



# Haematology and Serum Biochemistry in the Agouti (*Dasyprocta spp.*): A Neo-Tropical Rodent with the Potential for Domestication

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## Abstract

This review serves to summarize blood cell and serum biochemical values of the agouti (*Dasyprocta spp.*). The majority of the researches on the blood and biochemical profiles on the agouti were done in many countries, namely Columbia, Brazil, Peru, Trinidad and Tobago. The literature collected for this review spanned over twenty (20) years from 1997 to 2019. The haematological and biochemical values recorded at various locations were tabulated to give a composite reference range for *Dasyprocta spp.* The blood cells of the agouti were similar to those found in rodents and human with no differences seen in cell types seen between agoutis of different ages or sexes. The majority of articles showed that there was no difference in blood and biochemical values between ages or sexes. However, there were differences seen in calcium and phosphorus levels of pregnant animals and non-pregnant female animals.

**Keywords:** Brazil; Peru; Columbia; Trinidad and Tobago; Non-Pregnant; Calcium; Phosphorus

## Introduction

The agouti a Neo-tropical rodent of the *Dasyproctidae* family Emmons & Feer [1]. The agouti is utilized for its meat however captive rearing of these animals throughout the neo-tropics are currently being developed. The agouti practiced scatter hoarding which made it essential for the forest environment Silvius & Fragoso [2]. The agouti is one of six neo-tropical species with the potential for domestication Brown-Uddenberg et al. [3]. Recently biological information about the agouti has been reported in the Caribbean and South America. Observation of the diet, nutrition and digestive anatomy has been done. The agouti was reported to be a frugivorous animal which practices caecotrophy, with a preferred food particle size of 6.25mm x 1.25mm in captivity Garcia et al. [4]; Lall et al. [5]; Dookie et al. [6]. However, recently the agouti was described as being an omnivore where observers recorded the animal consuming eggs and animal matter Jones et al. [7]. Infectious pathogens the agouti can harbour have been reviewed but not no clinical effects have been reported Lall et al. [8]. Endoparasites in the wild population of agouti in Trinidad have been investigated Suepaul, et al. [9], in Brazil

Lainson et al. [10]. Endoparasites of captive reared populations in Trinidad have been reported Jones & Garcia [11,12]. Morphological studies of the peripheral blood cells of the agouti (*Dasyprocta prymnolopha*) in captivity were done. Blood cell types found were erythrocytes, reticulocytes, lymphocytes, eosinophils, neutrophils, monocytes, basophils and platelets. The cellular morphology was similar to other rodents and humans Conde Junior et al. [13]. Therefore, the management and monitoring of the health of the agouti in captivity has become important. The use of reference haematological and biochemical data in *Dasyprocta spp.* will be a valuable tool in the identification of sub-clinical diseases. The objective of this document was to give a comprehensive summary of haematological and serum biochemical reference values.

## Haematological analysis of *Dasyprocta spp.*

Peripheral blood cells of the agoutis in captivity were analysed in Brazil. Results showed that there was no difference in the morphology and morphometry of blood cells between sexes.

Erythrocytes had an elliptical form without a nucleus; lymphocytes were spherical with scarce cytoplasm having a dense centralized round nucleus Conde Junior et al. [13]. Monocytes were slightly basophilic having a spherical nucleus with central constriction. Neutrophils and eosinophils were spherical with a polymorphic lobulated nucleus. Basophils were observed to have an abundance of cytoplasmic granules Conde Junior et al. [13]. De Aquinos et al. [14] found that haematocrit values were higher in adults, platelets were superior in young females but there was no difference in white blood cells values between age groups and sexes. In contrast, Andrade et al. (2011) found that there was no significant difference in the blood parameter for age and sex in the agoutis (*Dasyprocta fuliginosa*) sampled. Further work was done in Brazil on the agouti and results showed that there was no significant difference in blood parameters for age or sex, but lymphocyte values were higher for older animals Ribiero et al. [15]. Haematological reference values for *Dasyprocta spp.* was summarized using information from published work and presented in Table 1.

