

Evaluate the effect of Integrated Nutrient Management (INM) on Economic and Physical attributes of Aonla (*Emblca officinalis Gaerten*).

Abstract:

The present investigation was conducted Evaluate the effect of Integrated Nutrient Management on Economic and Physical attributes of Aonla (*Emblca officinalis Gaerten*).The research was carried at Main Experiment Station, Horticulture, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) during the year 2021. It was laid out in a Randomized Block Design with 10 treatments namely: T₁ – Control, T₂- RDF 100% (1kg.N: 0.5kg.P:1kg.K per tree), T₃- FYM (10kg./tree) + RDF 100%, T₄- Poultry Manure (7.5kg./tree) + RDF 100%, T₅- FYM (10kg./tree) + RDF 50% + Azospirillum (10ml./tree), T₆- Poultry Manure (7.5kg/tree) + RDF 50% + Azospirillum (10ml./tree), T₇ -FYM (10kg./tree) + RDF 50% + PSB (10ml./tree), T₈- Poultry Manure + RDF 50% + Azospirillum (10ml./tree), T₉ -FYM (10kg/tree) + RDF 50% + Azospirillum (10ml./tree) + PSB (10ml./tree) and T₁₀- Poultry Manure (7.5kg/tree) + RDF 50% + Azospirillum (10ml/tree) + PSB (10ml./tree). The experiment was replicated thrice. Results showed treatment T₁₀ Poultry Manure (7.5kg/tree) + RDF 50% + Azospirillum (10ml/tree) + PSB (10ml./tree) outperformed the rest with maximum fruit set percent (78.56%), fruit retention (20.29%), Fruit Yield (102.78 kg/tree), 1 Fruit Weight (41.89 g), Fruit length (3.87 cm), Specific gravity (1.05 g/cm³) and maximum Gross return/ha Rs. 128264, 3 Net return Rs 92154 and Cost: benefit ratio was evaluated with the use of Treatment combination T₁₀. Thus the treatment combination is therefore recommended for application to Aonla trees in Eastern Uttar Pradesh in order to obtain high yields with better quality fruits.

Key word: INM, Aonla, Physical Quality, Azospirillum.

Introduction:

The Indian gooseberry or aonla (*Emblca officinalis Gaerten*) belongs to family “Euphorbiaceae” with the chromosome number 2n=28. It is native of Indo- China, particularly in central and southern India. Aonla finds mention in ‘Vedas, Ramayana, Charak Samhita and other ancient Indian Literature describing its fruit highly valuable as food, medicine and hair dye (Anon, 1964, chopra et al., 1958). In India Aonla cultivation is done mainly in northwest Himalayas (J & K, Himachal Pradesh, and Uttrakhand) to eastern Himalayas (Assam, Manipur, Meghalaya, Mizoram and Tripura). The domestication of aonla was first started in Varanasi, Uttar Pradesh with the initiative of Maharaja of Kashi. Banarasi, a superior genotype was selected from the wild aonla trees available in large number in the nearby Vindhyan hills. Authentic information regarding its cultivation dates back to 1881-82 in the Pratapgarh district of Uttar Pradesh. The ailing state owner of the district (King) was advised for regular consumption of aonla fruits (Singh et al., 2019).

It is commercially cultivated in Uttar Pradesh, Uttrakhand, Gujarat, Maharashtra, Rajasthan, Tamilnadu, Andhra Pradesh, Karnataka, Bihar, Haryana, Madhya Pradesh and west Bengal. In Uttar Pradesh Aonla more cultivated in nearby the belt of Pratapgarh followed by Ayodhya

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Replace with: RDF 100% (1kgN: 0.5kg, P:1kgKper tree), T₃- FYM (10kg/tree) + RDF 100%, T₄- Poultry Manure (7.5kg/tree) + RDF 100%, T₅- FYM (10kg/tree) + RDF 50% + Azospirillum (10ml/tree), T₆- Poultry Manure(7.5kg/tree) + RDF 50% + Azospirillum (10ml/tree), T₇-FYM (10kg/tree) + RDF 50% + PSB (10ml/tree), T₈- Poultry Manure + RDF 50% + Azospirillum (10ml/tree), T₉ -FYM (10kg/tree) + RDF 50% + Azospirillum (10ml/tree)

