

COMPARATIVE ASSESSMENT OF BAT GUANO AS AN EXCELLENT BIO-COMPOST IN REFERENCE TO NPK

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ABSTRACT

Bat guano is an old faecal matter was collected from the different habitats of the bat which live in old temples, caves and forest. In the present study 3 samples of bat guano and 11 animal wastes were assessed for its Nitrogen (N), Inorganic Phosphorus (ip), and Potassium (K) content. Our results indicates that bat guano contain to much NPK as compared to other animal waste and concluded that the bat guano as excellent biologically natural manure and safely used in agriculture as a biocompost .

ABSTRACT guano, nitrogen, inorganic phosphorus, potassium, Manure, Biocompost.

INTRODUCTION

The word guano originated from the Quichua language of the Inca civilization and means "the droppings of bat". The bats forage at night for insects over a particular area, and they return to the old temples during the day to sleep and care for their young. They attach themselves to ceiling, and their excrement accumulates on the floor below. In some situations the guano can reach a depth of feet in many years and appeared as guano-hip, and it has a valuable importance (Keleher, (1996).

Lonar crater is situated in village Lonar in the Buldhana District of Maharashtra, India. There are many old temples on the peripheral boundary of the crater which have now become roosting places for bats. Morache temple (Peafowl's temple) is now famous for existence of thousands of bats and peacocks. Waghache temple (Leopards temple) is also famous for bats and people have seen leopard found in it many times.

MATERIALS AND METHODS

The animal waste collected from 11 different animals and bat guano from different habits was of the bat like Lonar crater old temples, Ajantha, Werud caves and Melghat forest. For the chemical analysis of bat guano, 10 mg bat guano was dissolved in 100 ml deionized water every time. The undigested substances from the solution were discarded after filtration. Then filtrate was analyzed for its NPK content with the help of standard methods suggested (APHA, 1989; Munshi and Munshi, 1984).

RESULTS ANS DISCUSSION

The present study was aimed to assess the chemical characteristics especially reference to NPK from 14 different animal wastes which used as manure and compared with NPK content of bat guano from different habits was of the bat (Table No.1). Bat guano deposits have been found in several natural caves of the world. It is being commercially exploited as organic manure (Bhat and Shreenivasan 1990; Korine *et al.*, 1999; Sridhar *et al.*, 2006). In the present investigation the bat guano was collected from old temples of Lonar crater, Ajantha and Werud Caves and from forest. The roosting bats usually drop their droppings on the floor of temples and forest land respectively. The guano was collected carefully from the hips. Organic fertilizers are used to improve soil quality and tilth and to provide nutrients for plant growth. They provide nitrogen (N), phosphorus (P) and potassium (K), as well as other elements essential for plant development and overall good health. Nutrient values vary greatly among organic fertilizers. Differences reflect variations in the age of organic material, its decomposition rate, application method and timing, incorporation time, the percentage of organic matter, carbon to nitrogen ratio and soil type and compared the N, P, K content in different animal wastes. (Ross, 2003), which are used as a manures. Bat guano pellets and bat guano (humus) of cave bats was analyzed and recorded N, P and K as 7.7 to 8.5%, 2.0 to 3.0% and 0.4 to 1.2% respectively

in the bat guano. Goveas (Goveas and Sridhar, 2006), revealed NPK in bat guano as 2.6:4.2:0.6. These bats (*Pteropus giganteus*) are frugivorous and phosphorus is fairly high in their guano. Phosphorus in bat guano is higher than in cow and sheep manure. Mathur (1990), reported NPK in bat guano of frugivorous bats as 1.14:16.3:0.94. The NPK in guano of two bats, desert bat (8:4:1) and Dry Bar Cave bat (3:10:1) Yong, and Holt (1977). Similarly NPK content in bat guano of Jamaican bat is claimed by the Nitron Industries (Nitron Industries, 2000), as 3:8:1. All the above studies revealed that insectivorous bat guano contains more nitrogen than phosphorus and the frugivorous bat guano has more phosphorus than nitrogen. Bat guano deposits have been found in several natural caves of the world and commercially exploited as natural manure. Thus among the bat guano two broad categories have been identified based on NPK ratios: high phosphorus guano from frugivorous bats and high nitrogen guano from insectivorous bats.

In the present investigation (which is probably a first report), the bat guano analyzed from different habitats showed more phosphorus than nitrogen indicating that it is of frugivorous bats. But when it is compared with the earlier studies, it appears that the nitrogen and potassium contents in the bat guano comparatively more amount. This may be due to the different feeding habits adapted by the bats roosting in old temples. These bats feed on insects also. These results are very important as; (looking towards the NPK content in the bat guano) it can be used as manure. “Wealth from Waste” can be achieved by its use in agriculture. It will also help in improvement of soil’s nutritive value. However, it appears that bat guano’s composition varies according to the bat’s feeding habits and the type and form of caves/temples where they live, among other factors like age and the biological composition of bat guano.

Table-1 Comparison of N, P, K content in different animal wastes which used as manure.

Sr. No.	Manure Animal Waste	N %	P %	K %
1	Cow	2.0	0.7	2.0
2	Buffalo	2.8	1.9	2.1
3	Ox	1.9	2.2	0.9
4	Duck	2.6	1.4	0
5	Goat	4	0.6	2.8
6	Goose	3.3	0.4	0.6
7	Pig	2	1	1.2
8	Pigeon	6.5	2.5	2.5
9	Poultry	6	4	3
10	Sheep	3.6	0.6	1.7
11	Vermi-cast	1.86	3.61	1.60
12	Bat guano*	5.5 to 12.3	4 to 11	2.5
13	Bat guano**	3.82	9.80	2.86
14	Bat guano***	3.12	8.80	2.56

*Bat guano from caves; **Bat guano from Lonar Crater old temples; Bat guano from forest.

REFERENCES

- APHA (1989). Standard Methods for the examination of water and wastewater,
Bhat H. R. and M. A. Shreenivasan (1990). *Mammalia*. 54:69-106.
Goveas S. W.; K. R. Sridhar (2006). *Current Science*. 90 (2).
Keleher S. (1996). *Guano: Bats’ Gifts to Gardeners*. 14(1): pp. 15-17.
Mathur S. P., Patani N. K. and Levesque M. P. (1990). *Biological Wastes*. 34: 232-333.
Munshi J.D. and Munshi J.S. (1984). Fundamentals of fresh water Biol. 176-179.
Nitron Industries (2000). P.O. Box 1447, Fayetteville, www.batguano.org
Korine C., I. Izahi and Z. Arad (1999). *Biological Conservation*. 88:301-306.
Ross P. (2003). Top sources of organic manure and its effectiveness. 1-4.
Sridhar K. R.; K. M. Ashwini; S. Seena and K.S. Sreepada (2006). Manure Quality of guano of insectivorous cave bat. (6):103-110.
Yong R. A. and Holt R. F. (1977). *J. Soil Water Conservation*. 219-222.