

**SWAMI RAMANAND TEERTH  
MARATHWADA UNIVERSITY  
NANDED**

**SYLLABUS  
of**

**M.Sc. First Year  
DAIRY SCIENCE**

**CBCS Semester Pattern  
Effective from June 2014**

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

**CHOICE BASED CREDIT SYSTEM (CBCS)**

**SEMESTER PATTERN**

Faculty of Science

Post Graduate (PG) Programmes

**DAIRY SCIENCE – CURRICULUM**

w.e.f. Academic year 2014-15

M.Sc. Dairy Science First year curriculum

**SEMESTER – I**

An Outline

<b>Paper No</b>	<b>Title of Theory paper</b>	<b>Credits (Marks) External (ESE)</b>	<b>Credits (Marks) Internal (CA)</b>	<b>Total credits</b>	<b>Periods</b>
I	Advances in LPM	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
II*	Market milk Industry	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
III	Dairy Chemistry – I	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
IV	Dairy Technology - I	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
V	Seminar	-	Credit: 01 Marks: 25	01	-
	Total	Credits: 12 Marks: 300	Credits: 05 Marks: 125	17 Marks: 425	240

**ESE:** End of Semester Examination

**CA:** Continuous Assessment

\* Elective paper

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

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**SEMESTER PATTERN**

Faculty of Science

Post Graduate (PG) Programmes

**DAIRY SCIENCE – CURRICULUM**

w.e.f. Academic year 2014-15

M.Sc. Dairy Science First year curriculum

**SEMESTER – II**

An Outline

<b>Paper No</b>	<b>Title of Theory paper</b>	<b>Credits (Marks) External (ESE)</b>	<b>Credits (Marks) Internal (CA)</b>	<b>Total credits</b>	<b>Periods</b>
VI	Advances in Animal Nutrition and Breeding	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
VII	Quality Assurance in Dairy Industry	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
VIII	Dairy Chemistry – II	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
IX	Dairy Technology - II	Credits: 03 Marks: 75	Credits: 01 Marks: 25 2 tests: 15 Assignment: 10	04	60
X	Seminar	-	Credit: 01 Marks: 25	01	-
	Total	Credits: 12 Marks: 300	Credits: 05 Marks: 125	17 Marks: 425	240

**ESE:** End of Semester Examination      **CA:** Continuous Assessment

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

**CHOICE BASED CREDIT SYSTEM (CBCS)**

**SEMESTER PATTERN**

Faculty of Science

Post Graduate (PG) Programmes

**DAIRY SCIENCE – CURRICULUM**

w.e.f. Academic year 2014-15

M.Sc. Dairy Science First year curriculum

Laboratory course work (Practical)

Annual Pattern

An Outline

<b>Paper No</b>	<b>Title of Paper</b>	<b>Credits</b>	<b>Marks</b>
LC - 01 P-I + P-VI	Advances in LPM + Advances in Animal Nutrition and Breeding	04	100
LC - 02 P-II + P-VII	Market Milk Industry + Quality Assurance in Dairy Industry	04	100
LC - 03 P-III + P-VIII	Dairy Chemistry I + Dairy Chemistry II	04	100
LC - 04 P-IV + P-IX	Dairy Technology I + Dairy Technology II	04	100

M. Sc First year Dairy Science: Total credits: 50, Marks: 1250

(1 credit = 25 marks)

**SYLLABUS C.B.C.S. PATTERN**  
**M.SC. DAIRY SCIENCE- 1<sup>ST</sup> YEAR**  
(Semester - I)

**Theory Paper – I      Title : Advances in Livestock Production and Management      Periods/Week-4  
Credits : 04**

**Objectives** :      To provide recent knowledge of dairy farming.  
                  :      To provide knowledge regarding animal management and production.

**Unit - I : Perspectives of Dairy Farming in India.**

- ▲ Livestock production : Recent trends, future prospectus.  
A.H. & D. development during five year plans, role of different agencies in the development of livestock industry.  
Contribution of livestock sector to GDP and national income.  
Socio-economic impact and role in manpower employment.
- ▲ Sustainable animal production system.
- ▲ Farm stead management.

**Unit - II : Livestock production.**

- ▲ Resources and infrastructure.
- ▲ Introduction to livestock products technology.
- ▲ Environment synchronization for better productivity.
- ▲ Types of livestock farming, dairy farming systems.
- ▲ Study of different animal farm enterprises and characteristics of an ideal dairy farm.
- ▲ Sustainable livestock production.

