

## Organic Margosa: A Comprehensive Agent of Sustainable Agriculture and Agrobiolgy Practices

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**Abstract:** Agrobiolgy practices represent Natural farming, Bionic farming, Organic farming and Biodynamic agriculture practices. The focus towards sustainable and environmentally sound agriculture practices is now need of the hour in present context. The credit goes to all those agriculture practioners working in this area; that raises the importance of sustainable agriculture practices against ill consequences of chemical fertilizer based agriculture practices. In the same understanding with better acceptance and practicality, we are coming up with a bionic input called Organic Margosa. Important Objective behind the introduction of Organic Margosa is to replace the frequent use of chemical fertilizers; and simultaneously to maintain the soil health by its enrichment with increase in Nitrogen and other supplements amalgamated with more associated benefits.

**Key words:** Organic Margosa • Agrobiolgy • Biodynamic agriculture • Chemical fertilizers and Natural farming

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### INTRODUCTION

DEFICIENCY of NPK; Imbalance in nutrient status; Decrease in input use efficiency; Heavy metal and Salinity stress; Biotic stress from Pest tolerant pesticides; Biomagnification in various food chain and food webs (presence of pesticide residue in food material and milk sample); and Soil fatigue due to intensive cultivation etc. are the few adverse impact of Green Revolution (1967-1977) [1]. Organic agriculture offers many environmental and social benefits [2]. A/c to IFOAM, Organic agriculture is based on four principles i.e. The principle of health; The principle of ecology; The principle of fairness and The principle of care [3]. Organic farming helps in rejuvenating the degraded soil and ensures sustainability of crop production [1]. Doring, 2014 emphasized to conduct research in the field of Organic farming [4]. Organic Farming is the only sustainable way to safeguard the food security of present and future generations [5].

**Organic Farming: Global Perspective and Future Strategies:** Organic farming gets preliminary global expansion after institution of the IFOAM (International Federation of Organic

Agriculture Movements) in 1972 and establishment of certification standards through the 1990s and to date [6]. Many retail chains and supermarkets in advanced countries are accorded with 'green status' to sell organic foods [7]. The Soil Association's 2015 Organic Market Report reveals sales of Organic products increased by 4% in 2014, in a year when food prices fell by 1.9% and consumer food spending by 1.1% [8].

FiBL-AMI-Organic data network survey 2015, reported the data of top ten countries with the highest per capita consumption 2013 [9]. The ten countries made place in the list were Switzerland, Denmark, Luxembourg, Liechtenstein, Austria, Sweden, Germany, US, Canada and Norway. Among the following countries, Switzerland tops the chart with maximum consumption of 210 per capita in Euros.

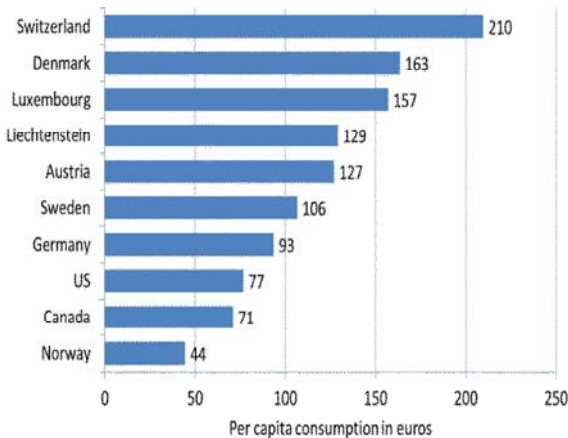


Fig. 1: Ten Countries with the highest per capita consumption 2013.

