**Potential Role of Arbuscular Mycorrhizal Fungi (AMF) and Vermicompost (VC) on the Maturation of Agriculture Crops - A Review**

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**Abstract** | Agriculture is the method of plant interaction with microorganisms. There is a growing need for an eco-friendly, eco-responsive system in agriculture that can provide adequate nutrients to the growing human population by improving the quality and quantity of agricultural manufacture. Plant Growth-Promoting Microorganisms (PGPMs) have the potential to inhibit the rhizosphere and are at the center of microbial inoculations to regulate risk of rooting. The decomposition of organic matter by earthworms by vermicompost (VC) is known as cheap and environmentally friendly process. It is a substantial provenance of essential nutrients, which bounce back the overall soil condition and stimulate the yield and development of plants that enhance the physical and chemical properties of the soil. For this vindication the blear of this review is on the momentary of soil symbiotic fungi like Arbuscular Mycorrhizal Fungi (AMF) and Vermicompost (VC), and their precious repercussions on plant maturation. An extensive outline of profuse details of the conservation process is of extraordinary consequence for crops maturation in cultivations.

**Keywords:** PGPMs, AMF, VC, Plant maturation.

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**INTRODUCTION**

The Green Revolution (GR) resulted in an increase in the mass-production. Growth of mechanized agriculture, that relied on the use of plant grains and produce, chemical high yielding varieties respond to high levels of chemical fertilizers, which are slow yield stagnation, soil degradation, environmental erosion and pollution, low soil organic carbon, low fertility, excess nutrient mining and disease, pest and weed risk. Agriculture is the most salient future contributing to India's economic development with 114 million hectares cultivated in India's geographical area of 329 million hectares (Raghuvanshi, 2012). In order to collect good harvest farmers inoculate the soil with fertilizers their chemicals are biofertilizers and in the last 150 years, heavy inputs of chemical fertilizers have rise the pollution of the soil, causing less productivity and severe health and environmental hazards. Soil an active living medium is a crucial part of the global ecosystem.

It is a beneficial resource not only for agricultural fabrication and food differentiation but also for maintaining most of the life process. Enlarge the competition and parasitism with the rhizosphere to provide some soil fertility factor for sustainable agriculture by controlling soil borne disease, including increment soil microbial activity (Dar et al., 2018). Progress has been made in exploring the use of microorganisms to refine soil fertility. Much emphasis is placed on the enhanced exploitation of indigenous soil microorganisms, which contribute to plant maturation and plant protection to intensification soil fertility. The soil organisms may contain more than 90% of the soil’s biological activity and nutrient cycling,
soil fertility and the co-operative process in the rhizosphere. So far the fungal diversity and function of the soil is not fully understood (Navnita et al., 2015). Plant growth promoting microorganisms has a positive effect on the growing and yield of plants through biological nitrogen determination, vitamins building, growth product manufacture, supply of plants with available phosphorus, spiraling the amount of nutrients in the rhizosphere as bio-control agents (Berg, 2009; Tagore et al., 2013; Warwate et al., 2017; Zaferanchi et al., 2019).

Organic farming is a method of creation that avoids or often excludes the use of synthetic fertilizers. Where possible, the organic farming systems rely on bio-composting, while reduction is a major issue in the organic creation systems (Song et al., 2015; Mishra et al., 2018). Organic resources are promising due to local availability as a supply of many nutrients and have the potential to enhance maturation properties (Sivakumar et al., 2013). Plant nutrients in organic fertilizers, such as enzymes and hormones, are essential for promoting soil sprouting and productivity (Jat et al., 2010; Mishra, 2014).

The organic assets such as biogas slurry, hen manure, green fertilizer and Farmyard Manure (FYM) can replacement for inorganic fertilizers to sustain making and environmental eminence (Mhamdi et al., 2015; Kaur et al., 2017). Organic fertilizers are directly affected by plant growth and their positive effects on soil physicochemical and biological properties. Here are the main effects on getting nutrition. Many of the benefits have been documented due to organic fertilizers by (Prasanna et al., 2016; Igiehon et al., 2017; Mitra et al., 2019). Magnification the population of beneficial microorganisms and their functions in the decomposition of organic matter was testimony by (Bakry et al., 2013; Kowsar et al., 2014). Organic fertilizers have made an entry into the economy of Nitrogen content and long-term availability in the field (Pandian and Perumal, 2002; Zhong et al., 2010). Srivastava et al. (2007) said that the use of organic fertilizer not only acts as a source of N$_2$ and other source of nutrients but also addition of the efficiency of nitrogen used.