**Unit - III : Animal management.**

- ▲ Farm animal behavior and management.
- ▲ General management practices for cattle/buffalo for better productivity.
- ▲ Requisites for successful dairy farm management.
- ▲ Material management and inventory control on a dairy farm.
- ▲ Features of mechanized and manual farm management shelter management.
- ▲ Milking management, mechanized and manual organic dairy production.
- ▲ Economics of calf, heifer and cow raising, breeding bull management.
- ▲ Preparation of project report for finance.
- ▲ Role of computers in animal production.

**Reference Books :**

- 1) Text books of animal husbandry by G. C. Banerjee.
- 2) Live-stock management S.K. Ranjhan.
- 3) Animal housing milk hygiene by – WHO
- 4) Feeds and feeding by – F.B. Morrison.
- 5) Modern dairy cattle management by – Davis.
- 6) Bovine production by V. D. Mudgal.
- 7) Dairy cattle science by – Ensminger.
- 8) Farm animal management practices by Jagdish Prasad.

# MARKET MILK INDUSTRY

## Theory Paper-II

Periods/week-4

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### Unit – I

Credits : 04

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- ❖ Introduction to MMI
- ❖ Market milk Industry. Organized, Unorganized marketing system.
- ❖ Study of major aided projects such as NDDDB, OF, Technology mission in dairy development and National dairy plans.
- ❖ Milk Production, Utilization and consumption pattern, seasonal and regional variation.
- ❖ Dairy development policy in India.

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### Unit – II

- ❖ Straining, filltration, clarification of market milk.
- ❖ Reception and preliminary testing of incoming milk
- ❖ Methods of milk preservation – methods of cooling and chilling of milk, farm cooling, refrigeration, LP system.
- ❖ Bio-protective factors for raw milk preservation. Bio-Preservation of Milk-bactofugation.
- ❖ Homogenization of Milk.

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### Unit – III

- ❖ Processing of Milk-pasteurization of milk principle, methods, LTLT, HTST, in bottle pasteurization, UHT, Uperization, stassanization, vacration.
- ❖ Sterilization of milk.
- ❖ Manufacturing of special milks-Soya milk, Groundnut milk, irradiated milk, fortified milk.
- ❖ Milk distribution systems.
- ❖ Problems of return and unsold milk.

# DAIRY CHEMISTRY-I

## Theory Paper-III

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### Unit - I : General Milk Chemistry :

Credits : 04

- ❖ Constituents of milk, Composition, Physical and Chemical Nature of Milk of Cow, Buffalo, Goat and Sheep.
- ❖ Physico-chemical properties of milk
- ❖ Nutritive value of milk
- ❖ Coagulation of Milk with Heat, acid, enzymes and alcohol.
- ❖ Newtonian and Non-Newtonian liquids, stocks law.

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### Unit - II : Chemistry of Milk proteins :

- ❖ Nomenclature.
- ❖ Classification.
- ❖ Significance
- ❖ Chemistry of casein micelle, it's structure, casein composition, fractions, properties and utility.
- ❖ Albumins, globulins and NPN compounds.
- ❖ Colloidal system – Types, properties.
- ❖ Milk as a colloidal system and it's stability.

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### Unit - III : Chemistry of Milk Lipids :

- ❖ Composition and classification of milk lipids.
- ❖ Significance.
- ❖ Properties.
- ❖ Structure of FG.
- ❖ Chemistry of FGM.
- ❖ Fatty acids and Factors affecting fatty acid composition.
- ❖ Phospholipids and their significance in dairy products.
- ❖ Fat contents.
- ❖ Rancidity and it's control.



# DAIRY TECHNOLOGY - I

## Theory Paper-IV

Periods/week-4

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<b>Unit – I</b>	<b>Technology of indigenous dairy products</b>	<b>Credits : 04</b>
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- ❖ An introduction to indigenous dairy products.
- ❖ Heritage of Indian dairy products.
- ❖ Classification of indigenous dairy products.
- ❖ Study of different indigenous milk products :  
Khoa and Khoa based; Channa and Channa based Chakka and Chakka based, Pysam, Padusha, Ghever, Milkcake, Kunda, Rajbhog, Khirmohan.
- ❖ Ghee : History, definition, composition, methods of manufacturing, grading, Renovation, quality parameters of ghee, like (P. value, R.M. Value, B.R. Reading, Iodine Value), defects and storage

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**Unit – II Technology of western dairy products.**

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- ❖ Classification of western dairy products
- ❖ Cream-Definition, Composition, methods of cream separation, types of cream, factors affecting cream skimming efficiency and defects in cream
- ❖ Butter-History, definition, composition, types, churning theories, methods of manufacturing, overrun, defects and storage.
- ❖ Cheese : History, definition, Composition, types, methods of manufacturing.  
Butter oil, Kefir, Kumiss, Yoghurt.

