FINAL EXAM SYLLABUS

Course: Hygiene, technology and control of foods from animal origin
Academic year 2015/2016

THEORY EXAM

1. Animal health requirements for slaughter animals in meat production. Classification of animals and slaughter carcasses. In which cases is slaughter forbidden (Which animals are ineligible for slaughter)?
2. Transportation, acceptance, pre-slaughter lairage and pre-slaughter analysis of animals.
3. Animal health and hygiene requirements for slaughterhouses. Horizontal and vertical slaughterhouses.
4. Technology of slaughter of Bovine animals (large ruminants) and post-mortem veterinary-sanitary examination of carcasses and internal organs.
5. Technology of slaughter of SR (sheep, goats) and post-mortem veterinary-sanitary examination of carcasses and internal organs.
6. Technology of slaughter of pigs and post-mortem veterinary-sanitary examination of carcasses and internal organs.
7. Anthrax (charbon) in farm animals. Measures in cases of anthrax found at slaughter or during the post-mortem veterinary-sanitary examination of carcasses.
8. Tuberculosis. Current concepts for disease pathogenesis and veterinary-sanitary examination of bovine and pig carcasses and internal organs.
9. Brucellosis in animals and veterinary-sanitary examination of raw materials.
10. Foot (hoof)-and-mouth disease in farm animals. Veterinary-sanitary examination of raw materials.
11. Swine fever and swine erysipelas (diamond skin disease). Veterinary-sanitary examination of meat and organs.
12. Rabies and veterinary-sanitary examination of the meat, organs and milk of ill or suspect animals.
13. Tetanus and paratuberculosis (Johne's disease) in farm animals for slaughter. Veterinary-sanitary examination of carcasses and organs.
14. Leucosis – disease course, pathoanatomical features and veterinary-sanitary examination of animal raw materials.
15. Tularemia, Q-fever, leptospirosis and veterinary-sanitary examination of animal raw materials.
16. Animal salmonelloses and veterinary-sanitary examination of animal raw materials.
17. Secondary salmonelloses in farm animals and veterinary-sanitary examination of animal raw materials.
18. Transmissible spongiform encephalopathies in ruminants. Veterinary-sanitary measures for their prevention and control in slaughterhouses.
19. Fowl typhoid (FT) and pullorum disease and salmonellosis in waterfowl; veterinary-sanitary inspection at slaughter. Role of duck and goose eggs in toxin-mediated human infection.
20. Trichinellosis in farm animals and veterinary-sanitary examination of meat and internal organs.
21. Cysticercosis in farm animals and veterinary-sanitary examination of meat and internal organs.
22. Echinococcosis (hydatid disease, hydatosis) and bladder worm (false hydatid, *Cysticercus tenuicollis*) and post-mortem veterinary-sanitary examination.
23. Fasciolosis and dicrocoeliasis and post-mortem veterinary-sanitary examination.
24. Types of toxicoses (poisonings) in animals. Veterinary-sanitary examination of meat and organs.
25. Emergency (casualty, immediate) slaughter. Animal health requirements in cases of emergency (casualty, immediate) slaughter. Pathoanatomical features of the carcass and organs of animals slaughtered in agony. Methods for treatment of conditionally fit meat.
26. Pathogenesis and clinical manifestation of human foodborne toxin-mediated infections. Characteristics of salmonella bacteria.
27. *Proteus* sp. and *Bac. ceeeus* in toxin-mediated human infections.
28. Role of *E. coli* in toxin-mediated human infections. Coliform titer and coliform index as indicators of the sanitary and hygiene conditions of meat products. Hygiene (veterinary-sanitary) inspection in such toxin-mediated infections.

