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Research Article

Effect of Aajivi PRO MYCO Formulated Using SEU Technology on Growth, Tuber Yield, and Nutrient Uptake in Potato (*Solanum tuberosum* L.)

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Abstract

Potato (*Solanum tuberosum* L.) is one of the most important vegetable crops worldwide and plays a vital role in food security owing to its high productivity and nutritional value. However, intensive cultivation and excessive dependence on chemical fertilizers have led to declining soil fertility, reduced nutrient-use efficiency, and sustainability concerns. Arbuscular mycorrhizal fungi (AMF)-based biofertilizers offer an eco-friendly strategy for enhancing nutrient availability and crop performance. A field experiment was conducted at Kapadvanj, Kheda District, Gujarat, India, to investigate the effects of PRO MYCO, a commercial arbuscular mycorrhizal biofertilizer developed using Mycorrhiza-SEU Technology and containing four AMF strains, namely *Funneliformis mosseae* (NCBI GenBank Accession No. PZ951203), *Rhizophagus clarus* (NCBI GenBank Accession No. PZ951207), *Rhizophagus aggregatus* (NCBI GenBank Accession No. PZ952833), and *Rhizophagus intraradices* (NCBI GenBank Accession No. PZ952834), on the growth and performance of potato (*Solanum tuberosum* L.). The experiment was conducted in a randomized block design with three replications. PRO MYCO was applied at 4 kg/acre, while uninoculated plots served as the control. Plant growth, tuber yield, root colonization, AMF spore density, and nutrient uptake were assessed, and the data were analysed by analysis of variance at $P \leq 0.05$. Compared with the control, PRO MYCO-treated plants recorded higher germination (96.42%), plant height (71.84 cm), total tuber yield (37.24 t/ha), root colonization (78.64%), and phosphorus uptake (36.84 kg/ha).

Keywords: Arbuscular Mycorrhizal Fungi; Biofertilizer; Nutrient Uptake; Potato; Root Colonization; Tuber Yield

Introduction

Potato (*Solanum tuberosum* L.) is one of the world's most important food crops and ranks among the leading staple crops after rice, wheat, and maize [1]. It is cultivated in more than 150 countries and serves as an important source of carbohydrates, dietary fiber, vitamins, minerals, and antioxidants [2]. Potato (*Solanum tuberosum* L.) is characterized by high productivity and a relatively short crop duration, making it an important contributor to global food and nutritional security. In addition to its nutritional value, potato cultivation provides substantial economic benefits by supporting farmers' livelihoods and the agricultural sector [3]. Despite its agronomic and nutritional

importance, sustained potato production requires effective nutrient management. The intensive use of chemical fertilizers may adversely affect soil health, disrupt nutrient balance, and increase the risk of environmental contamination, raising concerns about the sustainability of conventional potato production systems [4].

Plant growth-promoting microorganisms have emerged as an eco-friendly alternative to improve crop productivity while maintaining soil health [5]. Among plant growth-promoting microorganisms, arbuscular mycorrhizal fungi (AMF) are particularly important because they form beneficial symbiotic associations with plant roots. Once established, their extraradical hyphae extend beyond the nutrient-depletion zone surrounding the roots, enabling plants to access water and nutrients from a larger volume of soil [6]. This association is especially beneficial for the acquisition of poorly mobile nutrients such as phosphorus, along with micronutrients including zinc and copper. AMF colonization may also improve root development and water-use efficiency while increasing plant tolerance to biotic and abiotic stresses [7]. In addition to supporting plant nutrition, AMF can improve soil aggregation, influence microbial activity, and help maintain soil fertility, making them valuable components of sustainable agricultural systems [8].

Several commercial mycorrhizal biofertilizers have been developed to exploit these beneficial effects under field conditions [9]. PRO MYCO is a commercial mycorrhizal biofertilizer formulated to promote AMF colonization in plant roots and improve nutrient acquisition, thereby supporting plant growth and productivity [9]. A previous study reported that mycorrhizal inoculation improved vegetative growth, chlorophyll content, tuber development, nutrient uptake, and yield in potato [10]. Nevertheless, the field performance of mycorrhizal inoculants may be influenced by soil properties, environmental conditions, crop genotype, and prevailing agronomic practices. Therefore, their evaluation under specific agroclimatic conditions is essential to determine their effectiveness and practical agronomic potential [11].