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district. Area under aonla orchard in Pratapgarh district is about 1300 hectares. Whereas, the area in Sadder block of district of Pratapgarh approximately 3250 hectares (Rai et al., 2017)

Aonla is a subtropical plant and prefers dry subtropical climate but it can be successfully cultivated in wide range of soil and climatic condition. Aonla is a medium sized, much- branched tree occupying height of 10-20 m. Inflorescence is racemose type, flower minute, unisexual with short pedicel. It is richest sources of vitamin C (400-1300mg. /100g. fruit pulp) among the fruits next to Barbados cherry. Its fruit also contains 82.2% water, 0.5% protein, 0.1% fat, 14% Carbohydrate, calcium, phosphorous and iron. Aonla having a nutritional and medicinal value. Aonla is accepted hair tonic in traditional recipe for enriching hair growth and hair pigmentation. It is an important ingredient of Triphala and Chawanprash in Ayurvedic Medicine System. Beside fruits are commonly used for preparation of preserve (murabba), pickle, candy, jelly etc. It can be dried and powdered to be used subsequently. The soils of India and especially of arid and semi-arid regions are impoverished and hungry to plant nutrients. Considering economy, energy and environment, it is imperative that nutrients are to be used effectively by adopting the appropriate doses of nutrients to be applied, their placement and correct timings to ensured higher yields and to sustain the available nutrients in soil at the optimum level efficient nutrient management not only help in increasing the present fruits and vegetables production level but also sustained the fruit production and protect the environment from different types of hazards occurring due to misuses of costly fertilizers. Integrated nutrient management practices will help to increase the productivity of the crop and enrich the biota of soil (Sharma et al., 2018). It involves proper combination of chemical fertilizer, organic manures and bio fertilizers suitable to the system of land use and ecological, social and economic conditions.

Method & Material:

The present investigation was carried out at Main Experiment Station, Horticulture, Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) during the year 2021-2022. The experiment was laid out in Randomized Block Design with 10 treatments namely: T₁Control, T₂ RDF 100% (1kg.N: 0.5kg.P:1kg.K per tree), T₃FYM (10kg./tree) + RDF 100%, T₄Poultry Manure (7.5kg./tree) + RDF 100%, T₅FYM (10kg./tree) + RDF50% + *Azospirillum* (10ml./tree), T₆Poultry Manure (7.5kg/tree) + RDF 50% + *Azospirillum* (10ml./tree), T₇FYM (10kg./tree) + RDF 50% + PSB (10ml./tree), T₈Poultry Manure (7.5kg/tree) + RDF 50% + PSB (10ml./tree), T₉FYM (10kg/tree) + RDF 50% + *Azospirillum* (10ml./tree) + PSB (10ml./tree), and T₁₀Poultry Manure (7.5kg/tree) + RDF 50% + *Azospirillum* + (10ml/tree) + PSB (10ml./tree) replicated thrice. The Ayodhya district's climate is classified as semi-arid, with three distinct seasons: rainy or wet, winter, and summer or hot. The rainy season begins the last week of June and lasts until September or even into October, with 1200 mm of rain on average. The soil was identified as a sandy loam with an average pH of 7.71 and an average proportion of fine sand (64.77%), silt (22.76%), and clay (14.95%). Thirty-six year old plants were used in the experiment. The prescribed schedule for the Aonla plantation was followed for the usual cultural operations, plant protection measures, and basal application of manures and fertilizers. Data was collect on fruit set (%), Fruit retention (%), and Fruit yield kg/plant), Fruit weight (g/fruit), Fruit size (cm), fruit volume and specific gravity and cost: benefit ratio. The data obtained during experimentation were statistically analysed as per the method given by Panse and Sukhatme (1985).

