# Reviving Tradition: Liquid Organic Manures for Eco-Friendly Disease Management in ZBNF

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**ABSTRACT**

The overuse of chemical pesticides has raised significant concerns about environmental health, soil degradation, and food safety. In response, Zero Budget Natural Farming (ZBNF), championed by Subhash Palekar, emphasizes the use of traditional liquid organic manures such as Jeevamrit, Beejamrit, Panchagavya, Sonthastra, Khatti Lassi, and Brahmastra. These formulations, derived from cow-based products and medicinal plant extracts, are rich in beneficial microbes and secondary metabolites with proven antimicrobial properties. This review outlines their preparation, microbial composition, and effectiveness in managing key plant pathogens such as Fusarium spp., Rhizoctonia solani, Colletotrichum spp., and root-knot nematodes. These bio-inputs enhance soil fertility, improve crop resilience, and provide a sustainable alternative to synthetic agrochemicals, aligning traditional practices with modern ecological farming needs.

## INTRODUCTION

As concerns over chemical pesticide overuse grow impacting not only soil health and beneficial microbes but also food safety and the environment many farmers are turning to traditional, eco-friendly alternatives. Liquid organic manures such as

Jeevamrit, Beejamrit, Panchagavya, Sonthastra, Khatti Lassi, and Brahmastra are emerging as powerful tools in plant disease management, particularly under the Zero Budget Natural Farming (ZBNF) model popularized by Subhash Palekar (Palekar, 2006). These formulations, made using natural ingredients like cow dung, cow urine, medicinal plants, and fermented dairy products, are rich in beneficial microorganisms and bioactive compounds. They have shown effectiveness in suppressing plant pathogens and promoting healthy crop growth. For example, Jeevamrit contains bacteria such as *Azospirillum*, *Pseudomonas*, and phosphate-solubilizing microbes, which enhance soil fertility and suppress pathogens like *Alternaria alternata* and *Fusarium graminearum* (Sreenivasa *et al*., 2009; Sharma *et al*., 2024). Similarly, Beejamrit aids in seed treatment and has been shown to reduce infections from *Cercospora* and *Colletotrichum* species (Mukherjee *et al*., 2009; Pawar *et al*., 2024). Panchagavya, another age-old preparation, has demonstrated strong antifungal potential against soil-borne pathogens such as *Fusarium oxysporum*, *Rhizoctonia solani*, and *Sclerotinia sclerotiorum* (Basak & Lee, 2005; Sumangala & Patil, 2009). In addition, Sonthastra and Khatti Lassi—made from ginger and sour buttermilk respectively—are valued for their natural antifungal and antibacterial properties, aiding in the control of leaf blights and rust diseases (Kumar *et al*., 2020; Tak *et al*., 2021). Perhaps the most potent among these is Brahmastra, aptly named after the mythological weapon, which combines medicinal plant extracts with cow urine. Its application has led to reduced incidence of foliar fungal diseases and even nematode infestations in crops like rice and tomato (Devapatni *et al*., 2023; Maru *et al*., 2021). Together, these bio-inputs represent a sustainable and regenerative approach to agriculture, offering a cost-effective, environmentally sound, and culturally rooted method of managing plant health.

**Jeevamrit**

Jeevamrut, formulated using cow-derived products, are rich in beneficial microorganisms such as *Azospirillum*, *Azotobacter*, phosphobacteria, *Pseudomonas*, lactic acid bacteria, and methylotrophs. Additionally, they harbor beneficial fungi and actinomycetes, which contribute to soil health and plant growth (Sreenivasa *et al*., 2009). Bacterial phyla such as *Bacillus*, *Pseudomonas*, *Rhizobium*, and *Paenibacillus* were predominantly present. In contrast, *Ascomycota* was the dominant fungal phylum found in the soil sample (Saharan *et al*., 2023)

**Take 10 kg of fresh cow dung and 10 litres of cow urine**
↓
**Add 1 kg of jaggery and 1 kg of gram flour**
↓
**Add 200 grams of soil from the root zone of a healthy plant**
↓
**Mix all ingredients in 200 litres of water in a barrel**
↓
**Stir thoroughly, twice daily (morning and evening), for 5 to 7 days**
↓
**Jeevamrit is ready for us**

**Beejamrit**

It is a traditional organic preparation where *Beej* means seed and *Amrit* signifies a nourishing or life-giving liquid. It is a natural input primarily composed of cow dung and cow urine. To enhance its effectiveness, it is typically enriched overnight with soil from undisturbed forest areas, and occasionally, limestone is also added (Sreenivasa *et al*., 2009). Beejamrit harbors plant-friendly microbes, including nitrogen-fixing and phosphate-solubilizing bacteria, whose

populations tend to rise steadily and reach optimal levels by the fourth day of fermentation. Similarly, growth-promoting substances like indole acetic acid accumulate maximally after four days of decomposition (Mukherjee *et al*., 2009).