Accordingly, the present study aimed to assess the effects of PRO MYCO application on the growth, tuber yield, root colonization, and nutrient uptake of potato (*Solanum tuberosum* L.) under field conditions. The study also examined its potential to improve crop performance and nutrient-use efficiency under the prevailing cultivation conditions.

Materials and Methods

Experimental site and plant material

A field experiment was conducted at Kapadvanj, Kheda District, Gujarat, India, using potato (Solanum tuberosum L.) to evaluate the effect of PRO MYCO under field conditions. The study evaluated a commercial mycorrhizal biofertilizer, PRO MYCO, applied at the recommended dose of 4 kg/acre.

PRO MYCO and AMF composition

PRO MYCO is a commercial arbuscular mycorrhizal biofertilizer produced using Mycorrhiza-SEU Technology. The formulation contains four AMF strains: *Funneliformis mosseae* (PZ951203), *Rhizophagus clarus* (PZ951207), *Rhizophagus aggregatus* (PZ952833), and *Rhizophagus intraradices* (PZ952834).

Experimental design

The experiment was conducted in a Randomized Block Design (RBD) with three replications. Two treatments were evaluated: T_1 (PRO MYCO @ 4 kg/acre) and T_2 (untreated control). The treatments were randomly allocated within each replication to assess the effect of PRO MYCO on plant growth, yield, mycorrhizal colonization, and nutrient uptake.

Application of PRO MYCO

Before planting, the field was prepared according to standard potato cultivation practices. PRO MYCO was applied as a basal soil application in the planting furrows at the time of planting at the recommended dose of 4 kg/acre. The inoculum was thoroughly mixed with the soil surrounding the seed tubers to ensure uniform distribution and effective root contact. The control plots were maintained without microbial inoculation.

Plant growth and yield assessment

Plant growth observations were recorded at appropriate crop growth stages from representative plants in each treatment. Germination percentage was calculated based on the number of emerged plants relative to the total number of planted seed tubers. Plant height was measured from the soil surface to the tip of the main shoot, while the number of stems per plant was determined

by direct counting. Root length was measured after carefully uprooting representative plants at harvest. Chlorophyll content was estimated using a hand-held SPAD chlorophyll meter and expressed as the chlorophyll index (SPAD) [12].

At harvest, representative plants from each treatment were evaluated yield parameters. The number of tubers per plant was determined by direct counting, and average tuber weight was calculated by dividing the total tuber weight by the number of harvested tubers. Tuber length and diameter were measured at harvest. Fresh biomass was recorded on a per-plant basis, and dry matter content was determined from representative tuber samples after drying to constant weight. Marketable and total tuber yields were calculated from the harvested produce and expressed as tonnes per hectare (t/ha) [13]. Tubers were classified into large, medium, and small size categories. Harvest index (HI) was calculated using the following equation:

Harvest Index (%) = (Tuber Yield/Total Biological Yield) × 100 [14]

Assessment of root colonization, spore population, and nutrient uptake

Evaluation of mycorrhizal colonization began with the collection of root samples at harvest. The samples were thoroughly washed, cleared, and stained following the standard root staining procedure described by Phillips and Hayman [15]. Colonization was quantified by examining stained root segments under a light microscope using the gridline intersect method [16]. Rhizosphere soil samples were then collected to determine AMF spore density. Spores were extracted by the wet sieving and decanting technique and counted under a light microscope, with results expressed as the number of spores per 100 g of soil [17]. Plant samples collected for nutrient analysis were dried, ground, and analyzed for nitrogen (N), phosphorus (P), and potassium (K) using standard laboratory procedures. Nutrient uptake was expressed as kilograms per hectare (kg/ha).

Statistical Analysis

The experimental data were analyzed using Analysis of Variance (ANOVA) appropriate for a Randomized Block Design (RBD). Statistical analyses were performed using IBM SPSS Statistics version 26.0. Treatment means were compared at the 5% probability level ($P \leq 0.05$). The results are presented as mean ± standard error (SE), and the Standard Error of Mean (SEm), Critical Difference (CD) at $P \leq 0.05$, and Coefficient of Variation (CV%) were calculated to determine the significance of treatment effects.

