

KUNAPAJALA: AN ITK FOR SUSTAINABLE CROP PRODUCTION

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ABSTRACT

Due to the decline in agricultural productivity from the careless use of chemicals and unscientific intensive farming, a shift towards eco-friendly organic methods is necessary. Organic inputs like Kunapajala can enhance soil health and protect plants, boosting productivity. Kunapajala, an ancient organic manure from India, decomposes animal feces and recycles bio-waste into nutrients. It includes dairy excreta, products, natural resources, and non-edible by-products. This traditional formulation, adapted over time, contains essential vitamins, enzymes, growth hormones, and bio-pesticidal compounds. Kunapajala can be used alone or with other nutrients, promoting sustainable crop production.



KEYWORDS: Bio-enhancer, Organic farming, Plant nutrients, sustainable crop production

INTRODUCTION

The population on the earth is increasing day by day which urges more food. To fulfill the demand of food, chemical-based agriculture is dominant. Although chemical use has played a crucial role in fulfilling our stomachs and according to the FAO, if such chemicals (fertilizers, pesticides, etc.) hadn't been employed, almost 40% of the world's population would not exist today. But nowadays due to the use of chemicals in an unregulated manner, we are facing lots of second-generation problems such as degrading soil health and quality, contaminating waters, declining water table, nutritional imbalances, salinity, environmental pollution etc. and a reduction in net profit.

On the other hand, the net cultivated crop area is shrinking due to rising population pressure and that's why we need to increase crop productivity. Before the green revolution, agriculture in India was exclusively based on with organic inputs and techniques. In the past, organic farming produced enough food on its own to feed the whole population. Population increase proved organic farming unsustainable over time, and the green revolution replaced it with chemical-based agriculture. However, since 1990, agricultural productivity losses brought on by persistent chemical use have gained attention, and Indian

agriculture is once again exhibiting a paradigm shift towards organic farming to some degree (Biswas, 2020).

Organic farming is chemical-free farming that maintains a biological cycle, and biodiversity and it is well-known that it is an eco-friendly approach. It offers a variety of nutrients and speeds up the activity of microorganisms and other organic processes linked to crop production. The use of eco-friendly techniques and the use of organic manures, biopesticides, organic mulching, etc. are the mainstays of organic agriculture. Organic agriculture is the oddest farming system that is also related to a variety of conventional organic formulations in the form of indigenous technical knowledge (ITK), in addition to these organic goods and activities. These formulations vary with the location and availability of raw material but these are good sources of macro, and micronutrients, PGRs, and also a good source of microorganisms and *have bio-pesticidal activity* (Ram et al., 2018). Among these formulations, one traditional organic formulation is Kunapajala.

Kunapajala – Kunapajala is one of the oldest documented organic formulations that is produced from plant and animal products by the procedure of fermentation. Kunapajala is made up of two Sanskrit words, Kunapa which means ‘smelling like a dead body’ or ‘filthy’ and jala means ‘water’ or ‘fluid’. Kunapajala is mentioned in two probably contemporaneous texts: the Vrikshayurveda by Surapala, who lived in eastern India in 1000, AD. and Lokopakara, which was produced in 1025, AD in southern India's Karnataka state by poet Chavundaraya.

THE PREPARATION METHOD OF KUNAPAJALA

Kunapajala words are mentioned in two works of literature Vrikshayurveda i.e. written by Surapala and Lokopakara by Chavundaraya. However, the procedure of preparing *Kunapajala* is missing in Lokopakara. Vrikshayurveda (verses 101-106) mentioned the preparation procedure.

Surapala's Vrikshayurveda mentions varieties of *Kunapajala* and in verse 101 mentions that the marrow of the bones, excreta, flesh, brain, and blood of a pig is mixed with water and stored underground is called *Kunapa*. In the following verses, it is quoted that animal wastes are gathered and stored whenever they become available. Even though dead boar wastes were initially described. Surapala enlarged the scope of wastes to include other animals, particularly horned ones. After that, boiling the wastes and then they mixed with husk and stored. Subsequently, the formulation is cooked with the sesame oil cake, soaked black gram and honey, and finally, ghee pored. Verse 101 suggests burying animal waste to prevent unpleasant odors and to keep goods safe from wandering animals like dogs. Surapala has described

animal waste from cows, porpoises, cats, birds, deer, elephants, and other creatures in the lines that come after the ones that were previously cited.

Late Dr. Nene created a vegetarian version of the original method in 2012 known as herbal *Kunapajala*. Thus, utilizing cow pee and dung while keeping the other elements used by Surpala. In the herbal version of *Kunapajala*, the main ingredients are cow urine and dung, black gram seed, jaggery neem or mustard oil, rice huck, finely sliced weeds, and water in prescribed proportions.

Table 1: Ingredients and procedure to make herbal kunapajala

SN.	Materials	Quantity
1.	Cow Dung	15-20 kg
2.	Cow Urine	15-20 Litres
3.	Jaggery (Spoiled)	2 Kg
4.	Sprouted Black Gram	2 Kg
5.	Mustard or Neem Cake	2 Kg
6.	Local Farm weeds	20 Kg
7.	Water	10-12 Liters

BENEFITS OF KUNAPAJALA APPLICATION

Kunapajala is a traditional Vrikshayurvedic plant nutrient, fertilizer, and bio-enhancer that offers several remarkable advantages. Using this doesn't necessitate the use of any additional fertilizer. It can play a crucial role in enhancing crop quality and productivity by supplying varieties of nutrients for the plant's uptake from soil or foliar absorption. Valmiki Sreenivasa Ayangarya was the first one who experiment with herbal *Kunapajala* and documented the beneficial role of herbal *Kunapajala* on coconut and mango (Ayangarya, 2004).

Kunapajala is a rich source of plant growth-promoting bacteria (PGPB) and has the potential to help host plants in several ways, including encouraging plant growth, increasing nutrient availability, and controlling pests and diseases (Chakraborty et al., 2019). As a result, it has been extensively advised for use as a soil soaking or foliar spray for many crops, including black gram (*Vigna mungo*), mustard (*Brassica campestris*), and rice (*Oryza sativa*). According to Chakraborty et al. (2019), *Kunapajala* is a rich source of plant nutrients and majorly provides major plant nutrients which are N, P, and K.

Chakraborty *et al.*, (2019) also found that *Kunapajala* has pesticidal properties that overcome the attack of insects and diseases and help in quality crop production. Additionally, *Kunapajala* is a great technology for the waste management of plants and animal waste sustainably (Sorathiya *et al.*, 2014). Intensified crop production with livestock farming has been contributing to generating huge amounts of residue. India, as an example, produces about 683 million tones of crop residues per year from 10 major Indian crops (Bhattacharjya *et al.*, 2019), while rice and wheat alone contributed around 300 million tones of residue generation recorded in the year 2017–2018. It can be the best option to convert waste into wealth. (Venkatramanan *et al.*, 2021)

CONCLUSION

Kunapajala is an organic source of plant nutrients that plays a significant role in improving soil and plant health. It is made from agricultural waste and provides all essential nutrients by creating a supportive ecology for crop production. Some studies suggest that *kunapajala* helps to control pests and diseases. Therefore, through the application of Kunapajala, farmers can achieve the good quantity of crop yield with waste management and better soil health.

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