In cattle and sheep this should be followed with purgative i. e. Mag-Sulph. 450 gms. in Cattle and 120 gms. in Sheep.

(B) COMMON VETERINARY POISONS
NON-VOLATILE

1. Insecticides.—
(a) Organo Phosphates.— e.g. Malathion, Rogor, Dalf, Tick-20, Folidol-M, Sumithion, Diazinal.
(b) Organochloro Compounds.— e.g. D.D.T., Aldrin, Endrin, Gammexine.
(c) Organichloro Sulphur.— e.g. Endosulphan.
(d) Organochloro Phosphorous.— e.g. Nuvon, Phosphamidon.
(e) Carbonate compounds.— e.g. Sevin, Zineb, Baygon, Deetran, Tyrolan.

2. Plant Alkaloids.—
(a) Cyno genetic plants.— e.g. Jowar, Hiverpoda, Dhatura, Ergot, Nerium, Canabis, Opium Stry-Chnine, Cocaine, Nicotana-tobacum, Belladona.

3. Sulpha Drugs.— e.g. Sulphadiazine, Sulphaguanidine, Sulphadimidine, Sulphamerazine, Sulphamethazine, Sulphanilamide etc.

4. Miscellaneous Group.—
(a) Fertilizers.— e.g. Ammonium Sulphate, Urea.
(b) Anthelmentics.— e.g. Phenothiazine.
(c) Sodium Salts.— e.g. Sodium chloride.
(d) Other drugs.— e.g. Phenol, Barbituates, Trypanocides, Purgatives.

Volatile.— e.g. Carbon Tetrachloride, Chloroform, Carbon Monoxide, Chloral Hydras, Kerosine, Formaldehyde, Turpentine oil, Ether etc.

Inorganic.— e.g. Mercury, Lead, Arsenic, Lime, Nickel, Copper, Iron, Phosphorous, Sulphur, Antimony, Nitrates/ Nitrites, Solenium, Fluorine, Molybdenum, Acids/Alkalies.
(C) POISONS AND TREATMENT IN GENERAL

(A) Classification of Poisons:
1. Poisons causing death by Anoxia—e.g. Nitrates, Carbon monoxide.
2. Corrosive Poisons—e.g. Acids, Alkalies, Heavy Metals, Gases.
3. Poisons with selective toxicity nervous system—e.g. Anaesthetics, Alcohol, Narcotics.

(B) Metabolism of Poisons:
All soluble poisons are absorbed through vascular mucous membrane of gut.
Inhalation of toxic substances through lungs.
Pesticides and Nicotine are absorbed through intact skin.

(C) Distribution and Accumulation of Poison:
1. Poisons absorbed through intestine pass via portal vessels to liver where liver tries to detoxify foreign compounds.
2. Some poisons are selectively deposited in certain organs and tissues—e.g. Iodine in thyroid glands, lead in bones, D.D.T. in fat.

(D) Elimination of Poisons:
1. Insoluble poison is thrown out through faeces i.e. Lead, arsenate.
2. Volatile poison is excreted through lungs in expired air—e.g. Cyanides.
3. Irritant poison is excreted through kidneys.
4. Urine examination helps in detection of fluorides.
5. Milk examination helps in detection of lead, arsenic and insecticide poisoning.

(E) Diagnosis of Poisoning:
2. Convulsions—Ammonia salts, Cyanides, Nitrates and Nitrites, Phenol, Strychnine.
3. Coma—Bromides, Carbon monoxide, Nicotine, Alcohol.
7. Slow respiration—Atropin, Hypnotics.
10. Lameness—Flourine, Ergot, Insecticides.

(F) Common Antidotes:
Any poison remaining in the stomach should be neutralized as far as possible by administration of suitable chemical antidotes.

1. Universal Oral Antidote:
Preparation:
(a) Activated Charcoal
(b) Magnesium oxide
(c) Tannic acid
(d) Kaoline
Does:
1. Cattle, Horses
   2. Calves
   3. Sheep, Goat, Pigs.
   4. Dogs
   
Mixture of this antidote should be given in three parts of a day.

N. B. Antidote given should be followed by saline purgatives 450 gms, mag. sulph. in cattle.

2. Tannic Acid:
In the form of solution in water, Tannic acid effectively precipitates aluminium, lead, silver and the alkaloids (Useless against arsenic trioxide.)

3. Iodine solution (15 drops of the tincture in half a glass of water) effective for precipitation of lead, mercury, silver and certain alkaloids of quinine and strychnine.

4. Acid Neutralization:
By giving lime water, mag. carbonate.
5. **Alkali neutralization.**— Vinegar (5 per cent acetic acid), lemon juice, citric acid 5-10 per cent solution, Potassium permanganate solution has some value in oxidation of phosphorus. (Dilute solution, of KMnO₄ 1 in 2000).

6. Milk and egg white neutralize heavy metals and phenols.

7. **Demulcents.**— Mixture of eggs, sugar and milk to linseed-tea or oatmeal-gruel allays irritation caused by poison.

(C) **Treatment of Poison:**

1. **Removal of Poison unabsorbed:**
   (a) **On skin.**— Wash with cold water and don't use hot water. Do not rub the affected part or area.
   (b) **In gastrointestinal tract.**—
      1. Gastric lavage promptly either by neutralizing agent or with water.
      2. Emetics may be used when gastric lavage is immediately not available, Two table spoon of table salt in warm water, or one tea spoon of dry mustard powder.
      3. Cathartics.— After gastric lavage only, doses of sodium sulphate one to two tea spoonful may be given.
      4. Only activated charcoal is a good absorbent for organic and inorganic compounds. It may be mixed with gum acacia in equal parts with plenty of water and should be given only after gastric lavage.

2. **Removal of poison absorbed:**
   (a) **Through kidney.**—
      (i) Diuresis with water (Not saline)
      (ii) Electrolytes,
      (iii) Parenterally. 5 per cent to 10 per cent solution of glucose (No saline water should be used)
   (b) **Through lungs.**— fresh air.
   (c) **Intestinal Tract.**— Sodium sulphate, cathartics may be used.

