Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 06, Issue: 04 (JULY-AUG, 2026)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Microbial Potential of Jeevamruth in Sustainable and Natural Farming System

*Solanki Haresh B., Zankat Harshraj M., Chavda Nikita S.,
*Dr. Vivek Shrivastva and Dhruti P. Kotadiya
College of Fisheries Science, Rajpur (Nava), Himmatnagar, Kamdhenu University, Gujarat-383010, India
*Corresponding Author's email: vivek@kamdhenu.uni.edu.in

Jeevamruth is a fermented microbial formulation widely used in natural and Zero Budget Natural Farming systems to enhance soil biological activity and sustainable crop production. Prepared from cow dung, cow urine, jaggery, pulse flour, native soil, and water, it functions primarily as a microbial stimulant rather than a direct nutrient fertilizer. Scientific studies have reported the presence of beneficial microorganisms such as nitrogen-fixing bacteria, phosphate-solubilizing bacteria, and plant growth-promoting rhizobacteria in Jeevamruth. These microorganisms contribute to nutrient mineralization, improved soil fertility, and enhanced crop growth through biological processes.

Keywords: Jeevamruth, Soil microbial diversity, Natural farming, Nutrient cycling, nitrogen-fixing bacteria

Introduction

Agricultural intensification during the Green Revolution significantly increased food production but also led to serious ecological consequences, including soil degradation, loss of biodiversity, nutrient imbalance, groundwater contamination, and declining soil organic matter (Tilman *et al*., 2002; Lal *et al*., 2015). Continuous application of synthetic fertilizers has been associated with reduced soil microbial diversity and deterioration of soil physical properties, ultimately threatening long-term agricultural sustainability (Clara *et al*., 2017). In response to these challenges, sustainable and agroecological farming approaches have gained global attention. Among these, Zero Budget Natural Farming (ZBNF), developed and popularized in India, emphasizes the use of locally available biological inputs to restore soil health and reduce dependency on external chemical inputs (Khadse *et al*., 2017).

Scientific investigations have demonstrated that traditional organic formulations like Jeevamruth significantly increase soil microbial biomass, enzymatic activity, and nutrient availability. Sreenivasa *et al*. (2010) reported enhanced microbial populations and dehydrogenase activity in soils treated with Jeevamruth compared to untreated soils. Similarly, Devakumar *et al*. (2008) observed that Jeevamruth application increased beneficial microbial counts and improved soil biological properties. The mechanism underlying its effectiveness is attributed to the stimulation of heterotrophic microbial communities, which facilitate nitrogen fixation, phosphorus solubilization, and decomposition of organic matter, leading to improved nutrient availability for plants. Indigenous cow dung is a key component of Jeevamruth, contains diverse microbial communities, including nitrogen-fixing bacteria and phosphate-solubilizing microorganisms (Samanwita *et al*., 2023). The addition of jaggery and pulse flour serves as an energy source for microbial proliferation during fermentation. As a result, Jeevamruth acts as a catalytic agent that accelerates microbial activity in soil rather than functioning as a direct nutrient fertilizer.

Beyond soil fertility enhancement, Jeevamruth has also been associated with improved crop growth and yield in several field studies conducted under natural farming systems (Boraiah *et al*., 2017). However, while preliminary findings are promising, comprehensive long-term controlled trials remain limited, and further empirical validation across diverse agroecological regions is required (Khadse *et al*., 2017). Given increasing global concerns regarding sustainable agriculture and soil health restoration, Jeevamruth represents an important indigenous innovation that integrates traditional knowledge with ecological farming principles.

What is Jeevamruth?

Jeevamruth is one of the central formulations used in natural farming systems, particularly under ZBNF. It is a fermented liquid microbial culture prepared using cow dung, cow urine, jaggery (as a carbon source), pulse flour (as a nitrogen source), local soil, and water. Unlike chemical fertilizers that directly supply nutrients in soluble form, Jeevamruth functions primarily as a soil microbial inoculant and biological stimulant. It enhances the activity and multiplication of beneficial soil microorganisms, thereby promoting nutrient cycling and improving soil fertility through biological processes (Devakumar *et al*., 2014).

