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Integrated Approach towards Organic Farming and LEISA Techniques

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INTRODUCTION

What is Natural farming?

Natural farming emphasizes on efficient use of on-farm biological resources and enrichment of soil with the use of Vermiwash, Jivamruta, Bijamruta, Panchayagavya, & Plant growth botanicals to ensure high soil biological activity & increase the production without affecting the ecosystem.

What is LEISA?

Low External Input Sustainable Agriculture (LEISA). The term low external input sustainable agriculture has been defined as a production activity that uses synthetic fertilizers or pesticides below rates commonly recommended by the agriculture extension service. It does not mean elimination of these greater materials & yields are maintained through greater emphasis on cultural practices like INM, IPM, IDM and IWM.

Objectives of LEISA

- Recycling of farm wastes; crop residues, cattle waste, poultry waste, fish waste etc.
- Reduce external input to increase the production & productivity per unit area.
- Maximum utilization of available resources & stabilizing the yield sustainability.
- The LEISA concept seeks to optimize the use of locally available resources by maximizing the complementary & synergistic effects of different components of the farming systems.

- Poultry litter can replace nitrogen fertilizers in the production of vegetables.
- Preparation of various organic liquid by utilizing the on-farm resources to increase crop production by reducing the external inputs.
- Integrated pest management, disease management, nutrient management & weed management

Criteria's under LEISA

1. **Ecological criteria:** Balanced use of nutrients and organic matter, efficient use of water resources and diversity of genetic resources, minimum negative environmentaleffects.
2. **Economic Criteria:** Sustained farmer livelihood systems, competiveness, efficient use of production factors, and low relative value of external inputs.
3. **Social Criteria** Wide spread & equitable adoption potential, especially among farmers, reduced dependency on external institutions, enhanced food security at the family & national level, respecting & building on indigenous knowledge & value systems, contribution to employment generation.

Preparation of Organic Liquids & Plant Botanicals by Utilizing Available Farm Resources under LEISA Techniques

1. Panchgavya

Panchgavya, an organic product has the potential to play the role of promoting growth and providing immunity in plant system. Panchgavya consists of five products viz. cow dung, cow urine, milk, curd & ghee. With addition we can mix ripe banana, Tender coconut and jaggery.

Ratio of Materials used: (5:4:3:2:1) cow dung 5 kg: cow urine 4 lit: milk 3 lit: curd 2 lit: ghee 1 lit + 10 ripe banana + 2 lit coconut water + 2 kg jaggery.

Preparation: All the above items are taken in a mud pot or plastic container. The container should be kept open under shade & all the material is mixed properly & it is stirred twice a day both in morning and evening. Allow the product for fermentation upto 30 days. The Panchgavya stock solution will be ready after 30 days. Cover the container with a wire mesh or net to prevent houseflies from laying eggs and the formation of maggots in the solution.

Recommended dosage:

a. Spray system: 3-6% solution (3-6 lit of Panchgavya is mixed in 100 litres of water is ideal for all crops. This concentration was found to be most effective.

b. Irrigation system: The solution of Panchgavya can be mixed with irrigation water at 50 litres per hectare either through drip irrigation or flow irrigation.

c. Seed/seedling treatment: 3-6 % solution of Panchagavya can be used to treat the seeds or dip the seedlings before planting. Soaking for 30 minutes is sufficient. Rhizomes of Turmeric, Ginger and sets of Sugarcane can be soaked for 1hr before planting.

Table.1 Physico chemical properties of Panchagavya

Sr. No.	Chemical Composition	Concentration	Other Components Present
1	pH	5.45	Fatty Acids: Oleic acids, Palmitic acid
2	EC dSm2	10.22	Myristic acid, Deconore acid, Deconomic acid
3	Total NPK (ppm)	229, 209, 232	Alkanes: Decane, Octane, Heptane,
4	IAA (ppm) & GA (ppm)	8.5 & 3.5	Alcohols: Heptanol, Tetracosanol, Propanol and Methanol.

2. Bijamruta

Bijamruta, an organic product has the potential to play the role of promoting growth and providing immunity in plant system through seed treatment. Bijamruta is used as seed/ planting material treatment. Bijamruta consists of four products viz. cow dung, cow urine, milk, lime. With addition we can mix jaggery solution as stabilizer.

Ratio of Materials used: (5:5:5:0.2) cow dung 5 kg: cow urine 5 lit: milk 5 lit: Lime 0.2 kg + 0.5 kg jaggery.

Preparation: All the above items are taken in a mud pot or plastic container. The container should be kept open under shade & all the material is mixed properly. Allow the mixture for fermentation upto 1 day. The Bijamruta solution will be ready in 1 day for treating seeds.

Recommended dosage of Seed treatment: 5-6 % solution of Bijamruta can be used to treat the seeds or dip the seedlings before planting. Soaking for 30 minutes is sufficient. Rhizomes of Turmeric, Ginger and sets of Sugarcane can be soaked for 1hr before planting.

3. Jivamruta

Jivamruta an organic product has the potential to play the role of promoting growth and providing immunity in plant system. Jivamruta consists of four products viz. cow dung, cow urine, Jaggery, Pulse flour.