Comment [35]: Replace with: The area under the Aonla

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Comment [37]: Add a period: Aonla is a subtropical plant and prefers a dry subtropical climate, but it can be successfully cultivated in a wide range of soil and climatic conditions. Aonla is a medium sized, much- branched tree, occupying a height of 10-20 m. Inflorescence is racemose type, flower minute, unisexual, with a short pedicel. It is one of the richest sources of vitamin C (400-1300mg/100g. fruit pulp) among the fruits next to Barbados cherries. Its fruit also contains 82.2% water, 0.5% protein, 0.1% fat, 14% carbohydrate, calcium, phosphorous, and iron. Aonla has nutritional and medicinal value. Aonla is accepted as a hair tonic in traditional recipes for enriching hair growth and hair pigmentation. It is an important ingredient in Triphala and Chawanprash in the Ayurvedic Medicine System. Fruits are commonly used for the preparation of preserves (murabba), pickles, candy, jelly, etc. It can be dried and powdered to be used later. The soils of India, especially those of arid and semi-arid regions, are impoverished and hungry for plant nutrients. Considering economy, energy, and environment, it is imperative that nutrients are used effectively by adopting the appropriate doses of nutrients to be applied, their placement, and the correct timings to ensure higher yields and sustain the available nutrients in soil at the optimum level. Efficient nutrient management not only helps in increasing the present fruit and vegetable production level but also sustains fruit production and protects the environment from different types of hazards occurring due to misuse of costly fertilizers. Integrated nutrient management practices will help to increase the productivity of the crop and enrich the biota of the soil (Sharma et al., 2018). It involves a proper combination of chemical fertilizer, organic manures, and biofertilizers suitable to the system of land use and ecological, social, and economic conditions.

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Result and Discussion:

Effect of INM on different physical attributes and economic of *onla*:-

Fruit Set (%):

The data significantly presented in Table 1 revealed that maximum fruit set percent (78.56%) was noticed with the use of treatment T₁₀ -Poultry Manure (7.5 kg/tree) + RDF 50% + Azospirillum (10 ml/tree) + PSB (10 ml/tree) followed with the use of T₉- FYM (10 kg/tree) + RDF 50% + Azospirillum (10 ml/tree) + PSB (10 ml/tree). However minimum fruit set value (55.71%) was recorded with the use of T₁-control which was at par with T₅-FYM (10 kg/tree) + RDF 50% + Azospirillum (10 ml/tree), T₆- Poultry Manure (7.5 kg/tree) + RDF 50% + Azospirillum (10 ml/tree) and T₇- FYM (10 kg/tree) + RDF 50% + PSB (10 ml/tree).

Fruit Retention (%):

It is apparent from Table 1, treatment T₁₀-Poultry Manure (7.5kg/ tree) + RDF 50% + Azospirillum (10 ml/tree) + PSB (10 ml/tree) recorded significantly maximum number of fruit retention was obtained (20.29%) followed with the use of T₉-FYM (10 kg/tree) + RDF 50% + Azospirillum (10 ml/tree) + PSB (10 ml/tree). Whereas, the minimum fruit retention (12.23) percent was observed in treatment T₁ (control) which was statistically at par with T₂-RDF 100% (1kgN: 0.5kgP:1kgK per tree) and T₃- FYM (10 kg/tree) + RDF 100%. The results are in conformed with the findings of Hiwale (2009) and Prabhu et al. (2018).

Table: 1 Physical attributes

	Treatments	Fruit Set (%)	Fruit Retention (%)	Fruit Yield (kg/tree)	Fruit Weight (g)	Fruit Length (cm)	Fruit Width (cm)
T ₁	Control	55.71	12.23	54.97	37.14	3.10	3.32
T ₂	RDF 100 % (1kg N : 0.5kg P : 1kg K per tree)	57.53	13.98	68.15	38.90	3.18	3.45
T ₃	FYM (10kg/tree) + RDF 100%	59.66	15.55	73.46	39.17	3.30	3.50
T ₄	Poultry manure (7.5kg/tree) + RDF 100%	62.20	15.99	77.05	39.27	3.40	3.52
T ₅	FYM (10kg/tree) + RDF50% + <i>Azospirillum</i> (10ml/tree)	66.10	16.80	82.15	39.98	3.42	3.57
T ₆	Poultry manure (7.5kg/tree) + RDF 50% + <i>Azospirillum</i> (10ml/ tree)	70.06	17.80	85.08	40.06	3.46	3.62
T ₇	FYM (10kg/tree) + RDF 50% + PSB (10ml/tree)	73.16	18.0	90.02	40.87	3.60	3.70
T ₈	Poultry manure + RDF 50% + PSB (10ml/tree)	74.73	18.90	93.13	41.24	3.65	3.90