Composition of Jeevamruth

Jeevamruth is a fermented liquid bio-formulation widely used in Zero Budget Natural Farming (ZBNF). According to NITI Aayog (2018), Jeevamruth is one of the core inputs promoted under natural farming systems and is prepared using locally available biological materials to stimulate soil microbial activity.

Ingredients of Jeevamruth

The preparation of Jeevamruth requires simple and affordable ingredients:

1. Fresh cow dung (10 kg) – preferably from indigenous cows
2. Cow urine (10 liters)
3. Jaggery (2 kg) – energy source for microbes
4. Pulse flour (2 kg) – provides nitrogen
5. Handful of native soil – source of beneficial microbes
6. Water (200 liters)

Each ingredient plays an important role in promoting microbial growth and nutrient cycling.

Method of Preparation

1. Take a clean plastic drum (200-liter capacity).
2. Add 200 liters of water.
3. Mix fresh cow dung thoroughly in the water.
4. Add cow urine and stir well.
5. Add jaggery and pulse flour and mix properly.
6. Add a handful of soil from the farm.
7. Stir the mixture clockwise and anticlockwise for 10–15 minutes.
8. Cover with a cloth and allow fermentation for 7 days.
9. Stir the mixture twice daily during fermentation.

How Jeevamruth Works?

Jeevamruth functions primarily as a biological catalyst that stimulates the proliferation and metabolic activity of beneficial soil microorganisms, including bacteria, fungi, and actinomycetes. Rather than acting as a direct nutrient fertilizer, it enhances soil biological processes that regulate nutrient cycling and plant nutrient availability. The fermentation process involved in Jeevamruth preparation creates a nutrient-rich medium that accelerates microbial multiplication once applied to the soil (Devakumar et al., 2014). One of the primary mechanisms of Jeevamruth is the decomposition of organic matter. Soil microorganisms activated by Jeevamruth secrete extracellular enzymes that break down complex organic compounds into simpler substances, thereby releasing nutrients into the soil

system (Paul *et al*., 2015). This decomposition process increases soil organic carbon turnover and enhances nutrient mineralization. Jeevamruth supports biological nitrogen fixation, a process carried out by free-living and associative nitrogen-fixing bacteria. These microorganisms convert atmospheric nitrogen (N_2) into ammonia and other plant-usable forms, thereby contributing to soil nitrogen enrichment (Glick *et al*., 2012).

Another important mechanism is phosphorus solubilization. Many soil bacteria and fungi release organic acids and enzymes that solubilize insoluble phosphate compounds, making phosphorus available for plant uptake (Sharma *et al*., 2013). Enhanced microbial activity stimulated by Jeevamruth can improve phosphorus availability in soils where it is otherwise chemically fixed. Through these combined microbial processes-organic matter decomposition, nitrogen fixation, and phosphorus solubilization- Jeevamruth facilitates the conversion of nutrients into plant-available forms, thereby supporting sustainable crop growth. Its mode of action aligns with ecological soil fertility principles, where soil health is maintained through biological regulation rather than synthetic nutrient inputs (Reganold & Wachter, 2016).

Table 1: - Bacterial group reported in Jeevamruth

Author(s) & Year	Method Used	Bacterial Species / Groups Reported	Functional Role
Devakumar *et al*., 2014	Culture-based microbial analysis	*Azotobacter spp.*, *Azospirillum spp.*, *Bacillus spp.*, *Pseudomonas spp.*, Actinomycetes	Nitrogen fixation, phosphorus solubilization, organic matter decomposition
Sreenivasa *et al*., 2010	Microbial biomass & CFU enumeration	Total heterotrophic bacteria, Nitrogen-fixing bacteria, Phosphate-solubilizing bacteria	Nutrient mineralization and nutrient mobilization
Shubha *et al*., 2016	Soil biological property assessment	Heterotrophic bacteria, Actinomycetes	Soil biological activity enhancement
Boraiah *et al*., 2017	Rhizospheric microbial study	Plant Growth-Promoting Rhizobacteria (PGPR), *Pseudomonas spp.*, *Bacillus spp.*	Growth promotion, root colonization