**Take 5 kg of freshly collected cow dung**
↓
**Pour in 5 litres of cow urine**
↓
**Prepare a lime solution by dissolving 50 grams of lime (chuna) in water, then add it to the mix**
↓
**Optionally, include a small amount of soil taken from the root zone of a healthy plant or fertile field**
↓
**Stir the mixture thoroughly until it becomes a uniform blend**
↓
**Beejamrit is now ready to be used for seed treatment**

**Panchagavya**

In Sanskrit texts, *Panchagavya* refers to a mixture composed of five cow-derived products. Each individual component is known as *Gavya*, and collectively, they are referred to as *Panchagavya*. It is applied in various ways, including as a foliar spray, through soil incorporation with irrigation, and for treating seeds before planting. The use of Panchagavya promotes the development of lateral shoots in plants, which contributes to enhanced fruit production. This natural formulation is also significantly boosting root growth in plants (Kumar *et al*., 2020).

**Thoroughly mix fresh cow dung with cow ghee**
↓
**Let the mixture ferment for 2 days**
↓
**Add cow urine along with 5 liters of water**
↓
**Stir the mixture well twice daily (morning and evening) for one week**
↓
**Incorporate 500 grams of gram flour**
↓
**Add cow milk and curd to the mixture**
↓
**Continue stirring twice daily for an additional two weeks**
↓
**The Panchagavya preparation is now complete and ready for use**

**Sonthastra**

**Sonthastra** is a natural remedy used in **Zero Budget Natural Farming (ZBNF)** to help manage fungal issues in crops. It is made using simple, naturally available ingredients like **dry ginger** (*Zingiber officinale*) and **indigenous cow's milk**, both known for their antimicrobial qualities. To prepare it, dry ginger is ground into a powder, boiled in water to extract its beneficial compounds, and then mixed with previously boiled and cooled cow's milk. (Kumar *et al*., 2020). This blend is further diluted in water and sprayed on plants as a foliar application. Sonthastra offers an eco-friendly and chemical-free alternative for farmers aiming to control fungal diseases sustainably (IJSR 2014).

**Grind 200 grams of dry ginger into a fine powder**
↓
**Mix the ginger powder with 2 liters of water and bring it to a boil**
↓
**Boil until only 1 liter of ginger decoction remains, then let it cool**
↓
**In a separate pot, boil 5 liters of desi (indigenous) cow's milk once**
↓
**Cool the milk and remove the cream for household use**
↓
**Strain both the ginger extract and the milk using a clean cloth**
↓
**Combine the filtered ginger water and**

**boiled milk into 200 liters of clean water**
↓
**Stir thoroughly and spray over one acre of crop area.**

**Khatti lassi (sour buttermilk)**

**Khatti lassi** (sour buttermilk) is an effective bio-input in **Zero Budget Natural Farming (ZBNF),** widely used for managing crop diseases. Rich in **lactic acid bacteria (LAB),** it naturally suppresses harmful pathogens by producing organic acids and antimicrobial compounds. When applied to soil or foliage, it improves microbial balance, reduces fungal infections, and supports plant immunity—making it a sustainable and eco-friendly alternative to chemical treatments (Gajbhiye *et al*., 2018).

**Take 5 liters of 3–5-day-old sour buttermilk (*khatti lassi*)**
↓
**Place a small piece of copper into the lassi and let it soak for 3–5 days**
↓
**After soaking, remove the copper and mix the lassi into 100 liters of clean water**
↓
**Dissolve 50 grams of turmeric powder into the mixture**
↓
**Stir thoroughly to ensure even distribution**
↓
**Spray the solution on crops to help manage plant health naturally**

**Brahamastra**

The name of this pesticide is derived from Sanskrit, combining 'Brahma', which signifies divine or supreme, with 'astra', meaning weapon. According to Indian mythology, the Brahmastra was a powerful weapon used to combat evil forces (Devapatni *et al*., 2023). Due to the presence of phytochemicals like azadirachtin from neem and other secondary metabolites, Brahmastra exhibits antibacterial and antifungal effects. It repels a variety of insect pests, reducing the chances of vector-borne diseases. Its regular application has been associated with a reduction in the **incidence of foliar diseases, fungal infections,** and **insect-transmitted pathogens,** especially in vegetable and cereal crops. (Palekar,2006).