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**Unit – III Frozen dairy products**

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- ❖ Ice-cream – History, development and status of ice-cream industry.
- ❖ Definition, Composition methods of manufacturing and nutritive value.
- ❖ Types and standards of Ice-cream.
- ❖ Role of milk constituents in manufacturing of Ice-cream.
- ❖ Study and role of dairy and non-dairy ingredients in Ice-cream.
- ❖ Types of freezer
- ❖ O.R. in Ice-cream and their control.
- ❖ Packaging, Hardening storage and defects.
- ❖ Kulfi, Chocoboar, Milk Ices and lollies, Softy ice creams.

(Semester - II)  
**THEORY PAPER-VI**

**Title : 1 Advances in Animal Nutrition and Breeding.**

**Periods/Week-4  
Credits : 04**

**Unit - I : Animal feeds and feeding.**

- ▲ Animal feed technology : scope and constraints.
- ▲ Livestock feed resources, present scenario of India.
- ▲ Feeding strategies to enhance animal productivity, New trends in feeding dairy animals.
- ▲ Energy terms, concept of metabolic body weight and size in animal nutrition.
- ▲ Feeding standards for different categories of livestock.
- ▲ Feed efficiency; Biotechnology for animal Nutrition.

**Unit - II : Feed Technology**

- ▲ Legal standards and quality control in feed industry.
- ▲ Feed formulations – feed processes : dry, wet processes, feed mixing. Roughage processing methods. Effects of feed and fodder processing on digestibility.
- ▲ Biotechnological approaches in manipulation of rumen ecosystem.
- ▲ Linear programming, formulation of least cost ration.

**Unit - III : Animal breeding.**

- ▲ Breeding plans for cattle and buffalo improvement in India.
- ▲ Study of bio-techniques in animal reproduction.
- ▲ Semen collection and A.I.
- ▲ Synchronization of oestrus, super ovulation, ETT.
- ▲ Synchronization of lactation and induced lactation.
- ▲ Cloning.
- ▲ Improvement of breeding efficiency.
- ▲ Heredity and environment interaction.
- ▲ Sustainable animal breeding.

**Reference Book :**

- ▲ Text book of animal husbandry by – G.C. Banerjee.
- ▲ Animal nutrition by - S.K. Ranjhan
- ▲ Livestock management by - N.R.S. Sastry, Thomas and Singh.
- ▲ Feeds and feeding by – F.B. Morrison.
- ▲ Modern dairy cattle management by – Davis.
- ▲ Dairy cattle feeding and management by – William N. Etages and Paul M. Revis.
- ▲ Livestock feeds and feeding Church O and B books Oregon (USA)

## **THEORY PAPER-VII**

**Title : Quality assurance in dairy industry.**

**Credits : 04**  
**Four periods per week**

**Objectives :**

- ▲ To impart the knowledge regarding importance of quality of milk.
- ▲ To inculcate the knowledge regarding recent trends in quality management and quality assurance.
- ▲ Principle and technical aspects of quality control for various dairy equipments.
- ▲ To study various test procedures related to maintenance of quality of milk.
- ▲ To make awareness about statutory regulations.

# Topics

## Unit - I

- ▲ Introduction to concept of quality.
- ▲ History, definition and importance of quality assurance (QA) in dairy industry.
- ▲ Milk sampling-procedures for chemical and microbiological analysis.

## Unit - II

- ▲ Preparation of laboratory for quality control in dairy industry.
- ▲ Precautions while working in the laboratory.
- ▲ Methods of analysis of milk and milk products.
- ▲ Study of equipments-principles, operation and maintenance of various equipments.
- ▲ Quality requirements for raw milk and quality influences.
- ▲ Quality evolution of raw milk.
- ▲ Export potential in the global context.
- ▲ Quality assurance and hygiene in dairy plants.

