

REVIEW PAPER

A Brief Review of the Nutritive Value and Chemical Components of Bat Guano and Its Potential Use as a Natural Fertiliser in Agriculture

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ABSTRACT

New and improved fertilisers are constantly being introduced to the market to help increase crop yields. However, the common usage of chemical fertilisers had brought upon negative impacts to the environment and the study for sustainable fertiliser is still ongoing. This review will highlight the usage of bat guano as a valuable fertiliser which has a potential to diminish the effects of chemical fertiliser usage, increase yield and is cost effective. Its role as a fertiliser can support the agricultural growth and in turn provides additional care for plants. The chemical compositions of guano which was found to be subpar with other fertilisers support its usage of guano as an alternative for crop yield enhancement. Plant growth performance that shows a significant positive impact of guano on crops, further demonstrates its usage as organic fertilisers. In-depth study of the chemical composition of guano should be pursued as the fertiliser has high beneficial value to the ecology and economy.

Keywords: Bat guano, chemical composition, fertiliser, manure, plant growth

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INTRODUCTION

Plant growth is highly dependent on the plants' physical, chemical, and biological properties. Enhancement of these properties can be carried out by adding plant regulators or fertilisers (Bender *et al.*, 1998). Generally, fertilisers can be classified as organic or chemical. Using fertilisers is important in agricultural production for increment of plant growth efficiency (Karagoz-Sezer & Hanaya, 2020). The significance of agriculture to fulfil the food supply of this ever-growing population has caused farmers to opt out from the environmentally friendly plantation techniques (Fernandez *et al.*, 2003). Fertiliser industry had brought over extensive usage of chemical fertilisers worldwide. This is because the chemical fertilisers option was inexpensive and apparently, gave a faster result in yielding production (Kincheloe, 1983).

According to Oo *et al.* (2019), chemical fertilisers (inorganic or synthetic) are defined as

artificial chemicals containing primary nutrients for plants such as nitrogen (N), phosphorus (P), and potassium (K) in laboratories. Organic fertilisers on the other hand are fertilisers derived from organic matter that was collected from nature (plant or animal waste) making up to green manure, livestock manure or compost (Demirtas *et al.*, 2005).

Application of organic fertilisers such as compost, green manure and bioinoculants are a vital procedure in organic farming management (Thampan, 1993). Organic fertilisers provide constant availability of nutrients and an equal uptake by plants; hence, rainwater does not leach the nutrients away (Linn & Myint, 2018; Oo *et al.*, 2019). In addition, organic fertilisers play a role in decreasing greenhouse effect and global warming as it is able to isolate more carbon in the soil (Assefa & Tadesse, 2019). Several animal-derived fertilisers such as chicken manure and cow dung are one of the best organic fertilisers as they provide an eminent source of N, P, K, and other organic matter to the soil (Oo