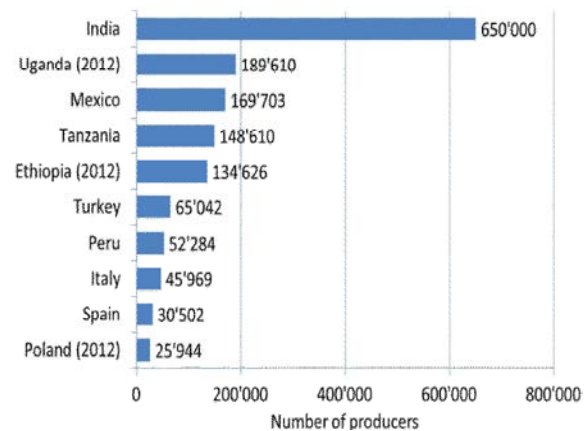


Fig. 4: Ten countries with the largest numbers of Organic producers 2013

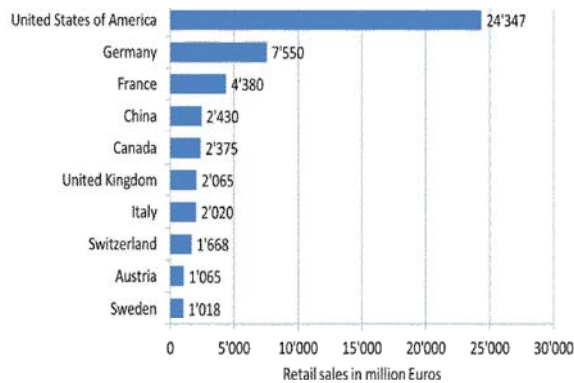


Fig. 2: Ten Countries with the highest markets for organic food 2013.

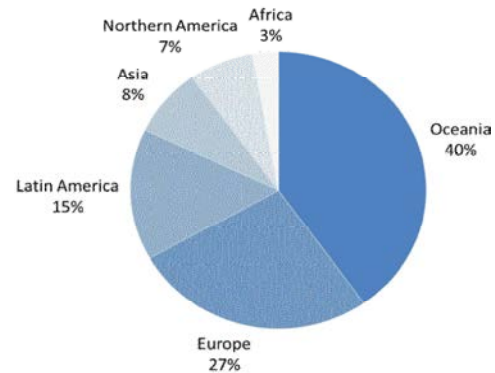


Fig. 5: Distribution of Organic agricultural land by region 2013.

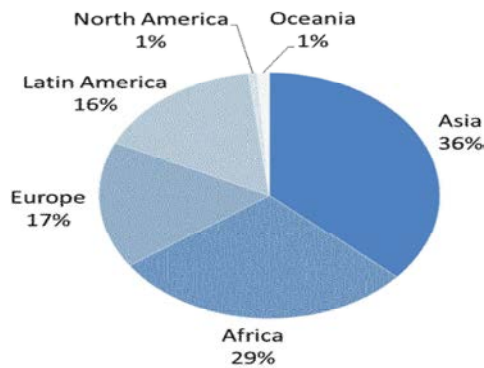


Fig. 3: Organic producers by region 2013.

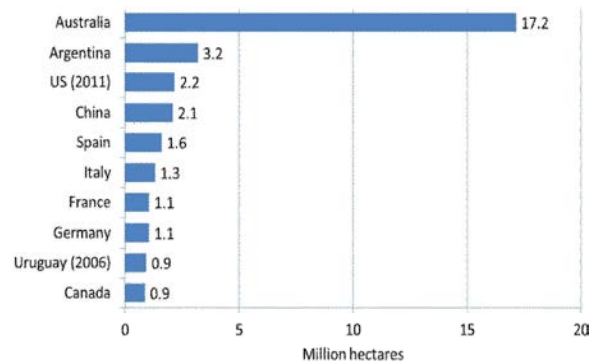


Fig. 6: Ten Countries with the largest areas of Organic agricultural land 2013.

USA topped the chart in retail sales of Organic food (in million Euros). Retail sales of 24347 million Euros (2013) were reported by FiBL-AMI-Organic data network survey 2015 [10].

Asia and Africa were among the top in Organic producers by region 2013 with occupancy of 36% and 29% respectively (FiBL- IFOAM survey 2015) [11].

However, minimum occupancy was claimed by North America and Oceania (1% each). It is interesting to note that besides Switzerland have highest per capita consumption of Organic foods 2013 and USA have largest market for Organic food 2013, India topped the list of largest number of Organic producers (6,50,000) (FiBL-IFOAM survey 2015) [12].

Table 1: Distinguished Whistleblower/Contributor of Organic farming worldwide.

