



A COMPILE STUDY OF HAEMOGLOBIN ON INSTITUTIONAL EXPERIMENTAL ANIMAL

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ABSTRACT

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Hemoglobin is the molecule of protein in red blood cells that carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues back to the lungs. For the hemoglobin related study, diagnosis, prevention and treatment there is branch of medicine known as Hematology. Now days there are various method or instruments used for measuring the hemoglobin content like sahli Haemometer also known as acid haematin method. The normal value of Hb value of different Institutional experimental animal like Mice (13.6-16.4gm/dl), guinea pig (11-15 gm./dl) Rat (11.1 to 16.1 gm./dl), Rabbit (14.6- 15.5 gm/dl). Now we had performed an experiment on these animals to check their Hb value. Here has Design a compile table of normal range of hemoglobin of institutional experimental animal with the help of the sahli's method.

INTRODUCTION

Hemoglobin:

Hemoglobin is the protein molecule in red blood cells (RBC) who carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues back to the lungs. Hemoglobin forms an unstable, reversible bond with oxygen. In its oxygenated state it is called as Oxyhaemoglobin and is bright red. In the reduced state it is called Deoxyhaemoglobin and is purple-blue¹.

Normal Hemoglobin Range of Hemoglobin of Institutional Experimental Animal^{1, 2}:

Hematology: Is the branch of medicine and a subspecialty of internal science. It focuses on the study, diagnosis, treatment and the

prevention of diseases that can cause abnormalities in the blood and its various components, which include blood cells, blood proteins, hemoglobin, platelets and blood vessels as well as the organs that are responsible for producing blood, namely the bone marrow and spleen^{3,4}.

Determination methods of hemoglobin:

Commonly used to determine the hemoglobin concentration in patients' blood are –

1. Sahli's Method or AcidHematin's Method
2. Cyanmethemoglobin Method [CMG] or Drabkin's Method

The principle of Drabkin's solution:

Drabkin's solution completely based on oxidation of Hb and its derivatives except sulfhemoglobin to form methemoglobin in the presence of alkaline K- ferricyanide. The methemoglobin reacts with K-cyanide to form a very power full stable compound, cyanmethemoglobin, this complex has maximum absorption at 540 nm.⁵.

Principle of Sahli Haemometer: When blood is mixed with an acid solution so that hemoglobin is converted to brown-colored acid Haematin. This is then diluted with water till the brown color matches that of the brown glass standard. The hemoglobin value is identifying directly from the scale which show in Hemoglobin pipette.

Sahli's Hemoglobinometer:

1. Comparator with brown glass standard. Opaque white glass is present at the back to provide uniform illumination.
2. Sahli's pipette or hemoglobin pipette. (Marked at 20 microliter or 0.02 ml)
3. Stirrer, made up of thin glass rod.
4. Glass dropper⁶.

Blood Samples are Collected Using the Following Techniques^{7, 8}:

MATERIAL AND METHODS:

Animal: Experimental animal were used for the study. They were housed in sanitized polypropylene cages containing paddy husk as bedding, other cage for experimental were housed in animal house under standard laboratory conditions at room temperature (23 °C ± 2 °C). They had free access to standard animal pellets as basal diet and water. Ethical clearance was obtained from Institutional Animal Ethical Committee (IAEC/ KCP/2019/04) Department of Pharmacology, Kota College of Pharmacy, Kota.

Chemicals: Hydrochloric acid: (Therefore add 8.3 ml of 37% HCL to 1 Liter of Distilled water to create 0.1N HCL solution.), Distilled water, Spirit, Blood sample.

Apparatus/ Equipment's ^{6, 9}: Sahli's Haemometer, Syringe, Gloves, Capillary tube,

Pasteur Pipette, Lancet, Cotton, Test tubes, Dropper.

PROCEDURE OF ESTIMATION OF HEMOGLOBIN BY SAHLI'S METHOD ^{9, 10}:

1. Clean the hemoglobin pipette and tube
↓
2. Fill the Sahli's hemoglobin tube up to the mark 20- microliter with N/10 HCL (yellow marking)
↓
3. Collect the blood from blood collection site by hemoglobin pipette mark up to 20- microliter.
↓
4. Make sure no air bubbles appear in hemoglobin pipette.
↓
5. Add blood sample into acid solution sahli's hemoglobin tube, and mix it properly by stirrer
↓
6. Place the tube at room temperature for 10 minutes for complete conversion of Hb into acid Haematin.
↓
7. Now add drop by drop of distilled water and mix it well with the help of stirrer, till it matches with the standard of Sahli's comparator box.
↓
8. If the color gets lighter after adding the first extra drop, it shows reading taken before dilution was correct; this is the final meniscus reading.
↓
9. Reading of this method is expressed in Hemoglobin gm. /dl (gm./100ml) of the blood.

CULCLUSION:

Here, A study of hemoglobin with the help of the Sahli method on Institutional Experimental animal, the estimate the normal range of hemoglobin here performed and find out the hemoglobin value of experimental animal with the help of the animal blood sample with the help of the Sahli's method., Here we were the find out the hemoglobin range of Rabbit 14.9g/dl, Rat 15.1 g/dl, Mice 13.9 g/dl, Guinea pig 14.7.

Table No 1: Normal Range of Hemoglobin Institutional Experimental Animal

S.no	Organisms	Normal value of hemoglobin
1	Mice	13.6 to 16.4 gm./dl
2	Guinea pig	11 to 15 gm./dl
3	Rat	11.1 to 16.1 gm./dl
4	Rabbit	14.6- 15.5 gm./dl

Table No 2: Blood Collection Site of Institutional Experimental Animal

S. No	Experimental animal (Scientific Name)	Blood collection not requirement anaesthesia	Blood collection requirement anaesthesia	Terminal procedure
1.	Rabbit (Oryctolagus cuniculus)	----	Marginal ear vein/artery	Cardiac puncture
2.	Rat (Sprague Dawley) (Rattus norvegicus)	Saphenous vein, dorsal pedal vein	Tail vein, orbital sinus, jugular vein, temporary cannula, blood vessel cannulation	Posterior vena cava, orbital sinus, cardiac puncture
3.	Mice (Mus musculus)	Saphenous vein, dorsal pedal vein	Temporary cannula , tail vein, tail snip, orbital sinus, jugular vein, blood vessel cannulation	Orbital sinus ,posterior vena cava, cardiac puncture
4.	Guinea pig (Cavia porcellus)	Saphenous vein	Tarsal vein, blood vessel cannulation	Cardiac puncture

Table No 3: Results of Hemoglobin value of institutional experimental animal

Hemoglobin	Rabbit	Rat	Mice	Guinea pig
Hb value (gm. /dl)	14.9 (gm./dl)	15.1 (gm. /dl)	13.9 (gm. /dl)	14.7 (gm. /dl)

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