

BIOCHEMISTRY

UNIT CODE: 0512 441 06A

TVET CDACC UNIT CODE: HE/CU/AHP/CC/02/5/MA

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply knowledge of biochemistry

Unit Duration: 50 hours

Unit Description

This unit specifies the competencies required by an animal health and production technician to apply knowledge of biochemistry in animal health and production. It involves applying the knowledge of macromolecules, enzymes in managing animal health, molecular genetics and biomolecule metabolism in animal health.

Summary of Learning Outcomes

By the end of this unit, the learner should be able to:

| S/No | Learning Outcomes | Duration (Hours) |
|--------------|--|-------------------------|
| 1. | Apply knowledge of macromolecules in animal health | 10 |
| 2. | Apply knowledge of enzymes in managing animal health | 10 |
| 3. | Apply knowledge of molecular genetics | 15 |
| 4. | Apply knowledge of the biomolecule metabolism in animal health | 15 |
| Total | | 50 |

Learning Outcomes, Content, and Suggested Assessment Methods

| Learning Outcome | Content | Methods of assessment |
|-------------------------|----------------|------------------------------|
|-------------------------|----------------|------------------------------|

| | | |
|---|---|---|
| 1. Apply knowledge of macromolecules in animal health | 1.1 Introduction to biochemistry 1.1.1 Define biochemistry 1.1.2 Basic structure of a | ● Practical ● Project ● Written tests |
|---|---|---|

| | | |
|--|--|---|
| | <p>living cell and how it is organized to conduct its characteristic chemical function</p> <p>1.2 Types of macromolecules</p> <p>1.2.1 Carbohydrates</p> <p>1.2.2 Proteins</p> <p>1.2.3 Vitamins</p> <p>1.2.4 Minerals</p> <p>1.2.5 Lipids</p> <p>1.3 Biochemistry of carbohydrates</p> <p>Structure</p> <p>1.3.1 Properties and classification of carbohydrates</p> <p>1.3.2 Carbohydrate metabolism</p> <p>1.3.3 Energy pathways and metabolic disorders of carbohydrate metabolism</p> <p>1.4 Biochemistry of proteins</p> <p>1.4.1 Structure</p> <p>1.4.2 Properties and classification of proteins</p> <p>1.4.3 Protein metabolism</p> <p>1.4.4 Metabolic pathways and metabolic disorders of protein metabolism</p> <p>1.5 Biochemistry of lipids</p> <p>1.5.1 Structure, properties</p> | <ul style="list-style-type: none"> ● Third party report ● Portfolio of evidence ● Oral questions |
|--|--|---|

| | | |
|---|--|--|
| | <p>and classification of lipids</p> <p>1.5.2 Lipid metabolism</p> <p>1.5.3 Metabolic pathways and metabolic disorders of lipid metabolism</p> <p>1.6 Biochemistry of vitamins:</p> <p>1.6.1 Structure</p> <p>1.6.2 Properties</p> <p>1.6.3 Classification, biochemical role</p> <p>1.6.4 Metabolism, and metabolic disorders of lipid metabolism</p> | |
| 2. Apply knowledge of enzymes in managing animal health | <p>2.1 Basic concepts of enzymes</p> <p>2.1.1 Isoenzymes</p> <p>2.1.2 Holoenzymes</p> <p>2.1.3 Coenzymes</p> <p>2.1.4 Apoenzymes</p> <p>2.2 Management of catalytic reactions</p> <p>2.3 Enzyme metabolism</p> | <ul style="list-style-type: none"> ● Practical ● Project ● Written tests ● Third party report ● Portfolio of evidence ● Oral questions |
| 3. Apply knowledge of molecular genetics | <p>3.1. Principles of molecular genetics</p> <p>3.2. Classification of Nucleic acids</p> <p>3.3. Nucleic acid metabolism</p> <p>3.4. Pentose sugars in nucleic acid</p> <p>3.4.1. DNA replication</p> <p>3.4.2. DNA transcription</p> | <ul style="list-style-type: none"> ● Practical ● Project ● Written tests ● Third party report ● Portfolio of evidence ● Oral questions |
| 4. Apply knowledge of the biomolecule metabolism in | 4.1 Biomolecule metabolism | <ul style="list-style-type: none"> ● Practical ● Project |

| | | |
|---------------|---|--|
| animal health | 4.2 Types of biomolecules 4.2.1 Carbohydrates 4.2.2 Proteins 4.2.3 Vitamins 4.2.4 Minerals 4.2.5 Lipids 4.3 Metabolic pathways 4.3.1 Glycolytic pathway 4.3.2 Krebs cycle 4.4 Management of effects of biomolecule metabolism. | <ul style="list-style-type: none"> ● Written tests ● Third party report ● Portfolio of evidence ● Oral questions |
|---------------|---|--|

Suggested Methods of Delivery

- Practical
- Projects
- Demonstrations
- Group discussion
- Direct instructions

Training resources for 25 trainees

| S/No. | Category/Item | Description/Specification | Quantity | Recommended Ratio (Item: Trainee) |
|-------|--------------------------------------|--|----------|-----------------------------------|
| A | Learning materials | | | |
| 1 | Projector | | 1 | 1:25 |
| 2 | Whiteboard/Smartboard | EPSOM | 1 | 1:25 |
| 3 | Desktop/computer | | 1 | 1:25 |
| B | Learning Facilities & Infrastructure | | | |
| 1 | Lecture/Theory room | With at least 25 seats | 1 | 1:25 |
| 2 | Biochemistry laboratory | | 1 | 1:25 |
| 3 | Animal farm | As guided by KVB | 1 | 1:25 |
| 4 | Library | Equipped with biochemistry books and E-section | 1 | |

| | | | | |
|----------|-----------------------------|---------|----|------|
| C | Consumable Materials | | | |
| D | Tools and Equipment | | | |
| | Centrifuges | | 1 | 1:25 |
| | Autoclaves | | 1 | 1:25 |
| | Incubators | | 1 | 1:25 |
| | Microscopes | | 5 | 1:5 |
| | Electrophoresis | | 1 | 1:25 |
| | Beakers | 200 pcs | - | - |
| | Calorimeter | | 5 | 1:5 |
| | Graduated cylinder | 200 pcs | - | - |
| | Water bath | Enough | | |
| | Funnel | | 25 | 1:1 |
| | pH Meter | | 5 | 1:5 |
| | Bunsen burner | | 25 | 1:1 |
| | Analytical balance | | 5 | 1:5 |
| | Test tubes | 200 pcs | - | - |