Good Animal Husbandry Practices - the way ahead

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Animal Husbandry Practices should satisfy

- Animal welfare standards
- Food safety

Animal Production is related with Food Safety Through

A. Animal Origin

1. Zoonotic diseases
2. Heavy metals
3. Residual pesticides and chemicals
4. Residues of hormones
5. Injury, brusiness and udder health
6. Veterinary Drugs
7. Genotype

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B. Animal Feed

C. Handlers Origin

1. Health
2. Cleanliness
3. Handling techniques

D. Facilities techniques

1. Cleaning and sterilization
2. Metal
3. Functioning precision

E. Environmental Origin

1. Type of housing structure
2. Cleaning and sterilization of animal sheds.
3. Disposal of dead animals

1. Zoonotic diseases

Disease	Causative Organism	Principal Animals Involved	Probable Means of Spread to Humans	Clinical Manifestations in Humans
		BACTERIAL DISEASES		
Anthrax	*Bacillus anthracis*	Cattle, sheep, goats, horses, wild herbivorous animals	Occupational exposure; foodborne in Africa, Russia, and Asia; occasionally wounds or insect bites; rarely airborne	Ulcerative skin lesions, pneumonia, sepsis
Brucellosis	*Brucella abortus*	Cattle, bison, elk, caribou	Occupational and recreational exposure	Fever, often subacute and undulant to sepsis
	B melitensis	Goats, sheep , camels	Milk, cheese, contact	As above plus arthritis
	B suis	Swine and wild pigs	Rarely airborne	As above plus endocarditis
Campylobacter enteritis	*Campylobacter jejuni*	Cattle, swine, poultry, dogs, cats, wild birds	Mainly foodborne, milk, waterborne, or occupational	Enteritis, arthritis, sepsis
Clostridial diseases (*See also* TETANUS, below.)	*Clostridium perfringens* , type A	Domestic animals	Foodborne; occasionally wound contaminant	Enteritis, gas gangrene, sepsis

Enterohemorrhagic *Escherichia coli* infections (Enterotoxigenic, enteroinvasive, enteropathogenic, and enteroaggressive strains are not considered zoonotic.)	*E coli* O157:H7; also implicated are types O26:H11, O111:H8, O104:H21, and O48:H21	Cattle, humans	Ingestion of undercooked ground beef, or food or water contaminated with bovine feces	Enteritis, hemolytic uremic syndrome
Mycobacteriosis	*M paratuberculosis*	Cattle, occasionally sheep and other ruminants		Chronic, intermittent diarrhea
	Mycobacteria other than tuberculosis (includes *M simiae*)	Cattle, other ruminants	Water and/or soil	Skin and pulmonary lesions
Salmonellosis	*Salmonella enterica* (2,000 serovars, 200 seen in the USA)	Poultry, swine, cattle, horses, dogs, cats, wild mammals and birds, reptiles, amphibians,	Foodborne infection, especially in the elderly, infants, or immunosuppressed; occupational and recreational exposure	Enteritis to sepsis
Streptococcal infections	*Streptococcus pyogenes* , other group A streptococci, uncommonly groups B-G	Cattle (*S agalactiae*), swine (*S suis*), horses (*S equi*); occasionally other animals including dogs, cats	Ingestion especially of raw milk; direct contact	Pharyngitis, cellulitis, pneumonia, meningitis, arthritis, sepsis
Tuberculosis (*See also* MYCOBACTERIOSIS, above.)	*Mycobacterium bovis*	Cattle, swine, monkeys, and other animals	Ingestion, inhalation, occupational exposure	Skin lesions, adenitis, enteritis