Nahum et al. (2007) details on the organic fertilizers naturally contain (N$_2$) and they are commonly added to other wastes to inflation nitrogen content and enter fertilizer with active biomass. Yang et al. (2004) investigated that the integration of excess of organic compost notably meiorated the uptake of N, P and K by rice plants and make possible the share and transfer of nutrient elements to the rice ears and grains.

**AMF in Plant Development**

More than 80% of plant species are linked with AMF, along with vascular and non-vascular plants and some main crops such as carrots, maize, leek, coffee, cocoa, soybeans, apples, citrus fruits, tomatoes and pepper to point out a few (Posta et al., 2013; Robl et al., 2013; Bona et al., 2017). Because AMF is normally distributed in various parts of the world, especially in the tropic, little operation-al information is known about them until the mid1950s (Smith and Read, 1997; Cozzolino et al., 2013; Li et al., 2014). They are found in a variety of landscapes, such as limestone, meadows, dry/semi-arid grasslands with many temperate forests, tropical rainforests and shrub lands in various parts of the globe (Sedlacek et al., 2013; Navnita et al., 2015). These studies have focused on AMF diversity in different regions and soil types or on the AMF status of the original crop plant species (Hawley and Dames, 2004; Boumari et al., 2006; Mohammadi et al. 2011; Piliarova et al., 2019). When AMF species are isolated each time among the Glomus sp. and other species are Acaulospora, Gigaspora and Scutellospora found in some members, where other species are not present (Bonfante and Perotto, 2000; Ulhmann et al., 2006). Saino and Bagyaraj (2005) observed that the level of development of varies with the AMF used by the biomass, Glomus bagyaraj was originated to be the most excellent AMF symbiont for inoculating Coleus forskohlii, after that behavior of Scutellospora and Calospora.

Inoculation of AMF has been recognized to enhance the germination of many plant species. This is credited with the boosting seedling growth (Karasawa et al., 2012). Multiplication of growth parameters due to AMF inoculation has been previously accounted in certain medicinal plants (Lima dos Santos et al., 2017). Perner et al. (2007) notes that in the case of three different commercial AMF inoculation, 28.2-36.4% of total root length was colonized, resulting in non- inoculated plants free root colonization. The role of AMF in the stimulation of sprouting and nutrient uptake of many host plants is well documented (Jeffries et al., 2003; Minaxi et al., 2013; Kim et al., 2017; Bianciotto et al., 2018; Khan et al., 2019). Tracchia et al. (2000) found that due inoculation of Glomus mosseae or G. deserticola and E. oxyasperum led to better maturation of plants. Likewise, combined inoculation of Trichoderma aureoviride and G. mos-seae had a synergistic outcome on the growth of marigold plants (Calvet et al., 1993).

Haggag and Abd-El Latif (2001) establish that incorpo-rate inoculation of G. mosseae and T. harzianum or P. oxal-tium better progress of sprout plants. Garcia-Garrido et al. (1998) noted that dual inoculation with G. mosseae and some strains of Fusarium sp. led to extent of growth in soybean plants. Ravansko et al. (2006) found that Clenastachys rosea and G. intraradices were reciprocally inhibitory, but encourage the plant growth with several changes in soil microbial communities. Mathur and Vyas (2000) mention that AMF provision of legume crops establish to multiply it’s vegetative of blooming and seed yield in count to get better.
noduleation on its root structure. Vaingankar and Rodrigues (2015) recounted that the inoculation with the G. fasciculatum enhanced Crossandra infundibuliformis development and enlarged its dry matter more than 2-fold compared with the non-inoculated and control treatments. Rabie and Al-Humiany (2004) and El-Azouni et al. (2008) designated that dual inoculation with G. clarum and A. brasilense utilize be able to enhance the plant height, dry weight and shoot, root fraction in cowpea plants.

The special effects of AMF cooperative association on the maturation of plants are well known (Rajasekaran and Nagarajan, 2004). Arumugam et al. (2010) announced that inoculation either with AMF or Rhizobium extensively addition (29.7-38%) of the shoot and root length, dry weights of shoot and root, total number of nodules when compared to un-inoculated seedlings. Lenin et al. (2010) observed that AMF soaping plant uptake of nutrients and consequently enhancing (17.2-28.5%) of root, shoot biomass and developed the experimental plants. Khade and Rodrigues (2010) reported that G. intraradices and G. mosseae make headway the growth in leaf petiole in Carica papaya. Halder and Ray (2006), communicate that development of growth in AMF inoculated plants. Tahat et al. (2008) examined that reaction of tomato (Lycopersicum esculentum Mill.) to G. mosseae, they found that G. mosseae was (5.8%) of build up shoot dry weight and make a larger in root length.