**Table 1:** Reference Haematological values of adult male agoutis (*Dasyprocta spp.*).

Parameters	Range
Red blood cell (RBC), 10 <sup>12</sup> /l	6.65-9.31
Haemoglobin (HGB), g/dl	13.28-17.19
Haematocrit (HCT), %	44.37-53.67
Mean Corpuscular Haemoglobin Concentration (MCHC), g/dl	28.13-35.67
Mean Corpuscular Volume (MCV), fl	55.58-74.58
Red Cell Distribution Width (RDWc), %	14.80-16.90
RDWs, %	33.60-44.10
Platelets (PLT), 10 <sup>9</sup> /l	137.33-346.67
Mean Platelet Volume (MPV), fl	6.40-8.80
Plateletretin, %	0.03-0.24
Platelet Distribution Width (PDW), %	7.30-16.40
White blood cells (WBC), 10 <sup>9</sup> /l	5.79-11.46
Lymphocytes (LYM), 10 <sup>9</sup> /l	2.01-4.90
Monocytes (MON), 10 <sup>9</sup> /l	0.12-0.65
Eosinophils (EON), 10 <sup>9</sup> /l	0.31-1.87
Basophils (BAS), 10 <sup>9</sup> /l	0.03-0.05
Neutrophils (NEU), 10 <sup>9</sup> /l	2.50-10.48
LYM, %	37.38-67.77
MON, %	1.90-7.47
NEU, %	19.87-45.27
EOS, %	1.08-6.35
BAS, %	0.34-1.97

### Serum Biochemical analysis of *Dasyprocta spp.*

*Dasyprocta spp.* were sampled in Brazil and biochemical analysis found there was no difference in parameters based on age or sex of the animal Ribiero et al. [15,16]. Male agoutis (*Dasyprocta leporina*) captive reared in Trinidad and Tobago were analysed with similar results as described in Brazil Jones et al. [17]. Nunes et al. [18] examined blood glucose, cholesterol, triglycerides, creatinine and total proteins of adult and young male agoutis in Columbia. Nunes et al. [18] values for glucose, creatinine and total proteins were similar to results obtained in Trinidad and Tobago by Jones et al. [17]. However, serum cholesterol and triglycerides were not recorded for the male agouti in Trinidad and Tobago Jones et al. [17]. Serum biochemistry of agoutis (*Dasyprocta prymnolopha*) was analysed during pregnancy. Finding showed that protein, globulin, urea, creatinine, alanine aminotransferase, glucose, aspartate aminotransferase, and total bilirubin of the pregnant and non-pregnant animals were not significantly different. Calcium and phosphorus were significantly different for pregnant and non-pregnant animal De Carvalho et al. [19]. However, the level of calcium and phosphorus during the entire pregnancy were constant De Carvalho et al. [19]. Serum biochemistry values are seen in Table 2 which was collected from captive reared and wild populations of *Dasyprocta spp.* with similar results seen at different locations [20].

**Table 2:** Reference serum biochemical values of agoutis (*Dasyprocta spp.*).

Parameter	Range
Total Bilirubin (TBIL), mg/dl	0.3-0.5
Blood urea nitrogen (BUN), mg/dl	3.0-13.0
Calcium (Ca), mg/dl	5.71-10.28
Phosphorous (Phos), mg/dl	4.49-6.20
Creatinine (CREA), mg/dl	1.15-2.05
Glucose (Glu), mg/dl	169.9-269.0
Sodium (Na), mmol/l	139-156
Chlorine (Cl), mg/dl	44.86-84.50
Potassium (K), mmol/l	8.1-8.3
Total Protein (TP), g/dl	5.12-6.83
Globulin (Glob), g/dl	1.49-2.46
Albumin (Alb), g/dl	3.55-4.31
Cholesterol, g/dl	87.4-128.8
Triglycerides, g/dl	45.4-111.0

Sources: Jones et al. [7]; Ribiero et al. [15]; Nunes et al. [18].

### Conclusion

Haematological parameters were similar for different ages and sexes in the Agouti (*Dasyprocta spp.*). Serum biochemical parameters were also similar for different ages and sexes with the only difference seen in pregnant animals. Calcium and phosphorus were different in pregnant animals as compared to non-pregnant animals but during pregnancy there was no difference seen in the blood calcium and phosphorus levels.

## Declaration of Conflict of Interest


The authors declare that there was no conflict of interest when constructing this document

## Authors Contributions

KRJ searched the databases for relevant in the construction of the review. KRJ formally wrote the draft document. KRJ and GWG revised the draft manuscript. GWG supervised the entire project.

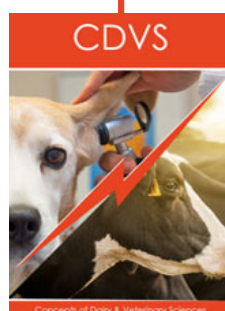
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