Ratio of Materials used: (10:10:2:2) cow dung 10 kg: cow urine 10 lit: Jaggery 2 kg: Pulse Flour 2 kg.

Preparation: All the above items are taken in a mud pot or plastic container. The container should be kept open under shade & all the material is mixed properly. Allow the mixture for fermentation upto 10-15 day. The Jivamruta solution will be ready in 15 day for application.

Recommended dosage:

a. Spray system: 6-10% solution (6-10 lit of Jivamruta is mixed in 100 litres of water is ideal for all crops. Higher concentration was found to be most effective in field & horticulture crops.

b. Soil application with Irrigation system: The solution of Jivamruta can be mixed with irrigation water at 400-500 litres per hectare either through drip irrigation or flow irrigation.

c. Seed treatment: 10 % solution of Jivamruta can be used to treat the seeds or dip the seedlings before planting. Soaking for 15-20 minutes is sufficient for effective germination.

d. Advantages: Jivamruta has been found to be rich in various beneficial microorganisms, as per the studies conducted by Bio Centre Bangalore the Jivamruta contains following microorganisms: Azospirillum 2 x 106, PSM 2 x 106, Pseudomonas 2 x 102, Trichoderma 2 x 106, Yeasts and moulds 2 x 107.

4. Plant Growth Botanicals Liquid Extract

Liquid Extract is an organic product which is extracted from various cultivated & wild species of plant. These extract play important the role in increasing growth hormones, pigments, enzymes, protein, vitamins and providing immunity against biotic & abiotic stress in plant system.

Plant Species used for preparation of liquid extracts: It consists of various species of cultivated & wild plants viz. Neem (*Azadirachta indica*), Banyan (*Ficus benghalensis*), Mango (*Mangifera indica*), Peepal (*Ficus religiosa*), Morinda (*Morinda citrifolia*), Pongamia (Pongamia pinnata), Datura (*Datura* stramonium), Castor (*Ricinus communis*), Lantana (Lantana camera) and Jatropha (Jatropha curcas).

Ratio of Materials used: 10 kg of leaves are taken from each of the plant species + 5kg cow dung + 5 lit cow urine.

Preparation: All the leaves from individual plant are taken and chopped into small pieces & taken in a big plastic container containing 100 lit of water. The container should be kept open under shade & all the material is mixed

properly & it is stirred twice a day both in morning and evening to avoid sedimentation. Allow the product for fermentation upto 25-30 days. The liquid extract solution will be ready after 30 for application.

Recommended dosage:

a. Spray system: 3-6% solution (3-6 lit of liquid extract is mixed in 100 litres of water which is ideal for all the crops. Higher concentrate will be most effective in horticulture crops.

b. Advantages: Liquid extract has been found to be rich in growth hormones, pigments, enzymes, anti bacterial, & anti fungal properties which Increases growth, yield and quality of the crops, controls pests like aphids, thrips, mites and other sucking pests & also controls diseases like leaf spot, leaf blight, powdery mildew etc.

Beneficial Effects of Organic Liquids & Plant Botanicals on Commercial Crops

- Induces dense flowering and increases more female flowers in mango.
- Enhances keeping quality by 12 days in room temperature in fruit crops.
- Flavour and aroma are maintained in mango.
- Fruits are plumy with strong aroma in citrus crops.
- Higher TSS is obtained in guava.
- The bunch size becomes uniform in banana crop.
- Enhances the yield by 22% in turmeric & zinger.
- Extra long fingers in turmeric & zinger and enriches the curcumin content inturmeric.
- Yield enhancement by 18% and in few cases like Cucurbits & Cole crops.
- The yield is doubled in Wholesome vegetables with shiny and fresh appearance ofskin

Beneficial Effects of Panchagavya on Animal Health

Panchagavya is a living elixir of many micro organisms, bacteria, fungi, proteins, carbohydrates, fats, amino acids, vitamins, enzymes, known and unknown growth promoting factors micronutrients trace elements antioxidant and immunity enhancing factors. When it is taken orally by animals and human beings, the living micro organisms in the Panchagavya stimulate the immune system and produce lot of antibodies against the ingested microorganisms. It acts like vaccine. This response of the body increases the immunity of animals and humans and thus helps to prevent illness and cures disease.

In Cows: Panchagavya with animal feed and water at the rate of 100 ml per cow per day, cows become healthier with increased milk yield, fat content and SNF. The rate of conception increased. The retained placenta, mastitis and foot and mouth disease can be controlled.

In Poultry: Panchagavya mixed with the feed or drinking water at the rate of 1 ml per bird per day, the birds became disease-free and healthy. They lay eggs for longer periods and in broiler chickens the weight gain was impressive and the feed-to-weight conversion ratio improved.

In Humans: Studies says that it is showing significant results over various diseases in humans; Psoriasis, Neurological disorders, Parkinsonism, Diabetes mellitus & Pulmonary Tuberculosis.

INFERENCE

On the basis of the information described in the present article, some points are represented as conclusion as the response of crop towards organic liquids & plant botanicals as foliar spray @ 10-15 days interval will be beneficial to increase yield attributes & quality of crops by minimizing the biotic & abiotic stress. However, more information about these procedures is needed and this topic needs more study and research.