29. Staphylococci and streptococci as causative agents of foodborne intoxications and hygiene (veterinary-sanitary) inspection.
30. Clostridia (*Cl. perfringens* and *Cl. botulinum*) as causative agents of human foodborne intoxications and hygiene (veterinary-sanitary) inspection of food products.
31. Chemical composition of meat tissue and characteristics of its components.
32. Post-mortem stiffening (rigor mortis) and maturation (aging, ripening) of meat and its importance for meat quality.
33. Deep putrefaction (autolysis) of meat and hygiene (veterinary-sanitary) inspection.
34. Spoilage (putrefaction, decaying) of meat, nature of the spoilage, meat spoilage microorganisms and hygiene (veterinary-sanitary) inspection.
35. Preservation by refrigeration: principles and refrigeration methods. Refrigeration chamber diagram. Organization of hygiene (veterinary-sanitary) inspection in large refrigerators.
36. Requirements for meat chilling. Disadvantages of chilled meat. Storage life of meat from bovine animals, SR and pigs.
37. Freezing of meat. Methods: advantages and disadvantages. Unfreezing of meat. Hygiene (veterinary-sanitary) inspection.
38. Meat products, types and classification. Main raw products in sausage production. Cutting and packing of bovine, SR and pig carcasses.
39. Short shelf-life cooked and cooked smoked sausages. Technology and hygiene (veterinary-sanitary) inspection.
40. Long shelf-life and medium shelf-life cooked smoked sausages. Technology and hygiene (veterinary-sanitary) inspection.
41. Raw (dry) fermented and fresh smoked sausages (flat sausages: lukanka and sudzhuk). Technology and hygiene (veterinary-sanitary) inspection. Added starter cultures used in their production.
42. Deli (delicacy) meat products (ham, cured meat cuts). Technology and hygiene (veterinary-sanitary) inspection.
43. Canned meat. Types. Technological principles and parameters of production. Hygiene (veterinary-sanitary) control in canned meat factories and storage regime of canned products.
44. Processing, preservation and storage of bovine, sheep, goat and pig intestines and hygiene (veterinary-sanitary) inspection.
45. Primary treatment of cattle, sheep and pig skins. Preservation, storage and hygiene (veterinary-sanitary) inspection.
46. Animal fat tissue. Backfat: types and storage methods. Suet – hygiene (veterinary-sanitary) control.
47. Melting of fatty tissue. Methods for production of pork lard and tallow for consumption. Hygiene (veterinary-sanitary) inspection.
48. Types of birds for slaughter. Classification. Composition of poultry meat.
49. Slaughter and processing of slaughter poultry. Quality assessment, methods for carcass processing and cutting, storage life and hygiene (veterinary-sanitary) requirements.
50. Poultry eggs. Types. Morphology and chemical composition. Changes that take place during storage of eggs.
51. Diseases in farmed birds. Abnormalities in the meat and internal organs and animal health (veterinary-sanitary) examination.
52. Types of fish for consumption. Tissue structure and chemical composition of fish meat.
53. Post-mortem changes in fish and veterinary-sanitary requirements for fishing and primary processing.
54. Methods for fish preservation and hygiene (veterinary-sanitary) requirements: chilled, frozen, salted, pickled (marinated) fish, dried and smoked fish. Marine (sea) hydrobionts.
55. Parasitic diseases in fish affecting meat quality. Animal health (veterinary-sanitary) examination.
56. Game meat. Veterinary-sanitary requirements for production and marketing (sale) of game meat.
57. Veterinary-sanitary requirements for meat production farms. Milking methods and hygiene of milking staff and equipment. Milking machines.
58. Primary treatment of milk. Filtration, cooling and storage of raw milk. Transportation.
59. Chemical composition of milk. Characteristics of water and solids content. Protein content in milk. Chemical composition and properties of milk proteins.