## Unit - III

- ▲ Quality and safety management systems in dairy industry.
- ▲ Concept of total quality management and quality assurance.
- ▲ Statutory regulations –
- ▲ Dairy processing and quality assurance.
- ▲ Quality assurance strategies.
- ▲ PFA specifications for milk and milk products.
- ▲ BIS standards for milk and milk products.
- ▲ AGMARK standards for milk and milk products.
- ▲ HACCP with advanced version.
- ▲ ISO-14000 (ISO 9000-2000)
- ▲ USFDA regulations.
- ▲ IDF regulations.

# THEORY PAPER-VIII DAIRY CHEMISTRY- II

Periods/week-4

Credits : 04

## Objectives of the Course :

- ▲ To study the chemistry of milk carbohydrates and minor milk constituents.
- ▲ To study the significance of lactose in various milk products.
- ▲ To Study the chemical nature of minor milk constituents and their significance in product preparation.

## Course content :

### Unit – I Chemistry of milk carbohydrates :

- ▲ Classification of carbohydrates
- ▲ Chemical nature of lactose
- ▲ Properties of lactose
- ▲ Significance of lactose in fermented milk and infant food.
- ▲ Lactose intolerance.

### Unit – II Chemistry of Minor Milk Constituents :

- ▲ Minerals in milk-major, minor and trace minerals in milk.
- ▲ Salt balance and heat stability-theory, factors affecting and control measures.
- ▲ Milk enzymes-classification, significance.
- ▲ Vitamins – Definition, classification, chemical nature, functions, deficiency symptoms and RDA.

### Unit – III :

- ▲ Flavours in milk and milk products.
- ▲ Chemistry of important by products : whey, lactose, casein.
- ▲ Milk and metal relationship.
- ▲ Qualities of dairy metal.

Semester-II  
**DAIRY TECHNOLOGY - II**

Paper-IX (Theory)

**Periods/week-4**

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<b>Unit – I</b>	<b>Condensed and evaporated milks :</b>	<b>Credits : 04</b>
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- ❖ History, status and scope
- ❖ Physico chemical changes taking place during manufacturing of condensed milk.
- ❖ Heat stability of milk and condensed milk.
- ❖ Methods of manufacturing of condensed Milk, sweetened condensed milk and evaporated milk.
- ❖ Seeding crystallization and stability of evaporated milk.
- ❖ Defects in condensed milk, their causes and precaution.
- ❖ Packaging and storage.

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<b>Unit – II</b>	<b>Dried milk products :</b>	
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- ❖ History, status and scope.
- ❖ Types, composition, PFA/BIS and international standards.
- ❖ Manufacturing of SMP and WMP
- ❖ UF/RO techniques.
- ❖ Physico-chemical properties of dried milk.
- ❖ Packaging, marketing and defects.

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<b>Unit – III</b>	<b>Study of dairy byproducts :</b>	
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- ❖ History, status and scope.
- ❖ Casein – Types, methods of manufacturing and uses.
- ❖ Lactose – Methods of manufacturing and Uses.
- ❖ Whey – Composition and importance, whey beverages, whey concentrates and whey powder.
- ❖ Butter milk – composition and importance and uses.

**Laboratory Course Work**  
**LC – 01 (Based on theory paper – I and VI)**  
**Credits : 04**  
**(Annual Pattern )**

1. Conventional and loose housing synchronized with environment.
2. Maintenance of sanitary and hygienic conditions at farms.
3. Mechanical disposal of waste and waste recycling.
4. Preparation of heat expectancy chart.
5. Ultra structure of mammary gland.
6. Machine milking-principle, operation, care and maintenance.
7. Clean milk production.
8. Detection and control of mastitis.
9. Collection of feeds and fodders, sampling techniques,
10. Feed processing.
11. Preparation of feed mixtures- study of feed processing mills.
12. Computation of ration and types of rations.
13. Use of agro- industrial byproducts in feeds: UROMOL.
14. Automation in animal feeding
15. Detection of aflatoxins in animal feeds.
16. Storage of feeds and fodders
17. Semen collection and evolution.
18. Pregnancy diagnosis.
19. Measuring breeding efficiency.
20. Cleaning, disinfection, cattle dips, foot, dips on farms.
21. Study of feedings and breeding records.
  - Visit to established dairy
  - Visit to agriculture collage.
  - Visit to A.I. centre.
  - Visit to feed factory.
  - Visit to ETT laboratory.