3. **Symptomatic Treatment:**
   (a) Maintainance of clear airway by removing obstructions, Block by falling of tongue back and position may be corrected.
   (b) Control of respiratory depression by giving stimulants.
   (c) **Stimulants:**— Caffeine is an effective stimulant.
      *Dose.*— 0.5 gm. I/V Repeat if required every two hours.
   (d) **Control of shock.**—
      (i) Protection from cold.
      (ii) Inflation of Oxygen.
      (iii) Replacement of losses of water and electrolytes.
   (e) **Control of convulsions.**— Give barbiturates by I/V route, if it is not possible then give by mouth.
   (f) **Control of Infection.**—

Secondary infections like bronchopneumonia, Skin Vesicless, and infection, of urinary tract may be corrected by giving proper antibiotic.

(D) **HANDLING THE SPECIMEN MATERIAL FOR TOXICOLOGICAL EXAMINATION**

(1) The Toxicology Unit of Disease Investigation Section, undertakes the diagnostic work only. The Disease Investigation Section is not recognised for medicolegal cases. No material for such purpose be sent to the Disease Investigation Section. But it should be sent to the concerned Forensic Science Laboratory through Police authority.

(2) **Material.**— The material required and the preservative to be used etc. is given in the para No. 7 below.

(3) **Container.**— The material be sent in wide mouth bottles of the appropriate capacity. The containers should be chemically clean.

(4) **Label.**— Proper labeling is a "must" in absence of which the material is likely to be mixed with other materials and leads to a Confused stage of affairs in the laboratory. Label should be self-explanatory giving all details required. The label be typed or use of ball pen be made.

(5) **Sealing.**— (A) In case of Medicolegal cases the sealing is very important. Hence following points be noted.
   (i) The bottles should be sealed with official seals. In absence of official seal the use of common articles like coins, keys, Buttons etc. should be avoided strictly.
   (ii) The seal is to be done in presence of Panchas.
   (iii) The copy of the seal used be sent along with the Post-mortem report in the space provided for the same in the report.

(B) In case of diagnostic case, material the sealing to stop the leakage is enough.
(6) Reporting.—The material sent to Disease Investigation Section (D. I. S.) for diagnosis should accompany the information about the symptoms, course of the disease, *post-mortem* lesions seen, treatment given and response observed along with the *post-mortem* examination report. The indication of a poison or a group of poisons is a must. It is of no use to send material and request to examine for “Toxicity, Poisoning”.

The material sent to Forensic Science Laboratory should accompany the post-mortem report in proper prescribed form and in the covering letter the following information be sent—

(a) Description of the animal or bird poisoned.

(b) Police Station (Write Name) .................................................. Place ...........................................................

Crime Registration No. .......................................................... Date

(c) Indian Penal Code, Section under which the case is being investigated ..............................................................

(7) Material required for Toxicological Examination.—

(a) For sending the material for toxicological examination the thumb rule is that the organ/s by which the poison enters into the body and the organ/s by which it is excreted should be sent for examination. In case of cumulative poison the organ/s (where the poison is stored into the body) be sent for examination.

The following are the examples of the information given above, but is not exhaustive.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Biological Material</th>
<th>Type of poison suspected</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Bile</td>
<td>Organic pesticides.</td>
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<td>2</td>
<td>Blood</td>
<td>Many types including nitrate, barbiturates, warfrain.</td>
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<td>3</td>
<td>Bones</td>
<td>Chronic lead poisoning.</td>
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<td>4</td>
<td>Brain</td>
<td>Alkaloids, barbiturates.</td>
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<tr>
<td>5</td>
<td>Fat</td>
<td>Organic pesticides.</td>
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<tr>
<td>6</td>
<td>Feed</td>
<td>All types.</td>
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<tr>
<td>7</td>
<td>Hair</td>
<td>Chronic Arsenic poisoning.</td>
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<tr>
<td>8</td>
<td>Intestinal Contents</td>
<td>Sub-acute poisoning.</td>
</tr>
<tr>
<td>9</td>
<td>Kidney</td>
<td>Lead, thallium, ethylene glycol</td>
</tr>
<tr>
<td>10</td>
<td>Liver</td>
<td>Many types, including Arsenic Oxalates, alkaloids, pesticides.</td>
</tr>
<tr>
<td>11</td>
<td>Rumen Content</td>
<td>Many acute poisonings.</td>
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<tr>
<td>12</td>
<td>Stomach content</td>
<td>Many acute poisonings.</td>
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<tr>
<td>13</td>
<td>Urine</td>
<td>Most types, preferred for thallium or nitrate.</td>
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</tbody>
</table>

