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Mineral status of forages and grazing goats in West Sumatra, Indonesia:

1. Macro minerals

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Abstract

This experiment was conducted to study macro mineral status of forages and grazing goats in West Sumatra, Indonesia. The forages evaluate consisting 13 species of grass and 7 species of legume were harvested from 5 different locations during dry and rainy seasons. Blood samples of goats were collected at the same locations through jugular puncture to determine macro mineral status of the animals. Results of the study indicate that mineral concentrations of forages varied widely among species and seasons. Calcium concentration of forages both in dry and rainy season was above the critical value for deficiency. However, percentage deficiency of forage phosphorus was found either in dry season (85.7% for legume and 30.8% for grass) or rainy season (71.4% for legume and 30.8% for grass). Average concentration of forage magnesium in dry season was above the critical level, while in rainy season percentage of Mg deficiency was 28.6% for legume and 23.1% for grass. Percentage of sulfur deficiency in dry season was 42.9% for legume and 46.2% for grass, and these values were higher compared to those of rainy season (14.3% for legume and 30.8% for grass). Data on mineral status of grazing goats showed that in overall the incidence of Ca, P and Mg deficiencies were 4.6, 7.7 and 5.7%, respectively. This experiment is a part of a series of experiments on the study of mineral status of forages and grazing goats in West Sumatra, Indonesia.

Key words: Macro mineral status, forages, goats, West Sumatra.

Introduction

Deficiency or imbalance of certain minerals of the forages in tropical countries have been reported by several researchers and suggested as one of the limiting factors for improvement of animal productivity in this region ¹. In most situations of the countries, sheep and goats are commonly raised by small farmers in rural areas under traditional system with native grass, tree leaves and agriculture by-products as main sources of feeds. Consequently, the grazing ruminants receive all nutrients as well as minerals only from the forages consumed in the field because normally no minerals and feed supplements are given to the animals. Ideally, minerals intake must be sufficient to ensure the maintenance of adequate amounts for growing and reproduction of animals. According to McDowell ², the animals receiving forages only as a main source of their feeds are usually deficient in certain minerals due to the forages rarely contain all the minerals required by the grazing animals.

Underwood and Suttle ³ reported that the availability and concentration of minerals in crop and forage plants are influenced by environmental factors such as climate and seasonal conditions during growth, amount of rainfall, the type and soil fertility on which the forages grows, stage of maturity, genus and species or strain (variety) of the forages. High concentration of fiber, especially lignin, can also reduce the availability of minerals for the animals. In Indonesia, land allocated for food crop is not available for forage production, therefore only land not suitable for food crop production with low fertility is used for forage, and

consequently the production and quality of the forage are very low. In general, forage grown in marginal lands has lower nutrient contents than forage grown at high fertility lands. Study by Prabowo *et al.* ⁴ showed that Ca and P are the most deficient minerals of forages in some parts of Indonesia, such as in Sulawesi.

Limited information exists concerning mineral content of forages and mineral status of grazing goats in West Sumatra. Therefore, the present experiment was aimed to investigate the macro mineral composition of some common forages and mineral status of grazing goats in West Sumatra during dry and rainy seasons. This work should be valuable for the provision of a strategic use of mineral supplementation for small ruminants, especially goat in West Sumatra, Indonesia.

Materials and Methods

Investigation area: This study was conducted in five regions in West Sumatra province, namely Padang, Solok, Tanah Datar, Pariaman and Sawahlunto Sijunjung. The province is located in the tropical and monsoon region, lies between 0°54'N to 3°30'S, 98°36' to 101°53'E. There are two seasons during the year, the dry season from February to September and rainy season from November to March. The temperature is nearly constant, differing only a few degrees among the dry and rainy seasons with a temperature range from 23 to 31°C. The mean of monthly rainfall