1. Purpose

The purpose of this guideline is to provide recommended blood sampling volumes and guidance on a variety of acceptable blood collection techniques.

1. Scope

This guideline applies to all personnel collecting blood samples from agricultural animals.

1. Guidance
   1. General Information
2. The acceptable quantity and frequency of blood sampling is determined by the circulating blood volume and the red blood cell (RBC) turnover rate.
3. For optimal health, blood draws should be limited to the lower end of the range. Maximum blood volumes should be taken only from healthy animals.
4. The approximate circulating blood volume of an animal is 55-70 ml/kg. A blood volume estimate for a single species may not reflect differences among individual breeds or variations due to age, size, or illness. In older or obese animals, circulating blood volume can be decreased as much as 15%.

Of the circulating blood volume, the following collection volumes and recovery periods listed in Table 1 below should be applied.

**Table 1: Collection Volumes & Recovery Periods**

|  |  |
| --- | --- |
| **Blood Volume Amount** | **Recovery Period** |
| No More than 1% blood volume | 24 hours |
| No More than 7.5% blood volume | 1 week |
| 10% blood volume | 10 days |
| 15% blood volume | 15 days |

**Table 2: Circulating Blood Volume & Examples of Maximal Survival Collection Calculation.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species** | **Circulating Blood Volume (ml/kg)** | **Average Adult Body Weight** | **Blood Volume** | **Maximum Survival Collection Volume (10% of circulating blood volume)** |
| **Pig (large)** | 65 | 110 kg | 7.15 L | 715 ml |
| **Sheep** | 60 | 60 kg | 3.6 L | 360 ml |
| **Goat** | 70 | 45 kg | 3.15 L | 315 ml |
| **Cattle** | 60 | 520 kg | 31.2 L | 3.12 L |
| **Horse** | 75 | 400 kg | 30 L | 3 L |
| **Chicken** | 60 | 2.5 kg | 150 ml | 15 ml |

**Table 3: Blood collection sites for multiple species.**

|  |  |
| --- | --- |
| **Species** | **Site** |
| **Pig** | Marginal ear vein, jugular vein, cephalic vein cranial vena cava |
| **Sheep** | Jugular,cephalic, and femoral veins |
| **Goat** | Jugular, cephalic and femoral veins |
| **Cattle** | Jugular and coccygeal veins |
| **Horse** | Jugular, transverse facial, cephalic, and saphenous veins |
| **Chicken** | Brachial and jugular veins |

1. Fluid Replacement

If replacement fluids are provided (equal volume of blood removed) (0.9% saline, Lactated Ringer’s solution), up to 15% of circulating blood volume may be collected at one time. A 4-week recovery period is required before additional blood can be collected.

1. Although blood volume is rapidly restored in an animal after blood collection, the recovery periods required for blood constituents (e.g., red blood cells, platelets, clotting factors) to be regenerated by the body. Hemostasis after collection can be achieved by using a silver nitrate stick, Quick Stop powder or by applying a gauze sponge over the site with gentle pressure until the bleeding stops.