60. Lipids and lipoids content in milk. Physico-chemical properties and changes in lipids and lipoids. Carbohydrates in milk. Composition and properties. Their importance in milk products.
61. Minerals in milk. Quantitative and qualitative content and their role in the nutritional value of milk. Enzymes in milk. Hydrolytic enzymes and. Hydrolytic enzymes and oxidoreductases. Properties and role in the quality and control of milk.
62. Physico-chemical properties of milk: density, relative weight, refraction.
63. Active acidity of milk. Buffering capacity of milk, factors that affect it.
64. Total (titratable) acidity of milk. Indicators for milk freshness.
65. Antibacterial activity of milk. Conditions for its manifestation.
66. Factors that affect the composition of milk. Differences between the composition of cow, sheep, buffalo and goat milk.
67. Sources of microbial contamination of milk. Pathogenic and spoilage microorganisms.
68. Microflora in milk and milk products. Classification of homo- and heterofermentative microorganisms.
69. Lactic acid, propionic acid, acetic acid bacteria. Characteristics: types (species) and their role in the quality of milk and dairy products.
70. Sanitary indicator microorganisms in milk (coliforms, enterococci, *Proteus* spp.), coliform index, enterococcus titer.
71. Heat-resistant (thermostable) microorganisms in milk; their properties and changes they induce in dairy products. Psychrophilic and psychrotrophic microorganisms in milk and dairy products. Changes they induce and veterinary-sanitary examination.
72. Yeasts and molds in milk. Properties and their role in the quality of milk and dairy products.
73. Growth of microorganisms in milk: growth phases of different species and changes in milk.
74. Lactic acid bacteria starter cultures. Types, methods for production, storage and use.
75. Infections and microorganisms transmitted to humans by milk (milk-borne diseases) (tuberculosis, brucellosis, foot and mouth disease, pox, salmonellosis, staphylococcosis.
76. Inhibitory agents and impurities in milk and veterinary-sanitary examination of milk. Withdrawal periods for antibiotics, pesticides, aflatoxins and chemical substances.
77. Methods for milk preservation. Refrigeration and freezing. Changes and veterinary-sanitary requirements.
78. Heat treatment of milk: thermization, pasteurization, sterilization, uperization, ultra-high temperature sterilization, ultraviolet treatment. Changes in milk.
79. Standardization of fat content, homogenization and clarification of milk. Veterinary-sanitary examination and quality assessment of fresh and pasteurized milk.
80. Methods for production of powdered milk. Types of milk powder. Quality indicators and defects of milk powders and veterinary-sanitary examination.
81. Technology and veterinary-sanitary examination in production, storage and marketing (sale) of different types of ice-cream. Defects and quality indicators.
82. Technology and veterinary-sanitary examination in production of fermented milk products: yogurt, acidified milk, kefir and kumis. Standard requirements, defects and shelf-life.
83. Production of fresh (sweet) and sour (fermented) cream. Maturation, technology and veterinary-sanitary examination. Defects and quality indicators.
84. Technology and veterinary-sanitary examination of milk butter. Equipment and method for production.
85. Biochemical and physical maturation of cream. Cream whipping: theories of whipping up butter. Washing, pressing and formation of butter. Types of milk butter.
86. Technology and veterinary-sanitary examination of margarine. Raw products, equipment and production. Types of margarine, quality indicators and defects.
87. Technology and veterinary-sanitary examination of white brined cheese. Raw products, quality indicators and tracking the manufacturing cycle. Types of white brined cheese, quality indicators and defects.
88. Technology and veterinary-sanitary examination of cheddar-type cheeses: technology of cheese and cheddar cheese production. Quality indicators. Defects and quality assessment.
89. Technology and veterinary-sanitary examination of cheeses with secondary heat treatment: Edam, Gouda cheese.
90. Technology and veterinary-sanitary examination of cheeses with secondary high-temperature treatment. Emmental and Tilsit cheese (Russian, Soviet).

