I PURPOSE

The purpose of urinalysis is to assess the piglet’s health in the least stressful manner. Urinalysis provides a basic overview of the health of the piglet and its measurements provide a method to assess progress throughout the experiment.

II SCOPE

This procedure provides instructions for analyzing urine. It includes tests for glucose, bilirubin, ketone (acetoacetic acid), specific gravity, blood content, pH, protein, urobilinogen, nitrite, and leukocytes in urine.

III RESPONSIBILITIES

It is the responsibility of Metabolic Assessment Laboratory personnel to follow this procedure. It is the responsibility of supervisory personnel to ensure compliance with this procedure and to train employees and students responsible for performing this procedure. Students will report accidents to the principal investigators immediately.

IV REFERENCES

N/A

V REAGENTS AND MATERIALS

V.A. Bayer Multistix Reagent Strips.
V.B. Plastic, white-capped scintillation vials (labeled: Piglet ID, Sample ID, Date).
V.C. Gloves.
V.D. Strip of aluminum foil.
V.E. Plastic, transfer pipette.
V.F. Freezer Storage Bag.
V.G. Scissors (disinfected with ethanol).
V.H. Non-toothed, Forceps (12cm).

VI EQUIPMENT

VI.A. Stopwatch.
VII SAFETY PRECAUTIONS

VII.A. Members of the MAL have been trained extensively in the procedures described in this SOP.
VII.B. Members of the MAL have been approved to work with human blood and piglet blood, tissues, and urine.

VIII DEFINITIONS

VIII.A. Standard Operating Procedure (SOP) – Standard Operating Procedure is a document that provides instructions for completing a specific task in the lab.
VIII.B. Metabolic Assessment Laboratory (MAL) – The Metabolic Assessment Laboratory is the laboratory that will use this SOP.
VIII.C. Piglet Identification (ID)—The Piglet ID is a unique, alphabetical and numerical label that identifies the piglet and the samples taken from that piglet.
VIII.D. Piglet Medical Record—The Piglet Medical Record documents anthropometric, laboratory, and piglet care observations throughout the experiment.

IX PROCEDURE

IX.A. Preparation of Specimen for Testing
   IX.A.1. Collect fresh urine specimen in a clean dry container.
IX.A.1.a. See SOP# CP042.00 for procedure on collecting urine.
IX.A.1.b. Gently invert the sample before testing.
IX.A.2. Remove one urinalysis strip from bottle and replace the cap.
IX.A.3. Do not remove strip from the bottle until immediately before it is to be used for testing. Refer to Figure 1 for description of the reagent strips.
IX.A.4. Remove the test strip using forceps.
IX.A.5. Do not touch test areas of the reagent strip.
IX.A.6. Hold the strip in a horizontal position to prevent possible mixing of chemicals from adjacent reagent areas.
IX.A.7. Replace cap immediately and tightly after removing reagent strip.
IX.A.8. Lay the strip down on a previously cut piece of aluminum foil.
IX.A.9. Using the forceps and a pair of disinfected scissors, cut the Multistix strip in half (longways). Both strips may be used for analysis on the control and keto urine, respectively. Cover the unused strip in a piece of aluminum foil.
IX.A.9. Use a transfer pipette to dispense the urine sample onto the strip. Do not let the urine leak or spill over multiple reagent areas.
IX.A.10. Only use as much urine as is necessary to do urinalysis. Do not waste urine.

IX.B. Urinalysis
IX.B.1. Compare reagent areas to corresponding Color Chart at the time specified using a stopwatch. Refer to Figure 2 for a description of the color chart for select testing.
IX.B.2. Hold strip close to the color blocks and match carefully.
IX.B.3. Do not read strips in direct sunlight.
IX.B.4. Avoid laying the strip directly on the Color Chart.

![Color Chart](Image)
IX.B.5. Opportune times for testing each reagent (use as a guide for order, not necessarily for exact time).
  IX.B.5.a. Read glucose and bilirubin test at 30 seconds.
  IX.B.5.b. Read the ketone test at 40 seconds.
  IX.B.5.c. Read the specific gravity test at 45 seconds.
  IX.B.5.d. Read the pH, protein, urobilinogen, blood, and nitrite at 60 seconds
  IX.B.5.e. Checking the pH area after exposing to urine.
     IX.B.e.(1) If the color on the pad is not uniform, read the reagent area immediately.
     IX.B.e.(2) Accomplish this by comparing the darkest color to the appropriate color chart.
     IX.B.e.(3) All reagent areas may be read between 1 and 2 minutes.
     IX.B.e.(4) This is done for identifying negative specimens as well as determining pH and specific gravity.
     IX.B.e.(5). Record data onto medical record and when sample was stored in freezer. (See Figure 3).

Figure 3.

IX.B.5.g. Replace urine in vial only if transfer pipette did not touch urinalysis strip.
IX.B.5.h. Place urine vial into freezer bag (labeled by day of collection) and place in freezer.
IX.B.5.i. Vials are categorized by Piglet ID.
IX.B.5.j. Any vial in which urine was placed but no more remains (even after using priority tests) after urinalysis should be placed in Biohazard waste.
IX.B.5.k. Dispose of used Multistix, pipets, and aluminum foil into biohazard waste (See Figure 4). Disinfect forceps with ethanol.
IX.C. Storage of urinalysis strips.
   IX.C.1. Strips must be contained in bottle at all times, except when used for urinalysis.
   IX.C.2. Store at room temperature between 15-30°C (59-86°F).
   IX.C.3. Do not use product after the expiration date.
   IX.C.4. Do not store the bottle in direct sunlight.
   IX.C.5. The priority of reaction sites shall be determined before each experiment in case there is insufficient urine to complete the strip.

Figure 4.
IX.B.5.k. Update urinalysis parameters into electronic copy of medical record.
ATTACHMENTS

X.A. For a list of materials and their locations, refer to SOP# CG098.00.