(b) By and large the following material may be sent for Toxicological Examination to Forensic Science Laboratory or to Disease Investigation Section for medicological/diagnostic investigation respectively.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Biological Material</th>
<th>Quantity Required</th>
<th>Preservative Used</th>
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<tbody>
<tr>
<td>1</td>
<td>Rumen Contents and the abomasal contents (in case of ruminants)</td>
<td>1 Kg.</td>
<td>For Sr. Nos. 1 to 4 use saturated solution of common salt.</td>
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<td>(b) Corp with gizzard and proventriculus.</td>
<td>Whole 10 in Nos.</td>
<td>Add sufficient salt, so that some salt remains undissolved.</td>
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<td>2</td>
<td>Small Intestine with its content.</td>
<td>250 gms. to 1 kg.</td>
<td>As above.</td>
</tr>
<tr>
<td>3</td>
<td>Liver.</td>
<td>1 Kg.</td>
<td>As above.</td>
</tr>
<tr>
<td>4</td>
<td>Half of each kidney</td>
<td>Half of each kidney. In case of birds whole kidneys at least ten in number.</td>
<td>As above.</td>
</tr>
<tr>
<td>5</td>
<td>Urine</td>
<td>All available.</td>
<td>For each 200 to 500 ml. Of urine use 1 gm. of Sodi. Benzoate or 5 ml. of-Hydrochloric acid.</td>
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<td>6</td>
<td>Blood</td>
<td>100 ml. or whatever is available.</td>
<td>For every 10 ml. Of blood use mixture of Pot. Oxalate (30 mgs.) Sodi. Fluoride (10 mgs.)</td>
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<td>7</td>
<td>Suspected Taxi Cmaterial (Fodder, Seeds, Water, Chemicals etc.)</td>
<td>Sufficient Quality</td>
<td>—</td>
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<tr>
<td>Sc. No.</td>
<td>Poison</td>
<td>Source</td>
<td>Route / Species</td>
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<tr>
<td>1</td>
<td>Abrin</td>
<td>Seed of plant Abris precatorius (Gunj).</td>
<td>Cattle, Sheep, Goats, Horse, Pig, Either oral or prick by needle.</td>
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<td>2</td>
<td>Acids</td>
<td>Accidents in treatment, salts in plant, Insect bite, effluent from industries, Spray on potato etc.</td>
<td>Oral/Skin eyes Rare among Livestock.</td>
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<td>3</td>
<td>Alkali</td>
<td>Contaminated food, Soil, Water, Effluent from industries.</td>
<td>Birds Livestock/oral Skin Eyes.</td>
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<td>4</td>
<td>Aflatoxin</td>
<td>Fungus Aspergillus Flavus through feed.</td>
<td>Duckling Poultry, Broilers, Pigs Lethal does in ducklings 0.5 mg. Per B. W.</td>
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<td>5</td>
<td>Antimony Compound e.g. Tartar emetics antimosan etc.</td>
<td>Accidents in treatment and over dosing.</td>
<td>Dogs Ruminants Cat Horse oral/skin and Parenteral.</td>
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<td>6</td>
<td>ANTU(Rhodenticide) Alphanaphylthic urea.</td>
<td>Lethal dose mg/kg. B. W. Cat-75 Dog-10 Pigs-25 Horse-30 Ruminants-50 Contaminated Feed ingestion of Rat, died of ANTU.</td>
<td>All animals and poultry Dogs are more susceptible oral. Sudden on-set Salivation, Vomition Dyspnea, Coughing In co-ordination increased heart rate and sound muted due to accumulated fluid, foam from nostrils and mouth. Watery diarrhoea coma and death. Cyanosis oedema of lungs Inflammation of G. I. Tract. Hydropericardium Liver enlarged and dark congestion and degenerative changes in Kidney.</td>
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<tr>
<td>7</td>
<td>Arsenic compounds e.g. Calcium, Copper, Zinc, lead, magnesmium arsenated stovarsal atoxyl.</td>
<td>Arsenical dip Dust, plants and surface Soil, water Accident in treatment Farm animals e.g. Cattle Sheep, Pigs oral/Skin.</td>
<td>Acute: Vomition Colic, Salivation trembling, in co-ordination, paralysis of hind limbs, anorexia, thirst, dehydration, Cold extremities, Grinding of teeth, oedema of eyelids, Ulceration of buccal mucus membrane. Chronic.— Indigestion, thirst wasting, dry staining, coat brick red colour of visible mucous membrane poor growth, drop in milk sloughing of skin, abortion, sterility, oedema of eyelids. Dying and cracking of skin, congestion of lungs, rupture of blood vessels and exudation of serum in tissues haemorrhages on pericardium, intense rose red inflammation of G. I. Tract, In Cattle, intestinal contents are blood tinged with mucous Haemorrhages on liver and Kidney. Pigs:— Congestion of mucus membrane of larynx and Trachea. Poultry:— Reddening of crop, duodenum, liver pale and friable.</td>
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<td>9</td>
<td>Boric Acid, Cumulative poison.</td>
<td>Accidental ointment excessive use of calborogluconate food Preservative.</td>
<td>All animals M. L. Dose: — Dog - 2.5 gm. to 3 gm. Per kg. B. W.</td>
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<td>10</td>
<td>Cadmium</td>
<td>Pasture in the Vacinity of industries using Zinc. Environmental Pollution due to mines. Smelting plants, metallurgical galvanotechnical and dye work. Some phosphate fertilizers cadoxide anthranilate used as antihelmities for treatment of ascariasis in Pig. Cadmium plated vessels.</td>
<td>Cattle, Cows, Pigs Camel, Man Route oral and inhalation.</td>
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<td>11</td>
<td>Carbamate Insecticide.</td>
<td>Consumption of forage inadvertently sprayed by carbamate insecticides consumption of contaminated drinking water Accidental ingestion by any means.</td>
<td>Cattle Sheep Goat Swine</td>
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<td>12</td>
<td>Castor bean (Ricin Poison-Toxalbumin)</td>
<td>Feeding of plants in drought, feeding of uncooked castor cake.</td>
<td>Horses are more susceptible than Cattle Sheep and Pigs Poultry is resistant Route oral, MLD for cow is 2 gms/ Kg. B. W.</td>
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<td>13</td>
<td>Chloral hydras</td>
<td>Accidents in treatment.</td>
<td>Horse, Dog other Livestock Route oral or parenteral.</td>
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<td>14</td>
<td>Chlorinated Hydrocarbons e.g. D.D.T. B.H.C., Aldrin, Endrin, Endosulphate.</td>
<td>Through intact skin, spraying on Pastures, fat soluble.</td>
<td>Cattle, Sheep Poultry Route of excretion is in milk.</td>
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<td>15</td>
<td>Chlorates and chlorine.</td>
<td>Chlorinated lime (bleaching powder) used in error of lime wash Contamination of whey with hypochlorites used for disinfecting whey containers.</td>
<td>Route oral Skin Inhalation and Gas. Cattle buffalo, Sheep, Goat, Pig, Dog.</td>
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<td>16</td>
<td>Chlorates e.g. Sodium chlorate (Weed killer)</td>
<td>Pastures and Dip.</td>
<td>Cattle more susceptible due to saline test to Pasture Route-oral, skin.</td>
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<td><strong>17</strong></td>
<td><strong>Chromium</strong></td>
<td>Drinking water contaminated with effluent from Chromium plating works Access to Zinc chromate used in hydroelectric engineering for cold Galvanising Accidental ingestion of potassium dichromate in horses.</td>
<td>Cattle Calves Horses through ingestion.</td>
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</tbody>
</table>
| **18** | **Copper Compounds**  
*e.g.* Copper Sulphate / Chloride / Oxichloride / Oxide and Carbonates. | — Fungicide Pesticide Foot bath Contamination of feed and drinking water with copper salts, excessive use of copper sulphate is snail eradication. Chronic poisoning when soil is rich in copper. Ingestion of plants leading to abnormal copper metabolism *e.g.* Helitropum and Echinum spp. Excess of Copper content in mineral mixture licks. | Route oral/wound and Cumulative poison Species Sheep Cattle Dog Pigs, dose MLD Cattle 200 mg/kg Sheep 20 mg/kg. | *Acute* - Nausea, Vomiting, Salivation Purgation, abdominal pain, convulsions and paralysis, faeces are deep green in colour  
**Chronic**- Constipation followed by diarrhoea, softening and of hair, anaemia, arthritis, thickening of skin, Jaundice, bone deformaty, infertility in both sexes. | *Acute* - Gastroenteritis, erosion and ulceration of mucus membrane of abomasum, congestion of liver, spleen and kidney, Contents of Stomach and gut are bluish in colour.  
**Chronic** - Icterus, liver enlarged, fragile and yellowish in colour Gall bladder B. with thick greenish brown bile, bending of ribs, overgrowth with long bones, myocarditis, cystitis. | *Note* - In all animals treatment is of no use once haemolytic crisis starts  
(1) Calcium E.D.T.A. (available as 5 ml ampoule of 20 per cent solutions) Dose by I/I-15-25 mg/kg (i.e. 0.08-0.125ml — of 20 per cent Solution) per kg/B/W in 500 ml of 5 per cent Dextrose solution given very slowly twice daily. By I/M 12.5 mg/kg every four to six hours. Dilute each does with an equal volume of 1 per cent Procaine.  
(2) Penicilamine (Cuprimine) oral dose for small animals 100 mg/kg B. W. Daily (Maximum) 1 gm daily) divided into 4 doses for no longer than one week.  
(3) B.A.L. (Dimercaprol) has a doubtful value.  
(4) In simple stomach animals gastric lavage with 1 per cent solution of potassium ferrocyanate is advised to form insoluble Cupric ferrocynide.  
(5) For severe cases associated with anorexia and haematuria intramuscular injection of 52 to 100 mg of cortisone every 6 to 8 hours or 10 mg of prednesolone three times a day. |
Copper Compounds.