Conclusion

Jeevamruth represents a biologically active fermented formulation that plays a significant role in natural farming systems by enhancing soil microbial diversity and activity. Scientific studies consistently report the presence of beneficial bacterial groups such as Azotobacter, Azospirillum, Bacillus, Pseudomonas, and actinomycetes in Jeevamruth and its core ingredients. These microorganisms contribute to essential soil processes including nitrogen fixation, phosphorus solubilization, organic matter decomposition, and nutrient mineralization. Overall, Jeevamruth holds promise as a cost-effective, eco-friendly input for sustainable agriculture, but rigorous scientific validation through advanced microbiological techniques and long-term field trials is essential to strengthen its scientific foundation.

References

1. Samanwita, B., Anil, K., & Surbhi, S. (2023). Importance of indigenous cow dung and its microbiota. *Int J Curr Microbiol App Sci*, *12*, 26-36.
2. Boraiah, B., Devakumar, N., Shubha, S., & Palanna, K. B. (2017). Growth and yield of capsicum under natural farming practices. *International Journal of Current Microbiology and Applied Sciences*, 6(11), 3530–3536.

3. Devakumar, N., Rao, G. G. E., Shubha, S., Imrankhan, N., & Gowda, S. B. (2008). Activities of organic farming research centre. *Navile, Shimoga, University of Agriculture Sciences Bangalore*, *12*.
4. Devakumar, N., Shubha, S., Gowder, S. B., & Rao, G. G. E. (2014). Microbial analytical studies of traditional organic preparations beejamrutha and jeevamrutha. *Building organic bridges*, *2*, 639-642.
5. Clara, L., Fatma, R., Viridiana, A., & Liesl, W. (2017). Soil organic carbon: the hidden potential. *Rome: Food and Agriculture Organization of the United Nations*..
6. Khadse, A., Rosset, P. M., Morales, H., & Ferguson, B. G. (2018). Taking agroecology to scale: The zero budget natural farming peasant movement in Karnataka, India. *The Journal of Peasant Studies*, *45*(1), 192-219.
7. Lal, R. (2015). Restoring soil quality to mitigate soil degradation. *Sustainability*, *7*(5), 5875-5895.
8. Prajapati, B., Patel, N., & Naik, B. (2018). Microbial diversity in indigenous cow dung. *Journal of Applied and Natural Science*, 10(2), 602–606.
9. Sreenivasa, M. N., Nagaraj, M., & Bhat, S. N. (2010). Beejamrutha and Jeevamrutha influence on microbial biomass and activity. *Journal of Biological Control*, 24(3), 231–234.
10. Tilman, D., Cassman, K. G., Matson, P. A., Naylor, R., & Polasky, S. (2002). Agricultural sustainability and intensive production practices. *Nature*, *418*(6898), 671-677.
11. Paul, E. A. (2015). Soil microbiology, ecology, and biochemistry: an exciting present and great future built on basic knowledge and unifying concepts. *Soil Microbiology, Ecology and Biochemistry, fourth ed. Academic Press San Diego*, 1-15.
12. Reganold, J. P., & Wachter, J. M. (2016). Organic agriculture in the twenty-first century. *Nature plants*, *2*(2), 1-8.
13. Sharma, S. B., Sayyed, R. Z., Trivedi, M. H., & Gobi, T. A. (2013). Phosphate solubilizing microbes: sustainable approach for managing phosphorus deficiency in agricultural soils. *SpringerPlus*, *2*(1), 587.
14. Glick, B. R. (2012). Plant growth-promoting bacteria: mechanisms and applications. *Scientifica*, *2012*(1), 963401.