

Syllabus of Research Methodology for RET in Agriculture

Unit 1: Concepts of research methodology

Importance and scope of research in agriculture. Types of research: Fundamental vs. Applied. Concept of researchable problem, Research prioritization, Selection of research problem. Approach to research, Research process.

Unit 2: Hypothesis Testing

Hypothesis- meaning- characteristics- types of hypotheses- Review of literature, Setting of course objectives and Hypothesis, Testing of hypothesis, z, t, chi-square and f-distribution

Unit 3: Data collection and descriptive analysis

Data- meaning, assessment of data needs, sources of data collection, collection of data in different fields of agriculture. Types of data, Classification, tabulation, and graphical representation of data, measures of central values, measures of dispersion, correlation and regression analysis.

Unit 4: Sampling


Sampling Theory and sampling design, methods of sampling; probability and non-probability sampling methods, Research design and techniques, Types of research design.

Unit 5: Probability

Theory of probability, Random experiment, Mathematical or classical definition of probability, Statistical definition of probability, conditional probability, Mathematical expectation.

Unit 6: Data analysis

Data coding, cleaning, transformation of data, Universal procedures for preparation of bibliography, writing of research articles, Project proposal, Introduction to ANOVA: One way and two-way, Introduction to SPSS















अधिष्ठाता
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Syllabus for Research Entrance Test (RET)

Paper –II

(subject content)

Unit I

MODERN CONCEPTS OF FEEDING MONOGASTRIC ANIMALS:

Nutritional factors affecting egg quality and hatchability in poultry. Feeding for designer eggs. Role of essential fatty acids, amino acids imbalance, toxicity and interactions in monogastrics. Developments in digestive physiology of swine – equines – Measurement of protein and energy requirements – Influence of processing of feeds and fodders in mono-gastric animal nutrition. Modern concepts of amino acid nutrition at various physiological status – Role of vitamins and minerals in health and disease. Advances in new generation feeds and feed additives.

FEED CONSERVATION, STORAGE AND QUALITY CONTROL

Principles of feed and fodder processing and preservation techniques, their merits and demerits. Procurement, planning and purchase procedures; traditional and modern farm level storage structures. Feed storage and godown management, estimation of storage capacity and stack plan. Evaluation of processed and preserved feeds and forages. Role of moisture, temperature and relative humidity during storage of feedstuffs and their effect on biotic factors. Handling and storage of liquid feed Ingredients. Physical and chemical changes in feeds during storage; storage losses; insect pests and rodents in feed stores and their control; Role of fungi, tolerance limits and measures to check them in stored products. Factors affecting the quality of feed and feedstuffs on preservation. Microbiological evaluation of processed and preserved feeds, Effect of preservation on nutritional value of feed. Properties and mode of action of pesticides and fumigants; principles of good sanitation and hygiene of godowns. Proximate composition, Limitations of various systems of analysis, Partitioning of forage fibre by Van Soest method, Quality control of fed ingredients, Specifications of feed ingredients and finished feeds, BIS standard., Pesticide and insecticide residues in feeds

Unit II

ADVANCES IN CATTLE AND BUFFALO PRODUCTION AND MANAGEMENT

Dairy farming in India – Global scenario - Present status and reasons for the same – Avenues for progress – The needs of the nation and how to achieve it. Advances in housing management of dairy cattle and buffaloes in various agroclimatic zone of India - Management systems for cattle and buffaloes. Establishing Dairy Cattle Enterprise – Characteristics of a successful dairy farm – Choice of the foundation stock – Breeding Management Problems associated with reproduction.

Advances in Feeding Management of cattle and buffalo, Feed for milking herd, dry cows, bulls and calves, Management of high yielding animals. Milking Management – Biosynthesis of milk - Factors affecting the composition and yield of milk - milk ejection reflex - Milking systems – Sanitary standards for the f quality milk – Cessation of milking, advances in herd management-raising calves – growing heifers, replacements and culling – marketing, Computerization of dairy enterprises. Advance in health management of dairy animals, metabolic diseases of high yielders-advances in preventive measures for production related diseases.

Unit III

ADVANCES IN SHEEP AND GOAT PRODUCTION AND MANAGEMENT

Utility origin – Domestication - Numbers and distribution of meat and dual purpose breeds - Methods of rearing – Range sheep production . The farm flock – Pure bred flock - Management during breeding season - The sexual seasons and its control - Puberty – Time of the year to breed – Flushing – Ram-Ewe ratio. Advances in feeding management, Nutrient deficiencies in range forage, Feed to supplement range forage,General feeding practices, Feeding materials, Lamb feeding, Use of antibiotics and hormones, Hand feeding,Self feeding,Pellet feeding , Feeding lambs and ewes during lactation. Recent development in sheep and goat management and their relevance under Indian economic conditions, needs and possibilities for future research. Role of sheep husbandry in dry farming in India, Present development programmes in sheep and goat production, Advances in reproduction, housing, feeding and watering, diseases, Shearing methods and culling of sheep and goat. Role of goat in animal agriculture,Goat farming in India, selection of Breeding stock, Breeding problems, Housing, Principles of feeding, Practices,Crops and crop residues for goats, Milking practices.