Augmentation of soil with different positive microorganisms including AMF species assist plant maturation (Xavier and Gemida, 2002; Khakpour and Khara. 2012). AMF may stimulate in advance flowering and stretch flower numbers (Gaur and Adholeya, 2005; Usha et al., 2005). These AMF are capable to assist for plentiful plant dry weights (Lee and George, 2005; Sivakumar, 2013; Mitra et al., 2019). AMF inoculation is stimulated widely the production of shoot biomass to a higher level than the addition of the amendment alone to soil or the mutual treatments (Xiuxiu et al., 2019).

Rajasekaran and Nagarajan (2004) reveal that AMF inoculation in mixture with phosphorus, inflating fresh and dry weights (8.2-13.7%) of shoot (2.2-4.7cm) and leaf area and leaf number of Vigna unguiculata (L). Germain et al. (2016) published that outstanding shoot dry weights (10.4-26.8%) hiking when Theobroma cacao was inoculated with AMF. The positive effects of these AMF and additional of organic manures have been reported by (Lesueur et al., 2001).

Sailo and Bagyaraj (2005) and (Xiuxiu et al., 2019) investigated that maximum (22.6 to 37.5) percentage of root length, shoot length, fresh weight, dry weight was observed in C. leuca and cucumber seedlings inoculated with AMF. Gill et al. (2002) give that biomass of the plant expand by AMF infectivity. Hazarika et al. (2000) proclaim that on the dual inoculation of AMF and Rhizobium it stimulated the assembly of more than (40-50%) root nodules when inspected to control plants. Ortas (2012) informed that the AMF due to indirect effects of the host plants affected a similar inspection in the lower parts of the roots. Many biochemical and physical factors affect soil quality. It has been demonstrated that rhizosphere contributes to nutrient cycling among microbial communities and directly affects soil fertility through transport to the process needed to upgrade structure development of soil health (Wu et al., 2005; Miransari et al., 2007; St-Arnaud and Vujanovic 2007; Wu et al., 2014; Khan et al., 2019).

Symbiosis has been shown to greatly aid the growth of many field crops due to the development of a broad hyphal network that aims to make communities more of value and encompass hormonal manufacture of nutrient availability and root diseases. Regulate the growth of nutrients in the soil nutrient availability and enhanced plant development (Manoharan et al., 2010; Tabassum et al., 2012; Martín-Robles et al., 2018). Soil usually contains the natives of AMF, which grows plant roots in colonies. Phosphorus uptake and sprouting of plants colonized by AMF is well-known process (Bonfante and Genre 2010; Fárzaneh et al., 2011; Wang et al., 2019; Song et al., 2020).

On the additional, mainly strengthen in yield of maize subsequent inoculation with AMF (Sabia et al., 2015; Mitra et al., 2019) particularly in low-P soils (Wang et al., 2018). Covacevich et al. (2007) communicated that the lesser use of agrochemical research is towards crop yield stability. Smith et al. (2011) described those mycorrhizae infection is known to build on plant growth by escalating nutrients. Linderman and Davis (2004) heard that the AMF inoculations enhance the 18.2% of plant height, 15.7% of number of leaves, and 19.1% of fresh and dry weights of crop plants. Charitha Devi and Reddy (2001) outlined that the unifield inoculation of AMF and Rhizobium gave the maximum (23.7-28.6) percentage of shoot and root length, fresh and dry weight of groundnut plantlet.

Growth and productivity of the legumes were always dependent on the combination of selected AMF and rhizobia, revealing that positive interactions between compatible symbionts could indispensable get larger development and yields. Enlargement and productivity of pulses, which are always dependent on a combination of selective AMF and rhizobia, reveals that positive correlation between compatible indices can appreciably proliferated (26.5-31.8) percentage of growth and yield (Attarzadeh et al., 2019). Pot tests with soybean with 9-16.8% of knots dry nodule, dry weight demonstrated that nitrogen fixation in mycorrhizal plants was generally higher than in non-mycorrhizal plants under controlled environmental conditions (Goss and de Varennes, 2002; Wang and Qiu 2006; Shuab et al., 2014).
However, it seems that nitrogen fixation is not always assisted under field condition. Even if the tripartite symbiosis formed by native rhizobium and soybean is established (Antunes et al., 2006; Baum et al., 2015).