S.No.	Name of Contributor	Publication that act as Whistleblower of Organic Farming/ Sustainable Agriculture/ Biodynamic Agriculture	Pioneering Contribution
1.	Sir Albert Howard	An Agricultural Testament	Referred to as the father of modern Organic agriculture [9].
2.	Lord Northbourne	Look to the Land	Coined the term Organic farming [9].
3.	J.I. Rodale	Organic Farming and Gardening (Later Retitled as Organic Gardening)	Popularize the term and methods of Organic growing [9], [10].
4.	F.H. King	Farmers of Forty Centuries	Focused on applications of Physics to agriculture [9], [11].
5.	Lady Eve Balfour	The Living Soil	Launched the Haughley Experiment [9], [12].
6.	Fukuoka	The One-Straw Revolution	Natural Farming/ Ecological Farming/ The Fukuoka Method/ The natural way of farming/ Do-Nothing farming [9], [13].
7.	William Albrecht	The Albrecht Papers (1975)	Dr. Albrecht found that soil infertility resulted from lack of Organic matter and mineral imbalance, which affected plant quality and by extension animal and human health [14].
8.	Firman E. Bear	Earth the Stuff of Life	He concludes by warning of the dangers of conventional agriculture [14].
9.	Rudolf Steiner	Agriculture, a course of eight lectures given in 1924 in East Germany.	Father of the Bio-Dynamic method [14].
10.	Erhenfried Pfeiffer	Bio-Dynamic Farming and Gardening, Soil Fertility, Renewal and Preservation (1943).	Invented a process for determining the quality of food products, nutritional defects and the needs of the body, called chromatography [14].

Oceania region occupied 40% of world's Organic agricultural land by region 2013 while Asia occupied only 8% (FiBL-IFOAM survey 2015) [13] Among Oceania, Australia have largest area of Organic agricultural land 2013 (17.2 million hectares).

### Organic Farming:

#### Current Indian Perspective and Future Developments:

A/c to NPOP India, Organic agriculture is a system of farm design and management to create an ecosystem, which can achieve sustainable productivity without the use of artificial external inputs such as chemical fertilizers and pesticides [15].

Organic Farming reduces the cost of production with returns 15 to 20% higher in the market [17]. India's share of Organic food products to touch 2% by 2020 as posted by Chatterjee, R. [18]. Madurai farmer reaps 792 Kg of paddy crop from 20 cents of land through Organic farming [19]. Madhya Pradesh has maximum 25.82 lakhs hectares land under Organic farming in the country, which is about half of total Organic farming area in India reported by Staff Reporter, Bhopal [20]. The IOFPCL (Indian Organic Farmers Producer Company Limited), headquartered in Aluva, Kerala is the largest Organic producer company in India owned by the farmers and serve its more than 2500 primary producer members in Kerala, Karnataka and Tamil Nadu [21]. The Finance Minister proposed to fully support Agriculture Ministry's Organic farming scheme- "Paramparagat Krishi Vikas Yojana" [22].

Table 2: Organic agriculture land area in India Vs the World (in lakhs hectares) [16].

YEAR	2009	2010	2011	2012
India	11.8	7.8	10.8	5.0
World	362.8	360.2	373.6	375.4

Table 2: Few Indian Contributor of Organic farming.

S.No.	Name of Personality	Contribution	Reference
1.	Kavita Mukhi	Contributor in Organic food market in India.	[24], [25]
2.	G. Nammalvar	Known as the 'Father or Guru of Organic farming' in Tamil Nadu. Dedicate his life to the upliftment of farmers in India and Organic farming.	[26][27]
3.	B.N. Vishwanath	Father of Organic urban terrace gardening in India.	[28]

A/c to the Yes Bank report, Organic food sector is growing at about 20% in India, with over 100 retail Organic outlets in Mumbai and about 60 in Bangalore [23].

## MATERIALS AND METHODS

Organic Margosa is an ecofriendly Nitrogen fertilizer saver enriched with Azadirachta indica, (Neem) and Pongamia pinnata (Karanj) as key ingredients. Neem and Karanj are among the many plants that are commonly used in pest control [29]. Neem is an important constituent of various bio-formulations



(a) (b)  
Fig. 7: A) One Kg Organic Margosa Powder; B) Finely crushed Organic Margosa Powder.