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T ₉	FYM + RDF 50% + <i>Azospirillum</i> (10ml/tree) + PSB (10ml/ tree)	76.13	19.50	96.09	41.38	3.69	4.00
T ₁₀	Poultry manure (7.5kg/tree) + RDF 50% + <i>Azospirillum</i> (10ml/ tree) + PSB (10ml/tree)	78.56	20.29	102.78	41.89	3.87	4.15
	SEm ±	0.77	0.36	1.27	0.68	.04	0.06
	CD at 5%	2.22	1.07	3.76	2.02	0.11	0.17

Fruit Yield (kg/tree):

Data presented in Table 1 clearly indicated that application of Poultry Manure (10kg/tree) + RDF 50% + *Azospirillum* (10ml./tree) + PSB (10ml./tree) was found to be significantly best treatment and maximum fruit yield obtained 129.79 kg per tree followed by FYM (10kg/tree) +RDF 50% + *Azospirillum* (10ml./tree) + PSB (10ml./tree). Whereas, minimum fruit yield obtained 72.95 kg per tree in treatment (control). The present findings are in conformity with report of Amiri and Fallahi (2009), Bhabiskar et al. (2011), Aiyelaagbe et al. (2012) and Ghosh et al. (2012).

Fruit Weight (g):

The significantly maximum fruit weight (41.89 g) was recorded in the treatment T₁₀- Poultry Manure (7.5kg/ tree) + RDF 50% + *Azospirillum* (10ml. /tree) + PSB (10ml. /tree) followed by treatment T₉- FYM (10kg/tree) + RDF 50% + *Azospirillum* (10ml. /tree) +PSB (10ml./tree). Whereas, treatment T₁ that is control indicated minimum average fruit weight (37.14 g) and application of T₈, T₇ and T₆ were found to at par with T₁₀ and proved equally good to increase fruit weight. This type of result are in close conformity with (1125:750:375 g NPK + 15 kg vermicompost + 250 g Azotobactor + 250 g PSB/plant) in Sapota Bhabiskar et al. (2011), Manjunath et al., (2006) Bendegumbal et al., (2008) and also reported by Aal et al. (2020).

Fruit Length (cm):

Fruit length has clearly presented in Table 1 revealed that the response of- Poultry Manure (7.5kg/ tree) + RDF 50% + *Azospirillum* (10ml. /tree) + PSB (10ml. /tree). The significantly higher fruit length was recorded with treatment T₁₀ Poultry Manure (7.5kg/ tree) + RDF 50% + *Azospirillum* (10ml./tree) + PSB (10ml./tree) and value was obtained (3.87cm) followed by T₉- FYM (10kg/tree) + RDF 50% + *Azospirillum* (10ml./tree) +PSB (10ml./tree) which was at par with T₈ and T₇. However the minimum fruit length (3.10cm) observed with treatment T₁ i.e. Control. Bhabiskar et al. (2011) reported maximum fruit size treated with (1125:750:375 g NPK + 15 kg vermicompost + 250 g Azotobactor + 250 g PSB/plant).

Fruit Width (cm):

It is evident from the data presented in Table 1 that application of integrated nutrient management significantly influenced the fruit width and in T₁₀ treatment recording maximum fruit width value obtained (4.15 cm) and it was followed by T₁₀. However treatment T₁₀ indicated minimum fruit width value (3.32 cm) which was statistically at par with T₂ and T₃.

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Bhabiskar et al. (2011) reported maximum fruit size treated with (1125:750:375 g NPK + 15 kg vermicompost + 250 g Azotobactor + 250 g PSB/plant) and similar result also reported by Aal et al. (2020) with the application of 50% RDF through chemical fertilizer + 25% RDN through vermicompost + 10 ml. Anubhav bio NPK consortium/tree).