Results and Discussion

Effect of PRO MYCO on growth parameters of potato

Germination percentage

PRO MYCO-treated plots recorded a significantly higher germination percentage (96.42%) than the untreated control (88.26%) at $P \leq 0.05$ (Table 1). This response indicates that PRO MYCO application was associated with improved establishment of potato seed tubers under the field conditions of the present study. The cited study, conducted under pot conditions, included potato plants raised from true seed and reported 70–75% emergence from true seed and complete germination of seed tubers. The study also reported improved plant growth following AMF inoculation [18].

Plant height

Potato plants treated with PRO MYCO attained significantly greater plant height than the untreated control, increasing from 60.38 cm to 71.84 cm (Table 1). This improvement in shoot growth may be attributed to enhanced nutrient acquisition and improved root function resulting from effective mycorrhizal colonization. Similar responses have been reported in potato. AMF-inoculated plants attained a height of 67.0 cm in one study [19]. whereas a separate field trial recorded an increase from 59 cm in the untreated control to 85 cm following mycorrhizal application [20]. Despite differences in the magnitude of response, both studies suggest that mycorrhizal inoculation may promote vegetative growth in potato.

Number of Stems per Plant

A significant increase in the number of stems per plant was observed following PRO MYCO application, with treated plants producing 5.84 stems per plant compared to 4.63 in the untreated control (Table 1). The greater number of stems indicates a favourable vegetative response to PRO MYCO application and may be associated with improved nutrient availability in the treated plants. Stem number in potato has been reported to vary with nutrient management. In the study cited above, plants in the untreated control produced 3.14 stems/plant, whereas nutrient-managed treatments recorded 3.70–3.76 stems/plant [21].

Number of leaves per plant

Leaf production was significantly enhanced following the application of PRO MYCO, with treated plants producing 54.68 leaves per plant compared with 43.27 in the untreated control (Table 1). The increased number of leaves in PRO MYCO-treated plants reflects improved vegetative development and canopy formation. Differences in leaf production under various crop-management practices have also been reported in potato, with 43.25 leaves/plant under the farmer's practice, 49.38 leaves/plant under the CIP technique, and 49.10 leaves/plant under flat-bed planting with ridging and mulching [22].

Root length

Root development responded positively to PRO MYCO application, with root length increasing from 21.84 cm in the untreated control to 28.62 cm in treated plants (Table 1). A longer root system may enable plants to explore a greater volume of soil and improve their access to water and nutrients. The effect of AMF on root development has also been observed in *Amygdalus pedunculata*, where inoculation with *Rhizophagus intraradices* increased total root length from 121.80 cm in non-inoculated plants to 182.94 cm [23].

Chlorophyll index (SPAD)

An increase in chlorophyll index was observed in response to PRO MYCO application, with treated plants recording 48.74 SPAD compared with 41.26 SPAD in the untreated control (Table 1). The higher SPAD value of PRO MYCO-treated plants indicates a higher chlorophyll index than that of the untreated control. In potato, AMF inoculation has been associated with an increase in chlorophyll index, from 48.17 SPAD in non-inoculated plants to 51.73 SPAD in inoculated plants [24].

Treatment	Germination (%)	Plant Height (cm)	Stems/ plant	Leaves/plant	Root Length (cm)	Chloro-phyll Index (SPAD)
T1 – PRO MYCO	96.42 ± 1.38^{a}	71.84 ± 2.42^{a}	5.84 ± 0.28^{a}	54.68 ± 2.14^{a}	28.62 ± 1.18^{a}	48.74 ± 1.62^{a}
T2 – Control	88.26 ± 1.72^{b}	60.38 ± 2.15^{b}	4.63 ± 0.22^{b}	43.27 ± 1.96^{b}	21.84 ± 0.96^{b}	41.26 ± 1.41^{b}
SEm (±)	0.78	1.18	0.13	1.06	0.58	0.82
CD (P = 0.05)	2.46	3.72	0.41	3.34	1.82	2.58
CV (%)	3.84	4.62	5.18	4.93	5.11	4.76

Table 1: Effect of PRO MYCO on Growth Parameters of Potato.