VIRAL DISEASES				
Cowpox	Cowpox virus	Cattle, rodents, cats, zoo cats	Contact exposure	Vesicles that become pustular, usually on hands; regional adenopathy
Japanese B encephalitis	Japanese encephalitis virus (flavivirus)	Swine, wild birds, horses	Mosquito (*Culex tritaeniorhynchus* , other *Culex* spp) bites	Fever, GI symptoms to severe encephalitis with seizures, paralysis; neurologic sequelae in up to 80% of survivors
Louping ill	Louping ill virus (flavivirus)	Sheep, goats, grouse, small rodents	Tick (*Ixodes ricinus*) bites	Biphasic illness with meningoencephalitis in second phase; relatively mild compared with central European tickborne encephalitis, which it resembles
Milker's nodules (Pseudocowpox)	Pseudocowpox virus (parapoxvirus)	Cattle	Occupational exposure	Papular to nodular red skin lesions; painless and self-limiting
Vesicular stomatitis	Vesicular stomatitis virus (Indiana and New Jersey strains)	Swine, cattle, horses, bats, rodents, other wild mammals	Contact exposure and insect bites, including mosquitos and biting flies (*Phlebotomus* spp)	Fever (± biphasic), myalgia, pharyngitis, cervical adenopathy, oral or rectal vesicles
PRION DISEASES				
Variant Creutzfeldt-Jakob disease	Prion protein—likely from bovine spongiform encephalopathy	Cattle	Ingestion of beef	Rapidly fatal neurodegenerative disorder similar to sporadic Cruetzfeldt-Jakob disease

FUNGAL DISEASES				
Coccidioidomycosis	*Coccidioides immitis*	Cattle, sheep, horses, dogs, wild cats, desert rodents, other animals; principally environmental in specific arid foci	Environmental exposure	Self-limited febrile illness; persistent meningitis or osteomyelitis in immunocompromised
Dermatophilosis	*Dermatophilus congolensis*	Cattle, horses, deer, sheep, other mammals	Contact; arthropod vectors	Pustular desquamative dermatitis
Nocardiosis	*Nocardia asteroides N brasiliensis N caviae*	Cattle, dogs, other mammals, fish; principally environmental in decomposing organic matter	Environmental exposure	Pneumonia, dissemination in immunocompromised
Ringworm (Dermatophytosis)	*Microsporum* , *Trichophyton* , and *Epidermophyton* spp	Dogs, cats, cattle, rodents, other animals	Direct contact with infected animals, fomites	Skin and hair lesions; rare skin dissemination in immunocompromised

PARASITIC DISEASES Protozoans				
Babesiosis	*Babesia microti B bovis*	Wild rodents, cattle	Bite of infected *Ixodes* ticks	Fever and hemolytic anemia, especially severe in immunocompromised (asplenic and elderly); recurrent or chronic infection may develop; dual infection with *B burgdorferi* may worsen both diseases
	B divergens	Cattle, other mammals		
Sarcocystosis (Sarcosporidiosis)	*Sarcocystis suihominis*	Swine	Ingestion of raw pork or beef; ingestion of feces	Meat yields intestinal form, usually mild; feces yield muscular form, usually asymptomatic; muscular pain and eosinophilia reported
	S hominis	Cattle	Ingestion of raw beef; ingestion of feces	Meat yields intestinal form, usually mild; feces yield muscular form, usually asymptomatic; muscular pain and eosinophilia reported

Cestodes (Tapeworms)				
Taeniasis				
Beef tapeworm disease	*Taenia saginata*	Cattle, water buffalo, reindeer, camels	Ingestion of undercooked meat containing larvae of *T saginata*	Bowel infection from larvae causes mild abdominal discomfort and proglottid passage; eggs do not cause disseminated disease
Pork tapeworm disease Cysticercosis and neurocysticercosis	*T solium*	Swine, humans	Ingestion of undercooked pork containing *C cellulosae* ; direct or autogenous transmission of *T solium* ova in humans may lead to cysticercosis	Usually asymptomatic for years until cysticerci result in inflammation in CNS (seizures) or less often in eye or heart; autoinfection with eggs may occur as well as infection of other humans; adult stage infection (taeniasis) mild or asymptomatic

RICKETTSIAL DISEASES				
Q fever (Query fever)	*Coxiella burnetii*	Sheep, cattle, goats, cats, dogs, rodents, other mammals, birds, ticks	Mainly airborne; exposure to placenta, birth tissues, animal excreta; occasionally ticks and milk	Fever, pneumonia, hepatitis, endocarditis