## Laboratory Course Work

### LC – 02 (Practical based on theory paper II & VII) Credits : 04

1. Layout for milk collection centre.
2. Receiving of milk and platform tests.
3. Sampling techniques.
4. Study of straining, filtration and clarification.
5. Chilling of milk.
6. Working of plate pasteurizer synchronized to homogenizer.
7. Study of milk separator.
8. Q.C. tests at collection centre.
9. Tests for detection of adulterants and preservatives.
10. Fluid milk packaging.
11. Study of CIP.
12. Study of can washing and crate washers.
13. Preparation of toned, Double toned and reconstituted milk.
14. Visit to milk collection centre.
15. Visit to village dairy co- operative society.
16. Prerequisites of quality control section.
17. Study of different instruments / equipments used QAL, like- Autoclave hot air oven, Incubator, Colorimeter, Centrifuges, Colony counter, TS apparatus, Analytical balances, pH meters, Moisture analyzer, Ele. Operated instruments like Milko- testers, Scanners etc.
18. Instrumental methods of analysis of milk and milk products
19. Visit to the dairy plants with ISO certification.



**Laboratory Course Work**  
**LC – 03 (Based on theory papers III & VIII)**  
**Credits : 04**

1. Chemical tests of milk - Cob, alcohol test, pH, Acidity, sp. gravity
2. Determination of boiling point and freezing point of milks.
3. Determination of T.S. and SNF by lactometer and gravity metric method.
4. Determination of fat in milk and from selected dairy products.
5. Determination of viscosity.
6. Determination of electrical conductivity.
7. Determination of refractive index.
8. Determination of milk protein by Kjeldhal method.
9. Determination of casein by PAGE.
10. Preparation of acid casein.
11. Detection of adulterants and preservatives in milk.
12. Manufacture of lactose.
13. Manufacture of whey proteins by U.F.
14. Chemical analysis of whey.
15. Chemical analysis of butter milk.
16. Preparation of formula foods.
17. Study of dairy metals.
18. Visit to M.F. unit.
19. Visit to beverage industry.

**Laboratory Course Work**  
**LC – 04 (Based on IV & IX)**  
**Credits : 04**

1. Quality of milk for milk product preparation.
2. Khoa making - Manual and mechanized.
3. Preparation of different sweet meats from Khoa.
4. Preparation of Dahi, Chakka, Shrikhand – Lassi.
5. Preparation of Rabri, Basundi, Khir, Pysam, Rasmalai , Yoghurt.
6. Preparation of Deshi butter.
7. Preparation of Channa, Paneer, Kalakand, Chhana podo, Rosogolla.
8. Economics of indigenous milk product preparation.
9. Quality parameters for indigenous milk products – sensory evaluation.
10. Packaging materials and packaging of indigenous milk products.
11. Technological innovations for traditional dairy products.
12. Preparation of special milks- toned, double toned milk, reconstituted and recombined milk.
13. Study of cream separator and types of cream - grading of cream.
14. Butter preparation- Creamery method, OR in butter.
15. Butter analysis for fat and moisture.
16. Ghee making- methods - quality- adulterants- detection.
17. Preparation of dairy by products- skim milk- casein, butter milk, Lassi, Limsi, use of Ghee residues.
18. Whey, whey beverages, WPC and WPI.
19. Determination of TS and moisture % in milk powders.
20. Quality determination of milk powder by solubility index.
21. Ice- cream making- calculation of mix, preparation of mix ageing, freezing- packaging of ice cream OR in ice - cream.
22. Preparation of casein.
23. Visits- Halwai shop.
  - Khoa making units.
  - Ice- cream plant, Kulfi unit.
  - Condensed milk plant.
  - Milk parlour.