Effect of PRO MYCO on tuber yield attributes of potato

Number of tubers per plant

Enhanced tuber formation was evident following the application of PRO MYCO, with treated plants producing 10.84 tubers per plant compared with 8.42 in the untreated control (Table 2). The greater number of tubers reflects improved tuber initiation and development, likely resulting from enhanced nutrient uptake and better plant vigor associated with mycorrhizal colonization. Comparable observations have been reported in potato, where AMF-inoculated plants produced 4.1–5.6 tubers/ plant, whereas the uninoculated control produced only 2.9 tubers/

plant, demonstrating the positive role of AMF in promoting tuber formation through improved plant growth and nutrition [25].

Average tuber weight

Average tuber weight was markedly improved by PRO MYCO application, increasing from 87.62 g in the untreated control to 112.74 g in treated plants (Table 2). Higher average tuber weight in PRO MYCO-treated plants may reflect improved assimilate accumulation during tuber development. Similar results were reported in a potato study, where mycorrhizal application increased mean tuber weight from 42.63 g in the untreated control to 72.36 g at the optimum application level [26].

Tuber diameter and tuber length

Improvement in tuber size was evident following PRO MYCO application, with tuber diameter increasing from 5.82 to 6.84 cm and tuber length from 7.16 to 8.43 cm compared with the untreated control (Table 2). The larger tuber size reflects enhanced tuber enlargement, which may be associated with improved nutrient uptake, photosynthate allocation, and overall plant vigor resulting from mycorrhizal colonization. Similar outcomes were reported in potato, where mycorrhizal inoculation increased tuber length from 5.26 to 6.28 cm and tuber width from 3.76 to 4.80 cm, demonstrating the positive effect of AMF on tuber growth and overall tuber quality [27].

Fresh biomass per plant

Potato plants receiving PRO MYCO accumulated 924.68 g plant^{-1} of fresh biomass, compared with 706.82 g/plant in the untreated control (Table 2). Enhanced nutrient availability in PRO MYCO-treated plants may have contributed to greater vegetative development and fresh biomass production. A previous study on potato also recorded a rise in the combined fresh weight of leaves and stems from 50.7 ± 2.2 to 55.3 ± 1.8 g/plant following biostimulant application [28].

Dry matter content

PRO MYCO treated plants produced tubers with a higher dry matter content, increasing from 19.72% in the untreated control to 22.84% (Table 2). The higher dry matter content indicates improved tuber quality and may be associated with greater carbohydrate accumulation resulting from enhanced nutrient uptake and photosynthetic efficiency. For comparison, the potato cultivar Santé has been reported to contain 22.86% dry matter, a level considered suitable for tuber quality and processing purposes [29].

Treatment	Tubers/plant	Average Tuber Weight (g)	Tuber Diameter (cm)	Tuber Length (cm)	Fresh biomass (g/plant)	Dry Matter (%)
T1 – PRO MYCO	10.84 ± 0.52^{a}	112.74 ± 4.81^{a}	6.84 ± 0.24^{a}	8.43 ± 0.31^{a}	924.68 ± 28.74^{a}	22.84 ±0.74^{a}
T2 – Control	8.42 ± 0.41^{b}	87.62 ± 3.96^{b}	5.82 ± 0.21^{b}	7.16 ± 0.28^{b}	706.82 ± 24.18^{b}	19.72 ±0.68^{b}
SEm (±)	0.22	2.24	0.12	0.15	14.32	0.35
CD (P = 0.05)	0.69	7.05	0.38	0.47	45.12	1.10
CV (%)	4.92	5.08	4.86	4.62	5.24	4.43

Table 2: Effect of PRO MYCO on Tuber Yield Attributes of Potato.

Effect of PRO MYCO on yield parameters of potato

Marketable yield

One of the most pronounced responses to PRO MYCO application was observed in marketable yield, which increased from 27.34 t/ha in the untreated control to 35.86 t/ha (Table 3). An increase in marketable yield was accompanied by a greater proportion of marketable-sized tubers in PRO MYCO-treated plots.Comparable results have been reported in potato field trials, where AMF inoculation increased marketable yield from 38.3 to 42.2 t/ha, with an average gain of 3.9 t/ha (9.5%) [30].