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Specific gravity (g/cm3):

The maximum specific gravity value (1.05g /cm3) was recorded with the use of T₁₀ followed by T₉. However T₁₀ was at par with treatment T₈, T₇, T₃ and T₂ whereas minimum specific gravity value (1.01g/cm3) was recorded with the treatment T₁ that is control. This type finding conformity with by **Rayees et al. (2015)** revealed that application of various treatment combinations of organic and inorganic fertilizers in strawberry (*Fragaria x annanassa* Duch.) was observed maximum specific gravity.

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Economics attributes:

Cost of production:

Data pertaining in Table 2 that cost of production varied as variation in different treatments. Maximum total cost of production was noted with the use of T₁₀ Poultry Manure (7.5kg/tree) + RDF 50% + Azospirillum (10ml/tree) + PSB (10ml./tree) followed by application of T₉ FYM (10kg/tree) + RDF 50% + Azospirillum (10ml./tree) + PSB (10ml./tree).

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Gross return:

The highest gross return/ha Rs. 128264 were recorded with the use of T₁₀. The lowest gross return/ha Rs. 68584 with the application of T₁.

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Net return:

Data pertaining in Table 2 revealed that the Maximum net returns obtained with the application of T₁₀ Poultry Manure (7.5kg/tree) + RDF 50% + Azospirillum (10ml/tree) + PSB (10ml. /tree).

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Cost: benefit ratio:

Data pertaining in Table 2 revealed that the Maximum benefit ratio obtained with the application of T₁₀ Poultry Manure (7.5kg/tree) + RDF 50% + Azospirillum (10ml/tree) + PSB (10ml. /tree). These types of results were noted by Kumar et al. (2018) in strawberry with the combined application with organic manures and also reported by **Srivastava et al. (2014)**

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Table: 2 Economics of different INM during present investigation:

	Treatments	Yield (q/ha.)	Cost of production (Rs. /ha.)	Gross income (Rs./ha.)	Net income (Rs./ha.)	Cost: benefit ratio
T ₁	Control	99.74	26650	68584	41394	1:1.57
T ₂	RDF 100 % (1kg N : 0.5kg P : 1kg K per tree)	106.31	30753	85048	54295	1:1.76
T ₃	FYM (10kg/tree) + RDF 100%	114.59	31450	97672	60222	1:1.91

T ₄	Poultry manure (7.5kg/tree) + RDF 100%	120.19	32120	96152	64032	1:1.99
T ₅	FYM (10kg/tree) + RDF50% + <i>Azospirillum</i> (10ml/tree)	128.54	32990	102832	69842	1:2.11
T ₆	Poultry manure (7.5kg/tree) + RDF 50% + <i>Azospirillum</i> (10ml/tree)	132.74	33210	106176	72966	1:2.19
T ₇	FYM (10kg/tree) + RDF 50% + PSB (10ml/tree)	140.43	34340	112344	78004	1:2.27
T ₈	Poultry manure + RDF 50% + PSB (10ml/tree)	145.28	34995	116224	81229	1:2.32
T ₉	FYM + RDF 50% + <i>Azospirillum</i> (10ml/tree) + PSB (10ml/tree)	149.90	35650	119920	84270	1:2.36
T ₁₀	Poultry manure (7.5kg/tree) + RDF 50% + <i>Azospirillum</i> (10ml/tree) + PSB (10ml/tree)	160.33	36110	128264	92154	1:2.55

Conclusion:

In this way experiment was revealed that the maximum Physical and Economical attributes viz., Fruit Set % , : Fruit Retention (%),Fruit Yield (kg/tree), Fruit Weight (g) , : Fruit Width (cm),and Cost: benefit ratio were obtained with the application of Poultry manure (7.5kg/tree) + RDF 50% + *Azospirillum* (10ml/ tree) + PSB (10ml/tree)

Future Scope:

INM is a system that helps to restore and sustain crop productivity and also assist in checking the emerging micro-nutrient deficiencies. With this view a dire need as felt and thought importance to minimize the use of chemical fertilizers with the use of integrated nutrient management towards better growth, yield of fruits.

References

Anonymous. 1964.

Agriculture in ancient India.