### **Reference Books :**

1. Out lines of Dairy Technology - S.K. De
2. Milk & Milk Products - Eckless, Combs & Macacy
3. Modern Dairy Products - Lampert
4. Dairy Chemistry - M.M. Rai.
5. Principals of Dairy Chemistry - Jeneess & Patton
6. A Text book of Dairy Chemistry - N.C. Ganguly
7. Fundamentals of Dairy Chemistry - Web & Jonson
8. Dairy Chemistry - Fox
9. Dairy Processing - James Warner
10. Indigenous milk products - ICAR pub
11. Hand book of Dairy Science - K.C. Mahanta
12. Dictionary of Dairying - Davis & Leonard Hill
13. Engineering for Food & Dairy Processing - E.M. Farrell
14. Dairy Plant-Management & Engineering - Tufail Ahemad
15. Text book of Practical Dairy Chemistry - N.K. Roy & D.C. Sen
16. Milk Testing - J.G. Davis
17. Dairy Microbiology - K.C. Mahanta
18. Dairy Bacteriology - Hammer
19. Fundamentals of Dairy Microbiology - J.B. Prajapati
20. Standard Methods for Examination of Dairy Products - Gary H. Richardson
21. Market Milk Industry - C.L. Rhodhouse & J.L. Henderson
22. Comprehensive Dairy Microbiology - Yadav, Batish and Grover
23. A Text Book of Animal Husbandry - G.C. Banerjee
24. The Fluid Milk Industry - Henderson
25. ISI Specifications - BIS Publication
26. Technology of Dairy plant operations - K. P. S. Sangwan.
27. technology of milk processing - C.P. Anantkrishnan, A. khan and P.N. Padmanabhan
28. Milk and It's properties - S.M. Srivastava
29. Chemical & Microbiological Analysis of milk & milk projects. - Ramakant Sharma.

**Dr. S. A. Kulkarni**  
**Chairman**  
**(Adhoc Board in Dairy Science)**

## DAIRY SCIENCE

### List of Refereed, Peer reviewed and Indexed Journals with ISSN No

01	Journal of Food Science of Technology	:	ISSN 0022-115
02	Asian Journal of food & Dairy Science	:	ISSN 09760563
03	The biosphere	:	ISSN 22517677
04	Journal of Animal production Advances	:	ISSN 2251-7219
05	Journal of Animal Science Advance	:	ISSN 1811-9751
06	International Journal of Dairy Science	:	ISSN 1557-4571
07	American Journal of food Technology	:	ISSN 2141-2448
08	International Journal of Livestock production	:	ISSN 1996-0794
09	African Journal of food science	:	ISSN 09715436
10	Indian Journal of Dairy and Bioscience	:	ISSN 22517685
11	Journal of Veterinary Advances	:	ISSN 09788988
12	Veterinary world (International Journal)	:	ISSN 0972-8988
13	Journal of Dairy Science	:	ISSN 0022-0302
14	Karnataka Journal of Agricultural	:	ISSN 13006045
15	American, Eurasian Journal Agricultural & Environmental Science	:	ISSN 18186769
16	Newzaland Journal of Dairy Science & Technology	:	ISSN 00288268
17	International Journal of Dairy Technology	:	ISSN 14710307
18	Journal of food science	:	ISSN 17503841
19	Pakistan Journal of Nutrition.	:	ISSN 16805194
20	International Journal of Food science and Technology	:	ISSN 13652621
21	Food science and Biotechnology	:	ISSN 20826456

22	Food Science and Nutrition	:	ISSN 248-7177
23	Emrold Nutrition and food science	:	ISSN 00346659
24	Dairy Science and Technology	:	ISSN 19585586
25	Italian journal of Animal Science	:	ISSN 15944077
26	Japanese journal and veterinary research	:	ISSN 00471917
27	Indian veterinary Journal	:	ISSN 0019-64799
28	Indian Journal of Animal Nutrition	:	ISSN 0970-3209
29	Patron	:	ISSN 09762310
30	International Journal of Agriculture innovations and research	:	ISSN 2319-1473
31	Indian Dairyman	:	ISSN 0019-4603
32	Indian Journal of Dairy Science	:	ISSN 0019-5146
33	Animal Nutrition and Feed Technology	:	ISSN 0972-2963
34	Asian Journal of Microbiology, Biotechnology	:	ISSN 0972-3005
35	National Journal of life Sciences	:	ISSN 0972-995X
36	Asian Academic Research Journal of multidisciplinary	:	ISSN 2319-2801
37	periodic Research	:	ISSN 2231-0045
38	Journal of International Research for multidisciplinary (Impact Factor : 1.393)	:	ISSN 2320-5083
39	Golden Research Thoughts (Impact Factor : 1.2018)	:	ISSN 2231-5063
40	Indian Streams research Journal (Impact factor : 0.2105 (GISI)	:	ISSN 2230-7850
41	Aisan Resonance	:	ISSN 0976-8602
42	Review of Research Journal (Impact Fact : 1.6672 (UIF)	:	ISSN 2249-894X