Total tuber yield

Yield performance of potato improved substantially following PRO MYCO application, with total tuber yield increasing from 28.46 t/ha in the untreated control to 37.24 t/ha (Table 3). In a previous potato study, AMF application at 20 g/plant and 40 g/plant resulted in tuber yields of 50 and 55 t/ha respectively [31]. These findings indicate that the yield response to AMF inoculation may vary with the application rate and growing conditions.

Large tubers

A marked shift towards the large-tuber category was recorded following PRO MYCO treatment, with its proportion rising from 34.62% in the untreated control to 52.68% in treated plots (Table 3). Large-sized tubers accounted for a larger share of the harvest following PRO MYCO application. In a previous study, large commercial-grade tubers (>100 g) represented approximately 36.5–61.4% of total production across potato genotypes [32].

Medium and small tubers

A favorable shift in potato tuber size distribution was observed following PRO MYCO application, as reflected by a reduction in the proportion of medium- and small-sized tubers compared with the untreated control (Table 3). Medium-sized tubers comprised 34.42% of the harvest in PRO MYCO-treated plots, compared with 41.58% in the untreated control, whereas the proportion of small tubers declined from 23.80% to 12.90%. Under different potato-growing conditions, the proportion of medium-sized tubers ranged from 19.4% to 25.8%, compared with 29.9% under the reference condition [33].

Harvest index

Improved assimilate partitioning was evident in PRO MYCO-treated plants, as reflected by an increase in harvest index from 68.42% in the untreated control to 76.84% (Table 3). The higher harvest index indicates that a greater proportion of biomass was allocated to tuber production, resulting in improved economic yield. This response is consistent with previous studies in potato, where AMF inoculation significantly increased biomass and tuber yield, indicating more efficient assimilate allocation towards economic yield.

Treatment	Marketable Yield (t/ha)	Total Yield (t/ha)	Large Tubers (%)	Medium Tubers (%)	Small Tubers (%)	Harvest Index (%)
T1 – PRO MYCO	35.86 ± 1.42^{a}	37.24 ±1.56^{a}	52.68±2.06^{a}	34.42 ±1.68^{b}	12.90 ±0.96^{b}	76.84±2.04^{a}
T2 – Control	27.34 ± 1.18^{b}	28.46 ±1.31^{b}	34.62 ±1.84^{b}	41.58 ±1.92^{a}	23.80 ±1.14^{a}	68.42 ±1.76^{b}
SEm (±)	0.72	0.79	0.98	0.84	0.61	0.92
CD (P = 0.05)	2.27	2.49	3.09	2.64	1.92	2.90
CV (%)	5.08	5.14	4.73	4.62	5.36	4.28

Table 3: Effect of PRO MYCO on Yield Parameters of Potato.

Further support comes from a study that reported an increase in harvest index from 65.31–66.46% in the untreated control to 70.94–76.58% under improved nutrient management, suggesting that better resource availability enhances assimilate partitioning towards tuber production [34,35].

Effect of PRO MYCO on root colonization and nutrient uptake of potato

Root colonization

Successful colonization of potato roots by arbuscular mycorrhizal fungi was achieved following PRO MYCO application, with root colonization increasing from 21.36% in the untreated control to 78.64% (Table 4). The higher colonization level confirms the effective establishment of a symbiotic association

between AMF and potato roots, thereby improving the potential for nutrient and water uptake. Experimental evidence in potato indicates that root colonization increased from approximately 19.9% with *Funneliformis mosseae* to 38.3% with *Rhizophagus irregularis*. Likewise, field experiments have shown measurable root colonization in uninoculated potato plants due to the presence of indigenous AMF; however, colonization remained lower than in inoculated plants, indicating more effective establishment of introduced AMF [36,37].

Spore count

AMF spore abundance in the rhizosphere was substantially higher in PRO MYCO-treated plants, reaching 348.42 spores per 100 g soil compared with 118.64 spores per 100 g soil in the untreated control (Table 4). The higher spore population reflects effective multiplication of mycorrhizal propagules and successful establishment of the fungus within the rhizosphere. A study in sweet potato, conducted under different field conditions, recorded 177 AMF spores per 100 g of soil in cultivated fields and 224 spores per 100 g of soil in fallow fields. Such differences may be influenced by soil conditions, host plants, and field-management practices [38].