Unit IV

ADVANCES IN POULTRY PRODUCTION MANAGEMENT

Various breeds of poultry for different purpose. Planning, organisation, executive and management of poultry farms and hatcheries of various sizes - alternative in poultry production. Demand, supply, present status of poultry production. Problems and new management techniques in poultry for egg and meat in India vis-à-vis in other countries of the world, automation in poultry houses, management of specific pathogen free flocks. Poultry development policies and planning for higher production constraints in development and solutions, Ethology and entology in relation to poultry production.

CONCEPTS IN COMMERCIAL POULTRY PRODUCTION

Global trends in poultry production - Advances in broiler production in India – concepts in egg production – Latest concepts in breeder management – advances in hatchery operations for higher hatchability & chick quality. Optimal microclimatic condition in poultry houses and cages for higher production – Management of poultry in environmentally controlled houses – Management of poultry under adverse climatic conditions – advances in the management of other species of poultry - Behaviour patterns of poultry in different growing systems. Advanced management techniques for egg and meat production - advances in lighting management, feeding management, litter management and manure management. The role of integration in poultry production – Factors influencing egg production in different species of poultry – Factors influencing growth rate and egg production - Automation in poultry production. Regulations for cage-free egg production and organic chicken production – Functional feeds for functional foods – Production of HACCP and GMP certified table eggs, meat, chicks, hatching eggs and other value added products for export.

Unit V

MARKET MILK PROCESSING AND DAIRY PLANT PRACTICES

Milk standards and legislation and related agencies.

Composition of milk, major and minor constituents of milk, physico-chemical, microbial and nutritional properties of milk and preservation of raw milk. Layout Designing and organization of dairy plant, Milk procurement, handling and transportation. Chilling, centrifugation, separation, clarification, bacto-fugation and homogenization. Thermal processing- pasteurization, UHT processing, sterilization, bacto-therm and packaging, Storage and distribution of processed milk. Fortified, reconstituted and mild floured milks. Membrane processing and related techniques; application of ultrafiltration, reverse osmosis; nanofiltration and microfiltration in the dairy industry. Current trends in cleaning and sanitization of dairy equipment, biological detergents, ultrasonic techniques in cleaning; biodetergents. Disposal of dairy effluents

Unit VI

QUALITY CONTROL OF MILK AND MILK PRODUCTS

Importance of quality control in dairy industry. PFA Act, BIS standards, AgMark standards and ISO standards of milk products. Total quality management in processing of milk products – HACCP and SPS. Types of microorganisms associated with milk and milk products-Milk borne diseases. Physico-chemical and microbial changes during procurement, processing and storage of milk and milk products.

Unit VII

TECHNOLOGY OF MILK PRODUCTS

Drying of milk and milk products; freeze dehydration, water activity; sorption behaviour of foods- dried ice cream mix – cream and butter powder. Hurdle technology and its application in development of dairy products. Manufacture of milk products; butter, evaporated milk, condensed milk, milk powders, ice cream and other frozen desserts. Manufacture of yoghurtacidophilus milk-bulgaricus milk-kumiss-kefir. Manufacture of cheddarmozzarella- cottage and processed cheese. Manufacturing of indigenous milk products- paneer- channa- khoa- ghee- dahi and shrikhand. Manufacturing of casein- caseinate- co-precipitates- Whey protein concentrate (WPC) - lactose- dairy whiteners; functional properties of whey proteinscasein- co-precipitates- Ultra Filtration retentate and their modifications. Evaluation of functional properties. Packing, storage and marketing of milk products. Defects in milk products, their preventions and remedies.

Unit VIII

ADVANCES IN MILK AND MILK PRODUCTS TECHNOLOGY

Principles and practices of production of high quality milk Advances in methods of chilling and preservation of milk. Thermal processing of milk, principles and methods, types of UHT-processing plants. Advances in packaging of milk. Bacteriological, physical, chemical and nutritional effects of processing on milk - New concepts in milk processing – radiation and microwave processingMembrane processing in dairy industry such as Reverse Osmosis(R.O), Ultra Filtration (UF),

Nano Filtration (NF) and Micro Filtration (MF)- Fouling and cleaning of membranes. New concepts in technology of dairy products. Cream powder, sterilized cream, frozen products, ice-cream mix, low, medium, high heat milk powder, milk based infant foods. Advances in starter cultures and their application, butter, butter spread, butter powder, cheese and cheese spread, probiotic products. Indigenous dairy products, khoa powder, paneer/channa powder, gulab jamun powder, kulfi powder- Recent advances in utilization of dairy byproducts in product development, preservation of milk products. Application of immobilized enzyme in dairy products.