The hyphopodia of AMF enter the root cortex to obtain carbon from the host plant and in return assist the plant with more uptakes of nutrients, especially P, which is necessary for the synthesis of nucleic acids, enhancing vegetative growth this might be the reason for the higher weight (fresh/dry root/shoot weight) of the plants (Bona et al., 2017; Solange et al., 2019). Biro et al. (2000) also noted a favorable effects on soybean of co-inoculation with A. brasilense, Rhizobium meliloti and G. jasiculatum, while Azospirillum and growth-promoting rhizobacteria has an indirect effect on AMF with a positive effect on root length that can be understood as an end result in pot and field experiments (Russo et al. 2005; Vacheron et al., 2013; Volpe et al., 2015).

**VERMICOMPOST (VC) IN PLANT IMPROVEMENT**

Vermitechnology is the latest feature of biotechnology where the use of earthworms to compost the problem of waste disposal to reduce pollution effects (Subha and Pushpa, 2007; Allardice et al., 2015). Composting is biological process through which microorganisms convert organic matter into compact rich soil. It is the same natural process that creates a layer of dark humus on the wild ground. It is the same natural process that created a layer of dark humus in the wild. Vermicompost building differs only in the creation of international conditions, resulting in rapid decomposition of organic matter, and then what usually happens in nature. While creating valuable soil fix for composting gardens and lawns, earthworm compost is a simple way to recycle home yards and food scraps (Blouin et al., 2013).

Atiyeh et al. (2002) account that the incorporation of little amount (10%) of pig manure VC, into commercial bedding plant potting media was sufficient to produce a major enhance in the 70 percentage of total biomass of tomato seedlings. Norman et al. (2007) explained that the number of seedling sprouted in the earthworm compost mixture of interest ranged from 0 to 100 per cent on petunias on greenhouse tests. VC contains a hormone like fertilizer function, and it triggers greater root opening, recuperate root biomaterials, and alters plant maturation and change of the morphology of plants (Mathivanan et al., 2013; Verma et al. 2018; Rahil et al., 2019).

Atiyeh et al. (2000) have established that VC generally has strikingly favorable effects on plan growing. Growth lifted in of Sesamum indicum seedlings at the ordinary level of VC treatments (Vasanth Pandiyan, 2020). There is good evidence that VC boost the plant growth (Joshi et al., 2013). Ansari (2008) statement that the sprouting enhancement of potato, spinach and turnip was recorded to 6 t ha⁻¹ VC applications. Chanda et al. (2011) disclose that tomato seedlings excellence in a growth medium substituted with 20%, 30% of VC. Gholami et al. (2018) initiate that VC stimulating the root length accruing the large number of Iranian chicory roots. Application of VC to field soils have also been reported to raising crop yields (Arancon et al., 2006; Bellit et al., 2017; Suresh et al., 2018; Mishra et al., 2018; Manimegala and Gunasekaran, 2020). VC has been found to have a positive pressure on all yield parameters of crops such as wheat, paddy, pea and sugarcane (Ismaïl, 2005; Ansari, 2008; Pezeshkpour et al., 2014). Ahmed et al. (2010) mentioned that (17.8-21.7%) of plant height, total dry weight and leaf area extensively hike up on the application of biofertilizers. Mahmood et al. (2006) found that plant height difference in (5.3-9.8cm) of wheat swell by inoculation with Azospirillum sp.

Many studies have reported mature compost positive effect on the promotion and development of plants by using parameters such as rooting (21.6-30.8%), time of flowering, leaf area (18.3-23.5%), development and lengthening of internodes (Arancon et al., 2004; Jim et al., 2007; Shishehbor et al., 2013; Jandaghi et al., 2020). The shoot dry weights of marigold plants gain strength eloquently and highest maturation of Dolicieous lab lab was taking place in T₄ compost hold mixture (Esakkiammal et al., 2015).

In the past few workers have reported the escalated germination of agriculture crops grown in media amended with humic acid that were extracted from VC (Jindo et al., 2016; Frasetya et al., 2019). Singh et al. (2008) information the maximizing in dry weight of strawberry (Fragaria x ananassa Duch.) leaves in 7.5 t ha⁻¹ VC application. Vermicompost which are stabilized organic materials created by interactions between earthworms and microorganisms in a non-thermophilic procedure have been reported to enhance in plant growth and yields in green house crops (Edwards and Arancon, 2004). Applications of VC have also reported to shoot up the improvement and yield in Cabbage (Nurhidayati et al., 2016).