Nitrogen uptake

Potato plants treated with PRO MYCO exhibited higher nitrogen uptake, reaching 146.72 kg/ha compared with 118.26 kg/ha in the untreated control (Table 4). Enhanced nitrogen uptake is likely a consequence of improved root colonization, which increases the soil volume explored by the fungal hyphae and enhances nutrient absorption. In potato, nitrogen uptake increased from 18.6 to 62.7 kg/ha with increasing nitrogen fertilizer application, demonstrating that enhanced nutrient availability promotes greater nitrogen acquisition and improved crop productivity [39].

Phosphorus uptake

Phosphorus uptake increased from 24.62 kg/ha in the untreated control to 36.84 kg/ha in PRO MYCO-treated potato plants (Table 4). This response may be associated with mycorrhizal colonization, as the fungal hyphal network can extend the volume of soil explored for phosphorus acquisition. In potato, seedling-stage inoculation with AMF increased phosphorus accumulation from 29.82 ± 0.76 kg/ha in the untreated control to 51.39 ± 1.84 kg/ha. This response was associated with greater mycorrhizal colonization, improved phosphorus-use efficiency, and increased tuber yield [40].

Potassium uptake

Potassium uptake also responded positively to PRO MYCO application, increasing from 151.74 to 182.46 kg/ha (Table 4). Enhanced potassium acquisition is likely a result of improved root growth and effective mycorrhizal colonization, which increased the plant's capacity to absorb potassium and other nutrients from the soil. Evidence from sweet potato also suggests a possible association between AMF inoculation and potassium acquisition. Inoculation with *Funneliformis mosseae* increased potassium accumulation from approximately 0.77 to 0.98 g/plant compared with the uninoculated control [41].

Treatment	Root Colonization (%)	Spore count (spores/100 g soil)	Nitrogen Uptake (kg/ha)	Phosphorus Uptake (kg/ha)	Potassium Uptake (kg /ha)
T1 – PRO MYCO	78.64 ± 2.41[a]	348.42 ±14.26[a]	146.72 ±5.64[a]	36.84 ± 1.52[a]	182.46 ± 7.16[a]
T2 – Control	21.36 ± 1.94[b]	118.64 ±9.82[b]	118.26 ±4.82[b]	24.62 ± 1.28[b]	151.74 ± 6.34[b]
SEm (±)	1.18	6.72	2.86	0.74	3.61
CD (P = 0.05)	3.72	21.16	9.01	2.33	11.37
CV (%)	4.81	5.34	4.93	5.18	4.84

Table 4: Effect of PRO MYCO on Root Colonization and Nutrient Uptake of Potato.

Conclusion

The present field study showed that PRO MYCO application improved several growth, yield, and nutrient-related characteristics of potato compared with the untreated control. Treated plants recorded higher germination, plant height, stem and leaf production, root length, and chlorophyll index. Improvements were also observed in tuber yield attributes, including the proportion of marketable and large-sized tubers, marketable yield, total tuber yield, and harvest index. In addition, PRO MYCO-treated plants exhibited greater root colonization, AMF spore density, and uptake of nitrogen, phosphorus, and potassium. These responses indicate that PRO MYCO may support potato growth and nutrient acquisition under the field conditions of this study. However, evaluation across additional locations, growing seasons, soil types, and potato cultivars is required to confirm the consistency of its performance under varied production conditions.

Bibliography

1. Reddy BJ., *et al*. "A review on potato (Solanum tuberosum L.) and its genetic diversity". I*nternational Journal of Genetics* (2018): 0975-2862.

2. Ahmadu Tijjani., *et al*. "The role of crop protection in sustainable potato (Solanum tuberosum L.) production to alleviate global starvation problem: An overview". *IntechOpen* (2021).

3. Devaux, André., *et al*. "Global food security, contributions from sustainable potato agri-food systems". In The potato crop: Its agricultural, nutritional and social contribution to humankind, pp. 3-35. Cham: Springer International Publishing, (2020).

4. Gelaye Yohannes. "Effect of combined application of organic manure and nitrogen fertilizer rates on yield and yield components of potato: A review". *Cogent Food and Agriculture* 9.1 (2023): 2217603.