**Take 10 liters of cow urine**
↓
**Add 3 kg of neem (*Azadirachta indica*) leaf paste**
↓
**Add 2 kg of karanj (*Millettia pinnata*) leaf paste**
↓
**Add 2 kg of dhatura (*Datura* sp.) leaf paste**
↓
**Add 2 kg of custard apple (*Annona reticulata*) leaf paste**
↓
**Mix all ingredients thoroughly**
↓
**Boil the mixture on a medium flame 4–5 times**
↓
**Allow it to cool and rest for 24 hours**
↓
**Stir the solution clockwise for 2–3 minutes in the morning and evening**
↓
**Ferment the mixture for 48 hours**
↓
**Filter the solution**
↓
**Now the Brahmastra is ready to use**

| *Name of liquid organic manure* | *Controlled plant pathogen* | *Reference* |
|---|---|---|
| *Jeevamrut* | Alternaria alternata, Puccinia graminis f. sp. Tritici, Colletotrichum lindemuthianum, Bipolaris sorokiniana, colletotrichum truncatum, Ginger rhizome rot, Fusarium graminearum | Pandia *et al.* (2019), Sharma *et al.* (2024), Sharma *et al* (2021), Dibya *et al.* (2020), Chatak, S. (2020), Ajaykumara *et al.* (2023), Kaur and Rana, (2022). |
| *Beejamrut* | Cercospora leaf spot in okra, | Pawar *et al* (2024), |

| | | |
|---|---|---|
| | colletotrichum truncatum, Fusarium graminearum, Paddy blast, Sclerotinia sclerotiorum | Chatak, S. (2020), Kaur, G. and Rana, S. K. (2022), Rana *et al.* (2016) |
| *Panchagavya* | The antifungal potential of Panchagavya was evaluated against many soil-borne pathogens, including Fusarium solani f. sp. pisi, Fusarium oxysporum f. sp. pisi, Rhizoctonia solani, Sclerotium rolfsii, and Sclerotinia sclerotiorum, Curvularia lunata | Basak and Lee (2005), Sumangala and Patil (2009). |
| *Sonthastra* | Controlling fungal disease | Kumar *et al* (2020). |
| *Sour Butter Milk* | Alternaria leaf blight, yellow rust of wheat, Yellow Sigatoka disease of banana | Hongal *et al* (2023), Tak *et al* (2021), Nagesh *et al* (2023) |
| *Brahamastra* | Brown spot of rice, Root knot nematode in tomato, | Srinivasarao *et al* (2015), Maru *et al* (2021) |

## CONCLUSION

The increasing awareness of the adverse effects of chemical pesticides has inspired a shift toward more sustainable, eco-friendly agricultural practices. Liquid organic manures such as Jeevamrit, Beejamrit, Panchagavya, Sonthastra, Khatti Lassi, and Brahmastra have emerged as practical, cost-effective, and environmentally safe alternatives under the Zero Budget Natural Farming (ZBNF) paradigm. Each formulation harnesses the power of natural ingredients and beneficial microorganisms to promote plant health and combat a wide spectrum of plant pathogens—including *Fusarium*, *Colletotrichum*, *Alternaria*, and even nematodes—without disturbing ecological balance (Palekar, 2006; Basak and Lee, 2005; Sharma *et al*., 2024; Devapatni *et al*., 2023). These bio-inputs not only suppress disease-causing agents but also enhance soil fertility, stimulate plant growth, and improve overall crop resilience. Their preparation relies on locally available, farm-based materials, making them accessible to smallholder farmers and reducing dependency on costly chemical inputs. Furthermore, the integration of these manures into mainstream agricultural systems could play a key role in climate-resilient and regenerative farming practices (Gajbhiye *et al*., 2018; Kumar *et al*., 2020; Pawar *et al*., 2024). In essence, these traditional yet scientifically backed formulations represent a fusion of indigenous knowledge and modern sustainable farming goals—offering a pathway toward healthier soils, safer food, and resilient agro-ecosystems.

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