Ergot (Selerotium of the fungus Claviceps Purpurea, Ergotoxin is the main toxic alkaloid).

Grazing Pasture contaminated with ergot fungus Cereal grass and crops like bajara-Cakes and feed (Repeated Ingestions).

 Oral Route Spp. Cattle Man Pig and other animals.

Acute — (Nervous Symptoms) hyper-excitability, in coordination, tremors blindness fatal convulsions hind limbs first affected Coma and death. Chronic — (Gangrenous Symptoms) Diarrhoea, Lameness, Coldness insensitivity and sloughing of extremities for e.g. hooves, tail, ear, abortion mummification of foetus. Injury to Capillary endothelium, blocking of vessels dry gangrene of feet, ears and tail and slough off without pain. Ulceration of mucus membrane of alimentary tract.

Preventions

(1) If Copper Poisoning is of soil origin the soil should be enriched with molybdenum about 300 grn/hecate.

(2) Medicated salt bricks containing molybdenum should be used (e.g. NaCl 100 kg + 70 kg Gypsum + 0.5 kg Sodium Molybdate).

(3) In Cases of exposure to risk following dose is reco recommended per sheep 0.3 to 10 grm. Sodium Sulphate and 50-100 grm of ammonium molybdate orally per day.

(4) A Solution of Sodium Sulphate and ammonium molybdate may be sprayed on hay and feed for 2 to 3 weeks.

There is no treatment for ergot poisoning other than rest and removal of the source of the fungus.
| 21 | Fluorine (Sodium, Barium and Calcium Salts) |
| 22 | Fuel oils Kerosine, Diesel |
| 23 | Gossypol (Cotton Plants) |
| 24 | Iron |

**Fluorine (Sodium, Barium and Calcium Salts)**

- Smoke and dust from Industrial area affecting plants, soil, water
- Feeding of Rock phosphate in Phosphorus deficiency
- Drinking water from wells or artesian bores
- Dust and gases from Volcanic eruption

**Route** — oral, and inhalation.

**Species** — Calves, Dairy Cattle, sheep, Goat, Hourse, Pig and Poultry.

**Acute** — Vomiting anorexia, Colic, increased thirst, lacrimation, Pupils dilated, Motting of teeth, Difficulty in chewing, lameness arthritis, green coloured faces with mucus, anaemia, coma and death.

**Chronic** — loss of appetite, constipation, followed by diarrhoea, emaciation, softening, and loss of hairs, thickness of skin, Jaundice, deformity of bones, over growth of long bones, infertility in both sexes.

**Route** — oral, and inhalation.

**Species** — Calves, Dairy Cattle, sheep, Goat, Hourse, Pig and Poultry.

**Acute** — Vomiting Shivering Constipation, followed by diarrhoea, emaciation, softening, and loss of hairs, thickness of skin, Jaundice, deformity of bones, over growth of long bones, infertility in both sexes.

**Chronic** — loss of appetite, constipation, followed by diarrhoea, emaciation, softening, and loss of hairs, thickness of skin, Jaundice, deformity of bones, over growth of long bones, infertility in both sexes.

**Route** — oral, Parenteral.

**Species** — Piglets, Dogs, Children.

**Acute** — Vomiting anorexia, Colic, increased thirst, lacrimation, Pupils dilated, Motting of teeth, Difficulty in chewing, lameness arthritis, green coloured faces with mucus, anaemia, coma and death.

**Chronic** — loss of appetite, constipation, followed by diarrhoea, emaciation, softening, and loss of hairs, thickness of skin, Jaundice, deformity of bones, over growth of long bones, infertility in both sexes.

**Prevention** — AvoidContaminated feed and water by mopping out the exposed territories.

**Route** — oral, and inhalation.

**Species** — Calves, Dairy Cattle, sheep, Goat, Hourse, Pig and Poultry.

**Acute** — Vomiting anorexia, Colic, increased thirst, lacrimation, Pupils dilated, Motting of teeth, Difficulty in chewing, lameness arthritis, green coloured faces with mucus, anaemia, coma and death.