5. Upadhyay Sudhir K., *et al*. "Plant growth-promoting rhizobacteria: a potential bio-asset for restoration of degraded soil and crop productivity with sustainable emerging techniques". *Environmental Geochemistry and Health* 45.12 (2023): 9321-9344.

6. Farhaoui Abdelaaziz., *et al*. "Arbuscular mycorrhizal fungi and their role in plant disease control: A state-of-the-art". *The Microbe* 8 (2025): 100438.

7. Boyno, Gökhan., *et al*. "Synergistic benefits of AMF: development of sustainable plant defense system". *Frontiers in Microbiology* 16 (2025): 1551956.

8. Fall Abdoulaye Fofana., *et al*. "Roles of arbuscular mycorrhizal fungi on soil fertility: contribution in the improvement of physical, chemical, and biological properties of the soil". *Frontiers in Fungal Biology* 3 (2022): 723892.

9. Ghorui Maunata., *et al*. "Recent advances in the commercial formulation of arbuscular mycorrhizal inoculants". *Frontiers in Industrial Microbiology* 3 (2025): 1553472.

10. Barzegari Barogh., *et al*. "Co-inoculation of arbuscular mycorrhizal fungi and plant growth-promoting rhizobacteria improve growth, biochemical attributes, and nutritional status of potato (Solanum tuberosum L.) minitubers". *Journal of Soil Science and Plant Nutrition* 23.3 (2023): 3447-3460.

11. López-Ráez Juan A., *et al*. "Root-Benefit Symposium & 3rd Annual Meeting, Granada 2026. Beneficial microorganisms for soil health and agriculture". (2026).

12. Jiang Chengyao., *et al*. "A correlation analysis on chlorophyll content and SPAD value in tomato leaves". *HortResearch* 71.71 (2017): 37-42.

13. Gupta RK., *et al*. "Response of potato (Solanum tuberosum) to nano-DAP based nutrient management under varying phosphorus levels at sub-tropics of North-Western Indian region". *Frontiers in Agronomy* 8 (2026): 1841220.

14. Lozano-Isla Flavio., *et al*. "Harvest index is a key trait for screening drought-tolerant potato genotypes (Solanum tuberosum)". *Journal of Crop Science and Biotechnology* 27.1 (2024): 91-103.

15. Phillips JM and DS Hayman. "Improved procedures for clearing roots and staining parasitic and vesicular-arbuscular mycorrhizal fungi for rapid assessment of infection". *Transactions of the British Mycological Society* 55.1 (1970): 158-IN18.

16. Giovannetti M and B Mosse. "An evaluation of techniques for measuring vesicular arbuscular mycorrhizal infection in roots". *New Phytologist* (1980): 489-500.

17. Gerdemann JW and TH Nicolson. "Spores of mycorrhizal Endogone species extracted from soil by wet sieving & decanting". (1963): 235-244.

18. Lone Rafiq., *et al*. "Effect of arbuscular mycorrhizal fungi on growth and development of potato (Solanum tuberosum) plant". *Asian Journal of Crop Science* 7.3 (2015): 233-243.

19. Naji Nour Sabah., *et al*. "Efficiency of some local isolates of arbuscular mycorrhizae in the growth and productivity of potatoes (Solanum tuberosum L.) in plastic pots". (2023): 274-280.

20. Melnyk OV., *et al*. "Effect of mycorrhizal formulation Mycofriend on potato productivity". V*egetable and Melon Growing* 73 (2023): 50-58.

21. Amjadi Hooshmand., *et al*. "Evaluation of yield, yield components and some quality traits of tuber of potato (Solanum tuberosum L.) under different weed and nutritional management practices". *Frontiers in Plant Science* 15 (2025): 1495541.

22. Parihar Chitrangda., *et al*. "The Effect of Alternative Tillage Practices on Potato Growth and Yield". *International Journal of Plant & Soil Science* 36.11 (2024): 327-331.

23. Bi Yinli., *et al*. "Plant growth and their root development after inoculation of arbuscular mycorrhizal fungi in coal mine subsided areas". *International Journal of Coal Science & Technology* 5.1 (2018): 47-53.