Aal, J.M.; Patel, K. M.; Patel, S.J.; and Sindha, D. J. 2020.

Effect of integrated nutrient management on fruit yield of aonla (*Emblica officinalis* Gaertn) cv. Gujarat Aonla-1, International Journal of Current Microbiology and Applied Sciences 9(10): 417-423.

Amiri, M.E. and Fallahi, E. 2009.

Impact of animal manure on soil chemistry mineral nutrients, yield and fruit quality in Golden Delicious apple. Journal. Plant Nurture, 32: 610-617

Comment [89]: Replace with: In this way, it was revealed that the maximum physical and economical attributes, viz., fruit set % , fruit retention (%), fruit yield (kg/tree), fruit weight (g), fruit width (cm),and cost-benefit ratio were obtained with the application of poultry manure (7.5kg/tree) + RDF 50% + *Azospirillum* (10ml/ tree) + PSB (10ml/tree).

Comment [90]: Replace with: assists in checking emerging micronutrient deficiencies. With this view, there is a dire need to minimize the use of chemical fertilizers with the use of integrated nutrient management for better growth and yield of fruits.

Comment [91]: The author(s) are to follow the journal reference style.

Aiyelaagbe, I. O. O., Oshuniyi, A. A. and Adegoke, J. O. 2012.

Response of Smooth Cayenne pineapple to organic fertilizer in south western Nigeria. In: Proceedings of XXVIIIth IHC-International Symposium on Organic Horticulture: Productivity and Sustainability. Acta Horticulture, 933: 261- 264.

Bhabiskar MN; Bharad SG; DOD VN, Barne VG. 2011.

Effect of integrated nutrient management on yield and quality of sapota. Plant Archives. 11(2):661- 663.

Bendegumbal, S.; Sajjan, Ashok, S.; Vyakaranahal, B.S.; Malbasari, T.A.; Hosamani, R.M. and Patil, A.B. (2008).

Studies of organic seed production in onion. Karnataka J. Agric. Sci., 21(1): 120-121.

Chopra, R.N.; I.C. Chopra; Handa and L.D. Kapur 1958.

Chopra's indigenous drugs of India (2nd Ed.) U.N. Dhur and Sons Pvt., Calcutta.

Ghosh, S. N.; Bera, B.; Roy, S. and Kundu, A. (2012).

Integrated nutrient management in pomegranate grown in laterite soil. Indian J. of Hort.; 69(3):333-337.

Hiwale SS.

The pomegranate. New Delhi, New India Publishing Agency. 2009, 158.

Manjunath, H.; Ganigar, V. M.; Reddy, B.G. and Joshi, V.R. (2006).

Integrated nutrient management in sapota (Achorussapota) using vermicompost to increase yield and quality. Indian J. Agric. Sci., 76(10): 587-590.

Panse, V.C. and Sukhatme, P.V. 1985.

Statistical Methods for Agricultural Workers, ICAR, New Delhi.

Prabhu, M., Parthiban, S., Kumar, A.R., Rani, B.U. and Vijayasamundeeswari. 2018.

Effect of integrated nutrient management on acid lime (Citrus aurantifolia Swingle. (L.)). Indian Journal of Agricultural Research, 52(3): 290-294.

Rayees A. Wani, S A Hakeem, Sabiya Bashir, Seerat Geelani, Mohammad Najeeb Mughal, V.M. Prasad, 2015.

Impact of integrated nutrient management on growth, yield and quality of strawberry (Fragaria x annanassa Duch.) cultivation in India. Nat Sci.13 (1):39-44]. (ISSN: 1545-0740)

Sharma, B.D., Meena Anita, Jatav, M.K. and Balai, Roop Chand, 2018.

Integrated nutrient management for horticultural crops in arid region. CIAH/ Tech./ Pub. No.77, pp 42. ICAR-Central Institute for Arid Horticulture, Bikaner, Rajasthan, India

Srivastava, Amrish, Singh, J.K. and Singh, H.K. 2014.

Integrated Nutrient Management (INM) on growth, yield and quality of papaya (Carica papaya L.) cv. CO-7. Asian J. Hort., 9(2): 390-395.