BIS Standards for milk and milk products

Item	SPC (max)	Coliform (max)	WBC (max)
Pasteurised milk	30,000	absent in 1in 10	-
Condensed	500/g	negative	10/g Yeast
Milk powder	5000/g	90/g (max)	-
Ice cream	2.5 lakhs/g	90/g (max)	-

SPC-Standard plate count,
WBC-White blood cell count

Certain poisonous metals with their maximum level of tolerance in finished meat product

Sl.No.	Name of the poisonous metal	Parts per million by weight
1.	Lead	2.5
2.	Copper	20
3.	Arsenic	1
4.	Tin	250
5.	Zinc	50

Certain preservatives with their maximum level of tolerance in finished meat product

Sl. No.	Name of the Preservative	Parts per million By weight
1.	Sulphur dioxide	450
2.	Sodium and Potassium Nitrite	200
3.	Commercial Saltpetre	500

Certain insecticides with their maximum level of tolerance in finished meat product

Sl No.	Name of insecticide	Tolerance limit mg./kg.(ppm)
1.	Aldrin dieldrin	0.20
2.	D.D.T	7.00
3.	Fenitrothion	0.03
4.	Lindane	2.0
5.	Chlorfenvinphos	0.2
6.	Chlorpyrifos	0.10
7.	2, 4-D	0.05
8.	Ethion	0.20
9.	Monocrotophos	0.02
10.	Trichlorfon	0.10
11.	Carbendazim	0.10
12.	Benomyl	0.10
13.	Carbofuran	0.10
14.	Cypermethrin	0.20
15.	Edifenphos	0.02
16.	Fenthion	2.00
17.	Fenvalerate	1.00
18.	Phenthoate	0.05
19.	Phorate	0.05
20.	Pirimiphos-methyl	0.05

Practices

1. Genotype
2. Housing management
3. Feeding management
4. Pasteurization and preservation
5. Health monitoring of livestock, Isolation of sick animals and their products

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6. Disposal of Farm waste
7. Disposal of dead animals
8. Disposal of expired drugs and products
9. Preparation of animals for slaughter
10. Traceability of Animals, feed and animal products

Good animal husbandry practices

Genotype and food safety

- Exploit genetic potential in their resistance towards certain diseases

Housing management

- Farm should be located away from- industrial and residential area
- Should be adequate in size and correctly ventilated
- Provision of complete, easy and effective cleaning and disinfection
- Use of inert construction and surface materials

Feeding management

- Pasture should be free from potential source of contamination
- Should be free from chemical residue and pathogens
- Check the feed delivered is correctly labeled
- Check out mould contamination in feed
- Avoid over filling of feeding trough
- Animals should be restricted to get access to polluted water reserves
- Avoid using pesticide and herbicide and spreading slurry and dairy effluents near water source

Veterinary drugs

- Therapeutic treatment should be undertaken when diagnosis is precise and certain-based on dual principle of maximum efficacy and minimum risk
- Recommended withdrawal periods of drug administration should be strictly followed
- Keep written records of all treatments dispensed to the animals

Farm management

a) Training of staff

i. To handle farm chemical inputs

ii. Manufacture feed on the farm

iii. Clean and disinfect premises and equipments

iv. Basic biosecurity principles

v. Record keeping etc

Control of pests, stray animals

- Global plan to control pest within the farm using licensed products in appropriate manner
- Restrict stray animals from roaming in and around livestock building

Disease prevention programme

- Daily surveillance and monitoring of animals
- Disease prevention measures like mastitis control programme, vaccination and deworming programme etc should be followed

Isolation of sick animals and their products

Storage and disposal of dead animals

- Prompt and proper disposal of dead animals by suitable disposal methods

Managements of waste materials and effluents

Preparation of animals for slaughter

- Ensure that animals are fit for slaughter
- Prevent animals from becoming soiled during their way to abattoir or in abattoir
- Humane handling to avoid undue stress

Traceability of Animals, feed and animal products

- Record of each animal should be kept for all commercial and health documents
- Data recording –to have information regarding feed, fodder, animal and animal products etc.