24. Abdulkadhum Mariam Hassan., *et al*. "Effect of mycorrhizal addition and organic fertilization on the growth and yield of potato in autumn season". In IOP Conference Series: Earth and Environmental Science 1262.4 (2023): 042004.

25. Davies Jr., *et al*. "Influence of Arbuscular Mycorrhizae Indigenous to Peru and a Flavonoid on Growth, Yield, and Leaf Elemental Concentration of Yungay'Potatoes". *HortScience* 40.2 (2005): 381-385.

26. Dinçel Burak and Güngör Yılmaz. "The Effects of Different GA3 and Mycorrhiza Dosages on Mini Tuber Production in Potatoes". *Turkish Journal of Agriculture-Food Science and Technology* 12.4 (2024): 619-624.

27. Kumar Niraj A., *et al*. "Field evaluation of arbuscular mycorrhizal fungal formulations on production performance of potato (Solanum tuberosum L.) cv. kufri sindhuri". *Current Journal of Applied Science and Technology* 24.3 (2017): 1-6.

28. Asghar Muhammad Ahsan., *et al*. "Comprehensive evaluation of biostimulants on leaf-level physiology, water use efficiency, and tuber quality in potato (Solanum tuberosum L.) under drought stress". *Frontiers in Plant Science* 17 (2026): 1837304.

29. Bodor Katalin., *et al*. "Investigation of the properties of different potato varieties and analysis of the starch structure". *Applied Food Research* 5.1 (2025): 100998.

30. Hijri Mohamed. "Analysis of a large dataset of mycorrhiza inoculation field trials on potato shows highly significant increases in yield". *Mycorrhiza* 26.3 (2016): 209-214.

31. Djeugap Joseph Fovo., *et al*. "Growth, late blight and yield response of potato (Solanum tuberosum L.) to arbuscular mycorrhizal fungi inoculation in West region of Cameroon". *Agricultura Tropica et Subtropica* 56.1 (2023): 163-170.

32. Liang Shumin., *et al*. "An evaluation based on the analytic hierarchy process and GGEbiplot on French fry potato genotypes in Yunnan, China". *Frontiers in Plant Science* 14 (2023): 1159848.

33. Pszczółkowski Piotr., *et al*. "Agroecological Determinants of Yield Performance in Mid-Early Potato Varieties: Evidence from Multi-Location Trials in Poland". *Land* 14.9 (2025): 1777.

34. Oladele Segun., *et al*. "Is arbuscular mycorrhizal fungal addition beneficial to potato systems? A meta-analysis". *Mycorrhiza* 35.1 (2025): 5.

35. Mwakidoshi Emmanuel R., *et al*. "Integrated nutrient management enhances potato yield and quality under acidic soil conditions". *Food and Energy Security* 15.2 (2026): e70231.

36. Deja-Sikora., *et al*. "AMF species do matter: Rhizophagus irregularis and Funneliformis mosseae affect healthy and PVY-infected Solanum tuberosum L. in a different way". *Frontiers in Microbiology* 14 (2023): 1127278.

37. Buysens Catherine., *et al*. "Tracing native and inoculated Rhizophagus irregularis in three potato cultivars (Charlotte, Nicola and Bintje) grown under field conditions". *Applied Soil Ecology* 115 (2017): 1-9.

38. Mukhongo Ruth Wilhem., *et al*. "Composition and spore abundance of arbuscular mycorrhizal fungi in sweet potato producing areas in Uganda". *Frontiers in Soil Science* 3 (2023): 1152524.

39. Liu Kailou., *et al*. "The response of potato tuber yield, nitrogen uptake, soil nitrate nitrogen to different nitrogen rates in red soil". *Scientific Reports* 11.1 (2021): 22506.

40. Liu Xiaoyu., *et al*. "Inoculation with arbuscular mycorrhizal fungi at the seedling stage of potatoes improves phosphorus use efficiency". *Frontiers in Sustainable Food Systems* 9 (2025): 1546032.

41. Yuan Jie., *et al*. "Interactive impact of potassium and arbuscular mycorrhizal fungi on the root morphology and nutrient uptake of sweet potato (Ipomoea batatas L.)". *Frontiers in Microbiology* 13 (2023): 1075957.