(like Dashparni extract; Neem-Cow urine extract; mixed leaves extract and various Broad spectrum formulations etc.) used in Organic agriculture practices [3]. Karanj cake is rich in Nitrogen [30] and popularized as useful organic manure, complemented with insecticidal and anti-nematodal properties [31]. Application rates were standardized with specific basal doses.

## RESULT AND DISCUSSION

Groundwater pollution, Eutrophication, enormous losses in the form of emission of NO leads to ecological imbalance, environmental pollution coupled with changes in nitrogen-carbon balance. Increase food production with minimum adverse impacts on the environment is one of the major challenges we are facing today. In order to address the above problems, we are coming up with an exclusive formulation of Neem and Karanj based Organic fertilizer "Margosa" which has proved its mettle with its use in various crops throughout all seasons in Indian soil. With multidimensional benefits it is a highly economical proposition for the farming community at large [32]. Margosa optimizes pH of soil towards neutral when applied with Chemical inputs like Urea/DAP/CAN etc. (Fig. 8).

Neem and Karanj Seed powder is a rich source of antioxidants with long lasting radical scavenging activity [33]. Margosa gives a better production and enhances productivity of agricultural crops [34]. Nitrate ions ( $\text{NO}_3^-$ ) are not held by soil particles and can easily be leached out when drainage occurs [35]. Thus, bioavailability is also one of the key issue need to be addressed. Margosa act as solid surface coating agent and increase the bioavailability of the chemical fertilizers, thus can reduce their excessive application in the agriculture field.

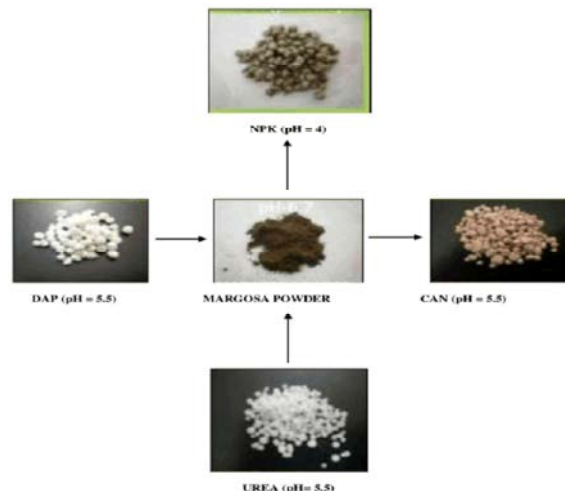


Fig. 8: Interaction of Margosa with Nitrogenous fertilizers.



(a) (b)  
Fig. 9: A) Nematode affected patches; B) Regained root-length with Margosa.

Organic Margosa has been successfully tested in Field Crops; Cash and Vegetable crops; Flower beds Tea and Coffee plantation; Cotton farming; Backyard farming; Creating lawns and Golf courses [36-40].

## CONCLUSION

Agriculturalists are the de facto managers of the most productive lands on Earth. A/c to Sofia *et al.* (2006), there is an urgent need of reinventing traditional methods of agricultural practices for sustained agriculture production. Efficient utilization of fertilizer is one of the keys to economic crop yield. It is of great importance to optimize the availability of an added N fertilizer in crop not only due to continuous increase in prices of fertilizer but also due to environmental pollution. GM crops are no solution to hunger, poverty, climate change as well as ecological, energy and economic challenges. Sofia *et al.* (2006), emphasized on more and more scientific research in the

field of Organic farming in order to bring forth a clear picture related to real value benefits. Suitable budgetary allocations must be made for mainstreaming agro-ecological practices. Furthermore, as a way to forward Organic farming, further research is required to improve knowledge and relevant methods that will enhance productivity. Margosa is an integrated effort to encourage Organic farming through sustainable routes and furthermore much extensive research is required for its prompt exploration and acceptance on global level with propionate economical upbringings and separate market setup.

Organic Margosa enhances the overall appearance, 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. Margosa significantly increases the NPK uptake and effectively managed the several insect/pests and plant-parasitic nematodes (IICBEE Malaysia) (Fig. 9). Proven study strongly establishes the fact, Margosa reduces leaching loss significantly and facilitates higher nutrient uptake, thus involving lesser Crop investment by a farmer.

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