



P-ISSN: 2349-8528

E-ISSN: 2321-4902

www.chemijournal.com

IJCS 2021; 9(1): 109-111

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Received: 08-10-2020

Accepted: 27-11-2020

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Non-conventional fertilizer sources for boosting flower production

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DOI: <https://doi.org/10.22271/chemi.2021.v9.i1b.11213>

Abstract

Organic farming indicates a food production system where traditional wisdom and ancient knowledge of Indian agriculture such as crop rotations, mixed cropping, mixed farming, organic manuring, residue recycling, and agroforestry systems combine with modern practices of crop cultivation and livestock management to enhance profitability without dependence on off-farm resources. The potential non-conventional fertilizers sources of plant nutrients are green manure crops, crop rotation, crop residues, organic manures, FYM, sludges, oilcake, blood meal, compost, phospho-compost, vermicompost, biogas slurry, agricultural wastes, press mud, Biodynamic preparations, bio-fertilizers, bio-enhancers, etc. (Sharma, 2004). In floriculture, organics are used as substrate media, as a component in plug plant production, in preparation of nursery for flower seeds, as a component for pot mixture for foliage plants, as essential media for greenhouse crops to improve the soil physical properties, as a soil drench of bulb soaking or foliar spray, in the propagation of ornamental crops, in the hardening of cultured tissue plants and as plant protection.

Keywords: Organic farming, non-conventional fertilizers, floriculture

Introduction

Organic farming means 'A food production system where traditional wisdom and ancient knowledge of Indian Farming such as crop rotations, mixed cropping, mixed farming, organic manuring, residue recycling, agroforestry systems are amalgamated with modern practices of crop cultivation and livestock management to enhance profitability without dependence on off-farm resources.' India blessed with various types of the naturally available organic form of nutrients, but the quality of these inputs needs to improve through Integrated Nutrient Management (INM), Integrated Pest Management (IPM), and Integrated Weed Management (IWM). Non-conventional fertilizers are those fertilizers manufactured using organic substances that are bio-degradable, i.e., non-conventional fertilizers are naturally occurring fertilizers and nutrient enhancers of the soil (Bokhtiar *et al.*, 2005) ^[3]. Therefore, every substance that occurs naturally and is easily bio-degradable is organic, and if this organic material enhances the richness of the soil, it is termed as organic fertilizer. These organic substances are further decomposed and broken into smaller and soluble particles by numerous microorganisms. After being turned into soluble and simpler compounds, these fertilizers are taken in by the roots. Manure, slurry, worm castings, peat, seaweed, sewage, and guano are the naturally occurring. Green manure, compost, blood meal, bone meal and seaweed extracts, etc., are manufactured organic fertilizers. Crops are also grown to add nutrients to the soil. Today each farmer is looking forward to being a proper solution to the agricultural problems without compromising the yields. It is a universally acknowledged fact that organic fertilization methods are eco-friendly and fetch slower but steady results. In floriculture, organics are used as substrate media, as a component in plug plant production, in preparation of nursery for flower seeds, as a component for pot mixture for foliage plants, as essential media for greenhouse crops to improve the soil physical properties, as a soil drench of bulb soaking or foliar spray, in the propagation of ornamental crops, in the hardening of cultured tissue plants and as plant protection.

Important non-conventional sources for ornamental plants

Coco peat: Coco peat is a multi-purpose growing medium made out of coconut husk. Coco peat is an excellent alternative to traditional peat moss and Rock wool.

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It has air-filled porosity and high-water holding capacity and is an ideal growing medium for ornamental plants.

Vermiculite: This is a micaceous mineral produced by heating to 745 °C. These are expanded plate-like particles having very high-water holding capacity, aeration and drainage.

Perlite: This is a siliceous mineral of volcanic origin. Perlite is rigid, sterile and nearly infertile with minimum CEC and neutral pH. Perlite may be included in the mix to increase aeration and to lower bulk density. It is generally recommended for use in propagation media.

Sphagnum Moss: This is the dehydrated remains of acid bog plants from the genus Sphagnum. It is low in soluble salts, long-lasting in the mixture, uniform in the composition and improves drainage and aeration.