91. Lactic acid cheeses. Cream cheese. Technology, quality indicators and defects.
92. Types of mold-ripened chesses. Production of Rockford and Camembert cheese. Defects and quality indicators.
93. Melted processed cheeses. Raw product and quality requirements. Technology of production of pasteurized and sterilized melted cheeses. Quality indicators and defects.
94. Technology and veterinary-sanitary examination of cottage cheese types. Quality indicators and defects.
95. Honey and bee products. Types, composition and characteristics of components. Sensory, physic-chemical and microbiological indicators of different types of honey and bee products. Defects and adulterations.
96. Types of disinfection treatment and disinfecting agents used in meat and dairy industry. Methods of application and control.
97. Self-regulation programs in the food chain. Standard sanitary operating procedures.
98. Self-regulation programs in the food chain. Good Manufacturing and Hygienic Practices (GMPs and GHPs). Tasks, principles and binding (mandatory) programs.
99. Self-regulation systems in the production of food products of animal origin (HACCP) – basic principles.
100. HACCP development: plan, basic steps, hazard analysis, critical control points.
101. Programs for traceability in the food chain.

Head lecturer:

(Assoc. Prof. Stanislav Radanski, PhD)

PRACTICAL EXAM

1. Sampling of milk. Detection of preservatives in milk. Determination of raw milk purity.
2. Determination of solids (dry matter) content, density, relative weight and fat content of raw and pasteurized milk.
3. Determination of milk freshness. Determination of rennet activity (rennet strength; total milk-clotting activity). Demonstration of the properties of casein, α-lactalbumin and β-lactoglobulin.
4. Determination of the temperature of heat treatment of milk, using enzyme tests and the properties of proteins.
5. Determination of total microbial counts in milk: a) enzyme-based test; b) bacterioscopic examination; c) microbiological analysis.
6. Determination of sanitary indicator microorganisms in milk: coliform titer, coliform index, enterococcus titer. Determination of the number of yeasts and molds.
7. Milk testing to reveal a mammary gland condition. Cytological and microbiological analysis. Isolation of mastitis pathogens.
8. Veterinary-sanitary examination of yogurt. Sampling. Physico-chemical analysis and defects (fat content, degree of acidity and isolation of *Lb. bulgaricum* and *Strept. thermophilus*).
9. Sampling of butter for analysis. Sensory analysis – quality assessment based on a 100-points system. Physico-chemical analysis – % fats, degree of acidity, % water.
10. Veterinary-sanitary examination of white brined cheese. Sampling. Quality assessment based on a 100-points system. Determination of: % water, solids (dry matter), fat content, acidity, % salt in the cheese and the brine.
11. Veterinary-sanitary examination of cheese. Sampling. Sensory analysis – quality assessment based on a 100-points system. Determination of: % water, solids (dry matter), fat content, acidity and % salt.
12. Analysis of honey. Types of honey. Adulterations – detection of starch and glucose. Testing the authenticity of honeydew honey. Determination of invert sugar, sucrose and % water. Testing for presence of hydroxymethylfurfural.
13. Collecting meat samples at emergency slaughter. Microbiological analysis: a) culture conditions and differentiation of salmonella, staphylococci and coliform bacteria; b) testing for presenceof anaerobic bacteria.
14. Post-mortem examination of Bovine carcasses – quality assessment and labeling.
15. Post-mortem examination of SR carcasses – quality assessment and labeling.
16. Post-mortem examination of pig carcasses – quality assessment and labeling.
17. Trichinella testing – hygiene assessment.
18. Testing for cysticercosis – hygiene assessment.
19. Determination of meat freshness: sensory, physico-chemical and microscopic analysis.
20. Veterinary-sanitary examination of sausage. Sampling. Sensory and physico-chemical properties: % water, % fats, % table salt.
21. Veterinary-sanitary examination of animal fats. Determination of the freshness of animal fats – degree of acidity, peroxide value, Kreis test.
22. Veterinary-sanitary examination of eggs.
23. Veterinary-sanitary examination of poultry. Quality assessment. Determination of freshness and degree of spoilage.
24. Veterinary-sanitary examination of fresh, chilled and frozen fish.
25. Documentation of food products and certification of fitness for consumption, storage and marketing (selling).
26. Veterinary-sanitary examination of canned meat.
27. Self-regulation systems in food industry: Sanitation Standard Operating Procedures, Good Manufacturing and Hygienic Practices (GMPs and GHPs), HACCP and Programs for traceability in the food chain.

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