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<td>25</td>
<td>Plants containing Cyanogenetic glucosides e.g. sorghum sugar cane tops, Hiver Pods, Linseed Meal and Cake White clover bitter almond arrow grass cherry.</td>
<td>Oral/inhalation Cattle Buffaloes, Sheep, Goat Horses and Pigs are less Susceptible Due to Gastric Acidity which destroy hydrolysing enzymes.</td>
<td>In peracute case sudden death without symptoms: Vomiting, Profuse salivation, excitement, Jerky movements of eye ball. Foam from nostrils and mouth having typical smell of Bitter almond. Openmouth breathing eyes insensitive of light. Bloat in Cattle. Muscular Weakness. Opisthotonus condition. Recumbancy, death due to Asphaxia. Typical cry before death.</td>
<td>Bright red colour of blood Unclotted blood in vessels. Congestion of lungs. Musculature is dark. Bitter almond smell when abdomen is open Bloat in Cattle endocardial haemorrhage etc. congestion of abomasum and intestine, some times, perforation of abomasum.</td>
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<td>29</td>
<td>Lead</td>
<td>(1) Accidental ingestion of paints based on lead compound.</td>
<td>Cattle Sheep Horse Dog and Cat, Pig, Poultry man. Goats are rather resistant.</td>
<td>Acute - Affected animals walk in circle, push head against fences, appears to be blind, grinding of teeth, excessive salivation. Muscular twitching, Violent blinking of eyelids, convulsions, weakness and prostrations. Gastroenteritis Elevated body temperature, weak pulse and respiration. Chronic - Anorexia, depression, progressive, wasting, muscular weakness and General prostration are characteristic. Blue line on gum, oedema of optic disc. Brisket and leg. Constipation in some Animals. Pustular eruptions on the skin Grinding of teeth, Occasional attacks of colic. Heart and respiratory action becomes weak. Abortion and sterility. Sheep - Anorexia anaemia, faeces dark with offensive odour, abortion Pigs - Slight diarrhoea, teeth grinding, anorexia, blindness, convulsions, incoordination. Dog - Vomiting along with haemoglobinuria. Paralysis of maseter muscle. Anaemia. Horse - Colic, lead line on gums, roaring due to paralysis of laryngeal muscle, partial paralysis, with knuckling over pastern joint. Gastroenteritis with haemorrhages. Liver becomes pale. Kidneys are congested and contain areas of haemorrhages. Petechial to ecchymotic haemorrhages in heart, excessive fluid accumulation around brain and spinal cord. After opening the carcass a typical smell and greenish red colouration of muscle is seen.</td>
<td>Acute lead poisoning is always almost fatal. (1) Attempts be made to remove lead by giving saline purgatives emetics and by gastric, lavage. (2) Oral dosing with small amounts of magnesium sulphate or sodium sulphate to form in soluble lead salts. (3) Milk, egg white or Tannic acid are recommended to immobilize the lead in the gut by precipitating it as albuminae or tannae. (4) Calcium versenate (Calcium disodium ethylendiamine tetracetate Ca Na 2 EDTA). 12.5 per cent solution i/v by continuous drop @ 110-120 mg/kg Body weight over 12 hrs. or two rapid i/v. injection 6 Hrs. apart and each of 110 mg/kg Body weight. This therapy may be repeated after, 7 days interval. This therapy is not free from danger. Toxic effects are damage to kidney, bone marrow, cardiac muscle and disturbed electrolyte balance if high doses are used.</td>
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<td>(2) Pesticide, containing lead.</td>
<td>(3) Carelessly discarded lead batteries.</td>
<td>(4) Air, Water and pasture, contamination due to industrial pollution.</td>
<td>(5) Smoke from vehicle near petrol pump.</td>
<td>(6) Contamination of feed, fodder, and water with grease, petrol, motor oil.</td>
<td>(7) Use of lead pipe for drinking water.</td>
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Sheep - Anorexia anaemia, faeces dark with offensive odour, abortion
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<tr>
<th>Book</th>
<th>Page</th>
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<th>Description</th>
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<tr>
<td>30</td>
<td>Nitrate and Nitrates.</td>
<td>Artificial manures Containing Sodium Potassium Ammonium Nitrate well water plants, grown on soil containing these salts. Crops like oat, Sugar, beet. Turniptops. Accidental mixing with feed and water.</td>
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<tr>
<td>31</td>
<td>Snake Venom</td>
<td>Bite of Poisonous snake e.g. Cobra, krait, viper, etc. Four types of toxins. (1) Necrotizing (2) Coagulant (3) Neurotoxin (ex. Krait, Viper) (4) Haemolytic (e.g. Viper) Secondary Bacterial infection may be present.</td>
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**Oral Cattle, Sheep, Goat, Pigs are most susceptible**

**NB** - Nitrates are converted into nitrates and are toxic. Due to Preservation of hay for long time.

- Sudden on set beginning with dyspnoea, violent respiratory efforts, Salivation.
- Abdominal pain and diarrhoea.
- Muscular weakness and incoordination, convulsions cyanosis of visible mucus membrane, Abortion, drop in milk, death due to anoxia.

**General Symptoms- Restlessness, excitement, depression Pupils dilated, not responding to stimulus, muscular twitching, inco-ordination, Convulsions, collapse and death.**

**Local - Swelling at the site which develops rapidly.**

**Acute cases - Symptoms appear within 15 min. of bite, excitement anxiety coagulation of blood is completely lost, death due to pulmonary thrombosis of excessive haemorrhage.**

**Subacute - More of local Swelling symptoms appear within one hour of bite excitement, convulsions, coagulability of blood not affected, Death due to paralysis of respiratory centre.**

**Bite by other type snakes.**—

Local swelling develops rapidly and causes sever pain, excitement, anxiety. If neurotoxin is more dilatation of pupil, Salivation, hyper esthesia, tetany, depression and terminal paralysis.

Tarry blood, thickened pleura, Ascites, Necrotic foci on liver. - Petechial haemorrhages on serous surfaces, - In peracute case no characteristic lesion is seen.

(1) Presence of fang marks in the centre of swollen area.
(2) Venom of both crotaline and Veperine snakes produce varying degree of swelling.
(3) Elapid venom causes only slight swelling and myonecrosis.

(1) Methylene blue 4 per cent solution I/V is the best treatment. (9 mg/kg. B. W) Repeat if required.
(2) Large doses of mineral oil to slow the absorption of nitrates.
(3) Supportive treatments.

(A) Local Treatment
(1) Clipping of hairs around the site of bite.
(2) Tourniquet above the bitten part to restrict venous circulation to be released at 20 min. interval.
(3) Immediate excision of bitten part (1 sq. inch) in size and 0.5 Cm deep.
(4) Massage the part towards the incision
(5) Suction of incised part may be beneficial.
(6) Infiltration of antivenom around the site.

(B) Systemic Treatment
(1) Polyvalent antivenom in large doses be given I/v as soon as possible unless specific antivenom is available.