Vermicompost: It is prepared from the organic wastes upon the action of earthworms. It contains 2.5-3.0% Nitrogen, 1.0-1.5% Phosphorus and 1.5-2.0% Potash.

Vermiwash: It is washings from the earthworms collected during the preparation of vermin-compost, used as a spray in raising of nursery, lawn and orchids. Vermiwash is rich in growth-promoting substances.

FYM/ Compost: It is prepared from the decomposition of organic wastes through anaerobic organisms. It contains a fair amount of macro and micro-nutrients and the most commonly used organic supplement given to flower crop cultivation. FYM contains 0.5-1.5% N, 0.4-0.8% P₂O₅ and 0.5-0.9% K₂O whereas Garden compost contains 0.5% N, 0.3% P₂O₅ and 0.8% K₂O.

Panchagavya: Panchagavya is an organic product that can promote growth and provide immunity in the plant system. Panchagavya consists of nine products viz. cow dung, cow urine, milk, curd, jaggery, ghee, banana, Tender coconut and water. When suitably mixed and used, these have miraculous effects.

Jeevamrutha: A mixture of fresh desi cow dung and aged desi cow urine, jaggery, pulse flour, water and soil on farmland. Jeevamrutha is a fermented microbial culture that adds nutrients to the soil and acts as a catalytic agent to promote microorganisms and earthworms' activity in the soil. Jeevamrutha also helps to prevent fungal and bacterial plant diseases.

Green manures: Green manures include beans, peas, alfalfa, red clover, or cowpeas. They store nitrogen in nodules on the roots plant, fix nitrogen gas from the air, and combines it with hydrogen. This process creates ammonia, which is converted by bacteria into nitrates, a usable form of nitrogen; once the plants are tilled into the soil, they release the nitrogen into the earth. Green manures improve the soil and provide supplemental nitrogen removed by other plants' growth; they also help prevent soil erosion as they are used as cover crops.

Bone meal: Bone meal is finely ground bone, a by-product from animal slaughterhouses. It is an excellent source of calcium and contains up to 15% phosphate bone meal promotes healthy root systems and flowering. It is often used when growing flowers.

Blood meal: Blood meal is dried, powdered blood collected from cattle slaughterhouses. It's such a rich source of nitrogen that gardeners have to be careful not to over-apply and burn the roots of their plants. Apply blood meal just before planting to stimulate green leafy growth.

Bio-fertilizers: They are living organisms or preparations containing bio inoculants of efficient strains of microorganisms that help in the uptake of nutrients by converting unavailable forms of nutrients to available forms for plants use

Poultry manure: Poultry manure is the feces of chickens used as an organic fertilizer, especially for soil low in nitrogen of all animal manures; it has the highest amount of nitrogen, phosphorus, and potassium. One chicken produces approximately 8-11 pounds of manure monthly

Table 1: Effect of non-conventional fertilizer sources in flower crops

Sl. No	Crop	Fertilizer source	Effects	Reference
1	Rose	Poultry manure (4 kg/m ²) + NPK 25, 20, 15 g/m ² + VAM	Increased plant growth and yield of flower	Singh <i>et al.</i> , 2006 ^[7]
2	Chrysanthemum cv. Little darling	VAM (20 g/plant) + vermicompost (300 g/m ²)	Vegetative and floral attributes of chrysanthemum cv. Little Darling increased significantly	Bohra and Ajit kumar 2014 ^[2]
3	Chrysanthemum cv. Dolly white	Vermicompost (2 t/ha) and goat manure (25 t/ha)	Recommended for commercial cultivation of chrysanthemum	Premkumar <i>et al.</i> , 2016 ^[5]
4	Gladiolus	VAM, vermicompost and vermiwash	Increased vegetative, floral and corm yield of gladiolus	Kumar <i>et al.</i> , 2012 ^[4]
5	Gerbera	Amended media + 20% vermiwash	Application increased overall performance of plant	Verma <i>et al.</i> , 2013 ^[9]
6	Anthurium	Sand and coir pit compost	Combination of this media increased vegetative growth	Basheer and Thekkayam 2012 ^[1]
7	Marigold	Sand + soil + vermicompost (1:1:2) + 5% biodynamic amendment	Growth and flowering increased in marigold	Singh <i>et al.</i> , 2015 ^[8]

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