Miceli et al. (2007); Ansari and Sukhray (2010) statement that the application of VC to tomatoes and okra cultivated in the field also gets larger the yield. The greenhouse testing has demonstrated that VC can get larger the germination, growth and yields of different vegetables and ornamental plants were widely and consistently (Warman and Lopez, 2010; Manh and Wang, 2014; Goswami et al., 2017; Mahaly et al., 2018).

The small number of field trial explanation in the literature have revealed that 50% VC amending soils can magnifying the growth and yield of Capsicum annuum (Rekha et al., 2017). Quite a few researchers have reported that...
VC enhancing seed germination, seedling growth and yield (Mishra et al., 2012; Joshi et al., 2013; Gholami et al., 2018). Ravindran et al. (2007) observed the halophytic compost and phosphorobacteria pick up the plant height, number of leaves, leaf area, root nodules, fresh weight and dry weight in *Arabiss hypogaea* L. Fresh and dry weights of cucumber seedlings were affected harmful by high amount of vermicompost (30%) indicating salt stress that resulted in growth retardation as nominated by Parthasarathi and Ranganathan (2002). Enormous data on the yield and shoot length heighten in several ornamentals, vegetable crop plants and trees treated with VC. Few attempts have been made to establish the role and expansion productivity of legume plants (Sinha et al., 2010; Yadav and Garg 2015; Hosseinzadeh et al., 2016; Kiran 2019).

Joshi and Vig (2010) also published the make bigger in plant development factors such as plant height, number of leaves, and plant dry biomass with application of 45% VC (cattle dung) amended treatment in *Lycopersicum esculentum*. And also, Gupta et al. (2014) inspected that addition of cow dung and household-based VC in appropriate quantities to the potting media resulted in increased rapid growth and flowering of marigold seedlings including plant biomass, plant height, number of buds and flowers. Plant height of maize also better knowingly as compared to the control when grown in soil amended with VC (Gutierrez-Miceli et al., 2008; Scaglia et al., 2016). Azarmi et al. (2008) present enhance in leaf area and shoot dry weight by 43.4% and 27.3%, correspondingly, in tomato with 15 t/ha sheep manure vermicompost applications. The microbes present in the VC may generate various plant growth regulators like auxin, cytokinins, gibberellins etc. and many metabolites which can be consume by the plants (Yang et al., 2015; Gholami et al., 2018).

**AMF with VC on biochemical content**

The effects of VC amendments on plant improvement and physiology vary depending on biological and environmental factors such as species and location. Few studies have reported on the developmental effects of VC and AMF use on some key role of agro-crops (Khorshidi et al., 2013; Khan et al., 2014; Oliveira et al., 2015; Hussain et al., 2016; Shamshiri et al., 2016; Nikkah Naeeni et al., 2017).

Douds et al. (2012) showed that different isolates of AMF can result in different effects on plant maturation. Expected growing retardation and diminish in chlorophyll content at 30% VC. Erashin et al. (2009) communicated that the 30% VC shoot up the chlorophyll content in cucumber seedlings. Reports from (Rathod et al., 2011) proved a raise of photosynthetic activity in leaves of *Glycine max*, injected with *G. fasciculatum*. There was a progress in chlorophyll content (chlorophyll ‘a’ and ‘b’ and total chlorophyll) noted in the leaves of *P. juliflora* inoculated with *G. fasciculatum* (Zhu et al., 2012).

Arumugam et al. (2010) disclosed that the booster of AMF, either alone or arrangement with *Rhizobium*, approved about great changes in chlorophyll ‘a’, ‘b’ and total chlorophyll content in concurrence with result reported elsewhere (Rajasekaran and Nagarajan 2004; Rajasekaran et al., 2006). Shrestha et al. (1995) have shown that the photosynthesis and transpiration rates of mycorrhizal *Satsuma mandarin* trees are higher than non-mycorrhizal trees. Zhang et al. (2018) also statement that the higher specific leaf area and strengthen rate of photosynthesis were present in AMF inoculated plants when compared with non AMF plants (*Ricinus communis*). The chlorophyll content, fresh weight and leaf area are higher in mycorrhizal plants than in non-mycorrhizal plants, but variations are notably under drought stress environment (Morte et al., 2000; Zhu et al., 2012).