Dose: - large animal 1 unit per 70 kg. B.W. or more.
Small animals - 5 units per 9 to 18 kg. b. w.
(2) Release of tourniquet.
(3) Broad spectrum antibiotic to control local infection at the site.
(4) Antitetanic serum 1500 to 3000 I. U. U. S/c.
(5) Cortisone acetate @ 50 mg I/m followed by six doses of 25 mg every 8 hrs. when shock is sever.
32 Sodium chloride or salt poisoning

(1) Excessive intake of salt.
(2) Salted meat in dogs and pigs.
(3) Scarcity of drinking water.
(4) Sea-fish meal for poultry.

Poultry Chicks and Broilers, Suckling Pigs, Dog and Cattle. Route oral.

- Tremors and Twiching of skeletal muscles, pulse rapid and weak, Intense thirst.
- In poultry wet faeces and leg Paralysis.
- In swine convulsions, clamping of Jaws, salivation and diarrhoea.

Gastro enteritis - Generalised tissue oedema
- Ureters full of chalky deposits
- Carcass appears to be water logged
- Pigs thirst, Salivation, Cerebral Oedema.

33 Urea and Ammonia

(1) Accidental Injection of Ammonium salts.
(2) Poisoning in Cattle may be caused by urea used as a fertilizer and spread unevenly on the pasture.
(3) Uneven mixing of urea in Livestock feed as non-protein nitrogen supplement.
(4) Leakage of Ammonia Gas.

Route-Oral Cattle, Sheep, Goat inhalation, birds.

- Increase in respiratory rate, forceful breathing marked jugular pulse, painful coughing, Pulmonary oedema is characteristic.
- Severe colic groaning, Shevering, staggering.
- Tremor, fibrillar muscular twitching.
- Salivation, photophobia, conjunctivitis and keratitis.
- Bloating, tonic and Clonic spasms.
- Death after violent struggling and bellowing.

Cattle - Generalise Pulmonary emphysema pale, flabby myocardium, blood spotting in the cortex and medulla of kidneys, marked degenerative changes in liver, Acute Gastroenteritis. Fibrinus exudates in forth stomach.

Gastro enteritis - Generalised tissue oedema
- Ureters full of chalky deposits
- Carcass appears to be water logged
- Pigs thirst, Salivation, Cerebral Oedema.

34 Zinc Poisoning

(1) Chronic Poisoning may occur in the proximity of zinc ore. Rosting plants or other zinc processing work, either by contamination of pasture or drinking water.

Young animals are more susceptible Cattle, Sheep, Goat, Horse, Dog, Swine Route Oral Inhalation of fumes from factory.

Cattle - Violent Vomiting diarrhoea with blood in faeces, Abdominal pain, anorexia, dyspnea, icteric colouring, of visible m/m Rapid decline in milk production in cows, arched back and tucked up abdomen causing death within 20 hrs.

Bloating, tonic and Clonic spasms.
- Death after violent struggling and bellowing.

(1) Removal of source of Zinc.
(2) there is no known treatment for acute zinc phosphide poisoning.
(3) Sod. Carbonate 1 per cent solution is administered as antidote to produce insoluble Zinc Carbonate.
(4) Tannic acid and egg albumin may have similar effect.
(2) Consumption of feed mixture containing excess amount of Zinc salt particularly in pigs and fowl.

(3) Metallic Zinc from Zinc coated containers or pipes.

(4) Ingestion of Rhodenticide baits containing Zinc Phosphide.

(5) Contamination of Pasture by spray of fungicide containing Zinc salts.

(6) Contamination of water, milk, milk products, kept for long time in galvanized iron vessels.

35 Oxalates

Oxalate containing plants (Oxalate content highest at leafy stage.)

Oral - Ruminants, Horse, Dog.

Dullness, loss of appetite, Ruminal Stasis, Constipation, Lowering of head, Excessive salivation with frothing, Nasal discharge, Progressive incoordination, deep and irregular breathing, followed by subcutaneous oedema at perineal, brisket, dewlap and abdominal region, oligouresis and anuria, coma and death.

Pigs - Anorexia, unthriftiness, weakness, convulsions, enlargement of joints, (Particularly shoulder).

Pigs - Non specific degenerative arthritis, Osteoarthritic lesions in bone, gastroenteritis pale flabby myocardium, blood spotting in cortex and medulla of kidney, degenerative lesions in the liver.

In Chronic cases inhibits animal growth and induces fatigue.

(5) Use of emetic and laxative to remove the source.

(6) Symptomatic treatment.

Calcium carbonate (Lime Water) orally @ one lit/animal twice in a day.

Ruminotonics, Purgatives in early stages.

Fluid in early stages,

Inj. Calcium borogluconate 25% s/c

Cattle: 300 - 500 ml.

S & G: 50 - 100 ml.
CIRCULAR No. 1

PREPARATION OF PICRATE PAPERS FOR TESTING HCN

Take 0.5 gms. of picric acid (powder) and 5.0 gms. of Sodium Carbonate in a beaker. Add 100 ml. of distilled water, to prepare picric acid solution. Cut the filter-paper into small rectangular strips. Dip the strips into this ready made solution. Remove the filter paper strips outside the solution, after they become completely soaked up with the solution. Allow the filter-paper strips (which will be now yellow in colour) to dry at room temperature. These strips are now picrate papers ready for the use of testing HCN poison.

SPOT TEST FOR HCN.—

Materials :—
1. Samples suspected for HCN-poisoning.
2. Chloroform.
4. Test tubes.
5. Picrate Papers.

Procedure :—
1. Sample received is to be cut into small pieces and taken in the beaker.
2. Take about 10 gms. of sample into test tube.
3. Add few drops of chloroform into the test tube.
4. Heat the test tube on spirit lamp.
5. Hold the picrate papers for 3 - 4 minutes at the mouth of test tube against fumes.

Observations and :
1. No change in colouration of picrate paper, indicates that sample does not contain HCN.

Inference :
2. If the picrate paper turns brownish to red; then it is suggestive of presence of HCN in the Sample tested.

Note :— Test is to be repeated for confirmation on large samples.

CIRCULAR No. 2

SPOT TEST OF NITRATE OR NITRITE POISONING IN SERUM, BLOOD AND URINE

(1) Nowadays there is an increasing tendency to use chemical fertilizers in cultivation for increasing the yield. Continuous feeding of such fodder to livestock, may, some times, lead to excessive nitrate/ nitrite, intake resulting in poisoning.

