ORGANIC MARGOSA: A NITROGENOUS FERTILIZER ENHANCER (NFE)

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Abstract- Margosa is an organic preparation of Neem (Azadirachta indica) and Karanj (Pongamia pinnata), impregnated with trichoderma & mycorrhizal spores alongwith biomimetic silver nanoparticles as bio stimulators. On application, Margosa limits the leaching loss of chemical fertilizers, thus enhance their bioavailability coupled with higher Nitrogen content in the soil (NFE). Apart from this, it also shows pesticidal, anti-nematodal, pH mordant and soil binding activities in the agriculture fields. The surface functionalized Urea/DAP/CAN particles (with Margosa) enhance flowability, minimize the moisture pickup, stabilize the surface, enhance appearance and modify nutrient release characteristics. Application of Organic Margosa ranges from agro covering use: diverse food crops, cash crops, vegetables, horticultural crops, plantation, lawns to forestry produce etc.

Keywords- Margosa, Chemical Fertilizers, NFE, Pongamia pinnata and Azadirachta indica.

I. INTRODUCTION

Extensive chemical fertilizers input in farming guarantees high yields [1] but also causes various environmental problems [1], [2]. Being single chemical entity, chemical pesticides have resulted in increased resistance in pests [3]. Besides this, volatilization of chemical fertilizers like Urea can increases with increase in soil temperatures (above 65 °F), humidity (above 60%) and pH (>7.0) [4]. Thus environmental conditions have major impact on productivity of crops associated with application of chemical fertilizers. Bio-dynamic farming will overcome these problems upto a certain extent. Biodynamic farming includes creation of diversified, balanced farm ecosystem that will help to restore and harmonize the vital life forces of the farm and to enhance the nutrition, quality and flavor of the food being raised [5]. Bio-dynamic farming helps to sustain soil productivity coupled with plant health, animal health [6] and food quality [7]. Application of green manures in the soil is not only beneficial to disease management but also improving plant growth and productivity [8]. A/c to Lemus (2011), Nitrogen loss could be reduced when coats are applied to fertilizers, (when optimum field conditions are not available) [4]. Gnanavelrajah (2011) studied the effect of blending Urea with organic materials possessing antimicrobial property on nitrification and ammonia volatilization in a tropical soil [9]. Keeping view of the above mentioned considerations, we device a biomimetic input called Organic Margosa to cater the some foremost obstructions faced by agriculture practitioners/farmers in today's scenario.

Azadirachta indica, (Neem) and Pongamia pinnata (Karanj) are the major green inputs of Organic Margosa [10]. The Neem tree is indigenous to India [11]. Neem comprises of 40 different active compounds called Liminoids or Tetranor-triperpernoids, known for preventing the insects from feeding, breeding or metamorphosing by hormonal disruptions as a result also prevents from development of resistance in future generations [12]. Triterpenes present in Neem extracts has bacteriostatic properties that result in retardation of Nitrosomonas activity responsible for Nitrification thus ensuring slow & targeted supply of Nitrogen to the plants [13]. The Karanj cake contains Nitrogen, Phosphorous (as P_2O_5), and Potassium (as K_2O) in 5.1, 1.1 and 1.3 percent respectively and has been reported as useful Organic manure for crops like Sugarcane, Paddy, Coffee and Oranges [14]. However, Karanj oil is widely used as natural insecticide and is effective against a wide range of pests [15]. In addition, added nanoparticles together with mycorrhizal and trichoderma spores aids further nutrient uptake efficiency (accelerates chelation process and active state mobilization frequency; increase the apparent solubility of poorly soluble active ingredients; and protects active ingredients against premature degradation etc.).
Currently India ranks 33rd in terms of total land under organic cultivation and 88th in terms of the ratio of agricultural land under organic crops to total farming area [16]. Organic farms although yield on an average 10-15% less than conventional farms, the lower yields are balanced by lower input costs and higher margins [17].

II. MATERIALS & METHODOLOGY

Quality control parameters were standardized in order to test the efficacy of Margosa [10], [18]. Margosa can be applied as basal application, top dressing, plough sole placement, localized placement, and

pellet application etc. Application rates were standardized as per the outcomes of extensive field trials [18].

Table 1: Major crops currently cultivated under Organic farming methods in India [6].

Cereals	Wheat, Paddy, Jowar, Bajra, Maize.
Pulses	Pigeonpea, Chickpea, Green gram, Black gram, Chana.
Oilseeds	Groundnut, Castor, Mustard, Sesame.
Commodities	Cotton, Sugarcane, particularly for Sugar candy (Gur).
Spices	Ginger, Turmeric, Chillies, Cumin Plantation Crops: Tea, Coffee, Cardamom.
Fruits	Banana, Sapota, Custard apple and Papaya.
Vegetables	Tomato, Brinjal, Cucurbits, Cole crops, Leafy vegetables.

III. RESULTS & DISCUSSION

Dominance of Chemical fertilizers in Agriculture cannot be neglected. However, Chemical fertilizer can increase crop productivity, but consequential environmental hazards should also taken into consideration with deep sense of seriousness. Alongwith this, requirement should be to understand the circumference of the Chemical fertilizers inputs, infield and outfield. Chemical fertilizer ensures higher productivity, but their day-by-day overuse will be responsible for various kinds of environmental hazards. Therefore, there is a need to understand the threshold level and productivity saturation limit of these Chemical Fertilizers. Leaching loss coupled with less nutrient availability could be one of the most probable reasons behind overuse of Chemical Fertilizers. Organic Margosa is effective against such type of losses. Margosa is an ideal candidate for alkaline, acidic soil and submerged conditions when applied with chemical fertilizers due to its natural pH mordant activities [18]. Organic Margosa enhances the overall appearance, farming texture and quality of produce and gives higher 'Returns on Investment' when induced with Urea/NPK/DAP/CAN by enhancing flowability, minimizing moisturization and stabilizing the surface while improving compatibility in end uses [19]. With multidimensional benefits it is a highly economical proposition for the farming community at large [10].

CONCLUSION

Organic is a ‘process claim’ rather than a ‘product claim’ [6]. Processing in order to promote biological pesticides in readily usable form is one of the ways of popularizing it as suggested by Kandpal, (2014) [20]. Inclusion of Organic meals in Swiss Air flights menu marked the significant beginning of an Organic era worldwide [6]. Health conscious Indian citizens have created a demand of an Organic food [20]. Organic Margosa is an effort in the same line to encourage Organic farming through sustainable routes [18]. It is very much effective to prevent fertilizer losses (Nitrogen or others) due to leaching, volatilization and denitrification. Coupled with Organic agriculture based practices together with various bionic/ biological agents, there is a need to think sustainably. Organic agriculture era is presently in its beginning phase, therefore to potentially strengthen this, we need to think sustainably, till the time promotes techniques and methodologies that can limit the overuse of Chemical fertilizers.

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