Get over something nutrition and water performance of AMF immunization leads to raise the physiology and quality of the product (Yang et al., 2014; Gao et al., 2020). In the documentation (Bolandnazar et al. 2007) confirmed 30% add to in chlorophyll content of *A. cepa* leaves under AMF application, with no major differences between the *Glomus species* tested. Borde et al. (2010) investigated that the AMF inoculated plants increased the photosynthetic action of *A. sativum* under salinity situation. Thus AMF symbiosis could make better the photosynthetic capacity of garlic leaves, as to the results of (Giri and Mukerji 2004; Sanazzaro et al. 2006; Sheng et al., 2008; Boldt et al., 2011).

Yang et al. (2014) observed high stomatal conductance, high transpiration rates and high photosynthetic rates with reduced internal CO2 concentration in fungal colonized plants than the non-colonized plants. Such higher photosynthetic rate as a consequence of fungal association has also been reported by Zhu et al. (2012). They observed high photosynthetic and transpiration rates in AM fungi colonized plants of maize than in non-colonized plants both under control and drought stress conditions.

Nemec and Meredith (1981) found that *G. etunicatum* inoculated *Citrus limon* leaves had higher total amino acids than control. Selvaraj (1998) also heard that accrue level of total amino acids in *P. juliflora*, immunization with *G. fasciculatum*. However, AMF seedlings have greater concentrations of soluble sugars in roots than non-mycorrhizal seedlings. Protein content also accumulates in AMF plants. It was exposed that *G. fasciculatum* with, tannery effluent treated *P. juliflora* showed a widen of protein content in both leaves and roots than the control. Whereas plant treated with tannery effluent alone showed least protein content due to the absence of AMF influence (Selvaraj et al., 2004). The higher protein content in mycorrhizal roots then in non-my-
Nitrogenase, responsible for N₂ fixation in legume nodules, can be denatured by O₂ and functions under micro-aerobic conditions. However, O₂ is required for ATP construction associated with nitrogenase activity. Inductment of nitrogenase activity occurred early in plant development and plant growth response about two weeks (Asimi et al., 1980). The inoculations of Rhizobium species make larger root nodulation of rice (Hassan and Bano, 2016) and lentil (Tena, 2016). It showed a better nodulation with higher nitrogenase activity. The normally grown plants of Vicia faba and Phaseolus sp. showed the maximum nitrogenase activity of flowering stage and declined after pod filling (Vidal et al., 1992; Jamro et al., 1994). Nitrogenase activity was positively correlated with nodule number in the case of Vicia faba and Phaseolus plants. Mishra and Dash (2014) accounted that difference in nitrogenase activity under water logged condition in legumes inoculated with Rhizobium. Htwe et al. (2019) reported that young nodules in Mung Bean, Cowpea, and Soybean had quite high nitrogenase activity even though only low levels of leghaemoglobin were distinguished. AMF inoculation also conspicuously bump up the concentrations of anthocyanins and carotenoids and ascorbic acid in plants in revelation to water restriction (Mo et al., 2016; Rahimzadeh and Pirzad, 2017; Bakr et al., 2017).

CONCLUSION

In the finale AMF and VC are recommended for all over the agricultural, horticultural crops to improve productivity and argument the soil nutrient status. The majority of this nutrient exchange is believed to occur within root cortical cells containing highly branched hyphal structures termed arbuscules. The beneficial effects of AMF symbiotic association on the growth of plants are well known. AMF help in water regulation of plants by extending their hyphae towards the available moisture zone for continuous water absorption and translocation them to plants. It has been established that AMF plants grow better in infertile soils because of improved mineral nutrition through hyphae, which helps in exploring greater volume of soil, beyond root hairs. In this review, the AMF and VC are focused on maintaining the health of the soil and staying rich. A balanced approach to the use of fertilizers is good for adopting sustainable agriculture crop growth. We have described several instances of AMF and VC plants that increase yield when used as a micronutrient to contribute to project growth and raise certain parameters linked to food quality. On the other hand, how the use of plant AMF obtains the quality of agricultural crops has been reported, among other benefits, by boosting of plant enlargement, biochemical, and enzyme activities. The farmers followed the inappropriate methods in cultivation by applying the excess amount of chemical fertilizers, which is not suitable...
for crop growth and soil health. To find and use bio-fertilizers and native soil microorganisms suitable for integrated management system for sustainable agriculture.

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