Therefore to detect nitrate/nitrite in serum, urine /blood, fodder the following quick field test may be useful.

Procedure :— Take 0.5 to 1.0 ml. of Diphenylamine Blue Reagent ((DPB) in the testing plate or glass slide and place one or two drops of suspected material into the reagent. If Blue Colour diffuses out of this material after 1 to 2 minutes, then the test is, positive for nitrate.

NB. :— DO NOT STIR

PREPARATION OF DIPHENYLAMINE BLUE REAGENT (DPB)

Take 1 gram of diphenylamine and dissolve the same in 100 ml. of concentrated sulphuric acid to give an almost water clear solution with a faint tint of blue colour.

If the diluted reagent is required for detection of lower concentration, 80 per cent Sulphuric acid is to be added in equal quantity of the above solution (DPB).

SPOT TEST FOR NITRATES IN PLANTS

Reference:—From “Disease of Livestock” by Hungerford.

Preparation of Reagent (DPB)

Take 0.5 gram of Diphenylamine in 20 ml. of water. Add concentrated Sulphuric acid to make 100 ml. Cool and Store in brown bottle.

For half strength add 80 per cent Sulphuric acid in equal quantity in the above solution.

Procedure:—Place one drop of the reagent on the freshly cut surface of the plant which is to be tested.

Observation:—If green colour turns to blue colour, then the test is positive for nitrates.

Inference:—Green to blue with half strength indicate 2% nitrate (which is dangerous to cattle).

(Sd.) X X X,
Joint Director of Animal Husbandry,
Disease Investigation Section,
M. S., Pune - 411 007.

DISEASE INVESTIGATION SECTION AUNDH, PUNE - 411 007

TOXICOLOGY UNIT

CIRCULAR No. 6

Sub. — Control Measures to avoid Hydrocyanic Acid poisoning (HCN).

In circular No. 5 pathogenisis, toxic doses, symptoms, treatment etc. were described. The feeding of plants or fodder containing cyanogenic glucosides is on increase especially on Government Farms. It is, therefore, desirable, to note carefully the following circumstances about the possibility of Hydrocyanic Acid poisoning and take suitable steps in feeding of the livestock to avoid plant poisoning.

1. (A) Circumstances in relation to plant / fodder:—Mature cyanogenetic plants usually contain smaller amounts of the glucosides than younger plants. Generally, less hydrocyanic acid is produced from the dried plant than from fresh ones. The concentration of the glucosides is more in leaves than in stems and the amount varies with and within strains. Nitrates fertilization and irrigation increase the glucoside content of such plants as Sorghums (Viz. Jawar, Maize and allied species). Spraying with 2, 4 - D has similar effect on beets. The application of nitrogenous fertilizers is known to increase the amount of glucoside twenty fold, particularly when applied to poor soils. Second growth plants stunted by lack of water, frost, injury, or other unfavourable conditions are particularly dangerous wilted plants, including those resulting from trampling and from storm damage or frost, are considered to be of the greatest danger because hydrocyanic acid is immediately available to animals after consuming such plants. Most of the potential hydrocyanic acid is reduced when plants are dried slowly, certain feeds, such as sorghums grown and harvested during the period of poor rainfall, are particularly dry at the time of harvest, dry completely in a short time, and thus retain enough glucosides to remain dangerous. Caution must be used in feeding any known cyanogenic plant with unsatisfactory growth, regardless of the cause.

(B) Circumstances in feeding:—The feeding of concentrates tend to prevent the liberation of HCN from Sorghum which may be consumed within about 24 hours thereafter. Large amount of dextrose (Molasses) tend to reduce, harmful effect. Water deficient sorghum can be utilized, with safety if converted into silage adding sufficient water to insure fermentation. Hungry and greedy cattle should not have free access to sorghum, its poisoning depends on the rate of liberation of HCN. If cattle are fed with some dry fodder before they have access to sorghum the speed of intake will be reduced. Thus chances of H. C. N. poisonings will be lessened. If fodder is suspected to contain excessive amount of glucoside, prevention of poisoning may be made by adding 5% sulphur to salt licks.

If linseed meal is to be fed, it should be fed in small quantities without soaking and gruel containing linseed meal should be thoroughly boiled to drive off free HCN.
CIRCULAR

Subject:— Poisoning due to consumption of Jute seeds.

Until recently jute was not a common crop in Maharashtra. However, because the jute seed fetches a lucrative price of Rs. 8 per kilo, the cultivators are attracted to sow jute for seeds, and the area under jute cultivation is gradually increasing every year.

Recently two incidences of toxicity due to jute seeds have been reported, one from Tuljapur in Osmanabad District and the other from Dhanora, Taluka Jalgaon (Jamod) of Buldhana District. At Tuljapur, 15 bullocks engaged in threshing operation of jute, exclusively consumed the jute seeds, out of which 6 bullocks subsequently died. At Dhanora, a herd of about 375 heads of cattle grazed exclusively on the dried pods of jute plants, out of which 132 animals subsequently died.

It has therefore become necessary to prevent the animal population from consuming the jute plants, pods and seeds. All the animal owners in the State must therefore, be alerted in this respect so that they will not allow their animals to have access to jute plants, pods or seeds. The findings of the above two incidences are outlined below for the guidance of the field Veterinarians, to enable them to take prompt action in such cases.

**Jute Plant:**

The jute plant belongs to the Genus Corchorus. Although there are many species of corchorus, only two species are known to yield jute fibre namely (i) Corchorus capsularis and (ii) Corchorus Olitorius. Out of these two species the seeds of Corchorus Olitorius are sweet and may be relished by animals, whereas the seeds of Corchorus capsularis being bitter in taste, may not be ordinarily eaten by animals. The sun-hemp which is cultivated for green manuring is altogether different from this variety of jute.

**Active Principles:**

A cardio-active glycone isolated from seeds of Corchorus species is isomeric with (i) Corchor-genin, (ii) Corchortoxin and (iii) Strophanthidine. Their action is similar to Digitalin.

**Toxic Dose:**

Cattle when consume the jute seeds at the rate of 5.0 gm. per kilogram body weight or more may show toxic effects. For buffaloes the dose may be little higher, whereas for smaller ruminants, it may be little less. For pigs, the toxic dose is 0.5 gm. per kilogram body weight and above.

**Clinical Symptoms:**

The following symptoms were observed in the affected animals at the two places mentioned above:—

(i) Suspension of rumination.
(ii) Impaction with tympany.
(iii) Dyspnoea.
(iv) Diarrhoea followed by dysentry.
(v) Colour of the faeces-blackish.
(vi) Groaning suggestive of mild colic.
(vii) Passing of undigested seeds in the faeces.
(viii) Subnormal temperature before death.

**Course:**

The first deaths were reported 36 hours after the consumption of seeds and the last deaths were reported on the 5th day after eating the jute seeds. So the course may be 1 to 5 days.
Post-mortem Lesions:

The following gross changes were reported in the dead animals which were autopsized:

(i) Haemorrhagic enteritis,
(ii) Seeds in the ingesta of four stomachs and intestines,
(iii) Sero-sanguinous effusion in the pericardial sac,
(iv) Petechial haemorrhages on the trachea, endocardium, liver and ecchymoses in the abomasum,
(v) Lungs congested and emphysematous,
(vi) Kidney—Congestion in the medula,
(vii) Liver—Enlarged with rounded borders,
(viii) Colour of blood dark coffee coloured,
(ix) Spleen—no enlargement.

Antidote:

1. Attempts are in progress to ascertain the specific antidote against jute poisoning. However, in the absence of knowledge about the specific antidote “POWDERED CHARCOAL” is found to be the most effective universal antidote. The dosage of the powdered charcoal is as stated below:

   Cattle 200 to 225 gms.
   Buffaloes 250 to 300 gms.
   Horses 200 to 225 gms.
   Calves 25 to 30 gms.
   Pigs 20 to 25 gms.
   Sheep 25 to 30 gms.
   Goats 25 to 30 gms.
   Dogs 20 gms.

   Two to three times a day after thoroughly mixing with sufficient water.

   (If there are no symptoms of Gastro-enteritis, the administration of powdered charcoal may be followed by a suitable purgative).

2. Methylene Blue:

   Methylene blue in doses of 5.0 miligram per Kilogram body weight, dissolved in sufficient quantity of distilled water and injected intravenously can also be tried as a general antidote.

3. Sodium Hyposulphate:

   Sodium hyposulphate or sodium thiosulphate can also be tried as a general antidote in combination with sodium nitrate in the following doses:

   Cattle and Buffaloes:
   Sodium Nitrate 3 gms.
   Sodium hyposulphate 15 gms.
   Distilled water 200 ml.

   (To be administered as Intravenous injection)

   Sheep, Goat and pigs — The dose should be 1/5th of large animal dose i. e. 40 ml of the above injectable “sodium hyposulphate, which is known as hypo available in Photography shops can also be given” orally in suitable doses.

Symptomatic Treatment:

Along with the administration of Universal/General antidotes as mentioned above, symptomatic treatment should also be undertaken like:

(i) Injections of relatively large quantities of glucose saline i/v to check dehydration.
(ii) Soothing drugs in cases of Gastroentritis.
(iii) Stimulants in case of nervous depression (The symptom of nervous depression was not noticed in cases of jute poisoning).
(iv) Tranquilizers or Sedatives in case of convulsions (Convulsions were also not observed in jute poisoning).

Supportive Therapy:

(i) Supportive therapy should consist of 20% Dextrose solution i/v for energy in convulsing cases.
(ii) Belamyl, Livogen or Liv 52 as liver tonics.
(iii) Avil or Antihistaminic drugs wherever necessary.
IMPORTANT NOTE :

REMOVE THE CONTACT OF THE ANIMALS FROM SUSPECTED POISON IMMEDIATELY

Material to be collected and sent for Laboratory Examination

By and large the following Material may be sent to the Laboratory for confirmation of the toxicity :

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<tr>
<th>Sr. No.</th>
<th>Material to be collected</th>
<th>Quantity required</th>
<th>Mode of collection i.e. (Preservative)</th>
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<tr>
<td>1</td>
<td>Stomach Contents</td>
<td>About one kilogram</td>
<td>Saturated solution of common salt. Add sufficient salt so that some salt remains undissolved or on ice with a messenger</td>
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<tr>
<td></td>
<td>(a) Rumen and abomasal contents in case of ruminents</td>
<td></td>
<td>- do -</td>
</tr>
<tr>
<td></td>
<td>(b) Crop with gizzard and proventriculus of Poultry.</td>
<td>Complete organs.</td>
<td>- do -</td>
</tr>
<tr>
<td>2</td>
<td>A loop of small intestine with its contents.</td>
<td>About one kilogram.</td>
<td>- do -</td>
</tr>
<tr>
<td>3</td>
<td>Liver</td>
<td>1 kilogram or whole liver from poultry</td>
<td>Saturated solution of common salt. Add sufficient salt so that some salt remains undissolved or on ice with a messenger</td>
</tr>
<tr>
<td>4</td>
<td>Kidney</td>
<td>Half of each kidney. In case of birds whole kidneys from 10 birds should be sent.</td>
<td>- do -</td>
</tr>
<tr>
<td>5</td>
<td>Urine</td>
<td>Whole urine available in the bladder.</td>
<td>For each 200 to 500 ml. of urine use one gram of Sodium benzoate or 5 ml. chloroform or 5 ml. of dil. HCL.</td>
</tr>
<tr>
<td>6</td>
<td>Blood</td>
<td>100 ml. or as much is available.</td>
<td>For every 10 ml. of blood use 30 mgs. of pot. oxalate and 10 mgs. of Sodium fluoride.</td>
</tr>
<tr>
<td>7</td>
<td>Suspected toxic material. (Fodder, seeds, water, chemical etc.)</td>
<td>Sufficient Quantity.</td>
<td></td>
</tr>
</tbody>
</table>

For clinical toxicological examination about 225 ml. of urine overlayed with a layer of Toluene and 100 ml. of citrated blood may be sent.

Conclusion :

All the Veterinarians are requested to alert the cultivators on the possibility of poisoning due to consumption of jute seeds, so that the cultivators will not allow their animals to eat the jute seeds. In the event of any incidence of toxicity due to jute seeds, the guidelines suggested above should be immediately followed to save the affected animals. Wide publicity may be given to alert the farmers, through the media of work campaigns, farmers Shibirs, Public meetings, Radio news, T. V. broadcast etc. Information needed on any other point can be sought from Disease Investigation Section, Pune - 411 007.

(Sd.)

for Director of Animal Husbandry,
Maharashtra State, Pune - 411 001.