Grafito
Innovations

India's First Desktop Vegetable Grafting Robot

Achieve Healthier & High-Yield Seedlings with Precision Grafting

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Get your grafting robot today !

What is Grafting ?

Grafting is a horticultural technique where the tissues of **two different plants are joined together to grow as one**. The lower part, known as the **rootstock**, provides the root system, while the upper part, called the **scion**, develops into the stem, leaves, flowers, or fruits. For grafting to be successful, the cambium layers of both the rootstock and scion must be precisely aligned so they can fuse and form a strong union.

Types of grafts used

Splice grafting is a simple and popular method where the rootstock and scion are cut at matching 30–45° slants so their cambium layers align and join easily. The stems **must be of similar thickness**, and the joint is secured **with a grafting clip** to ensure proper healing. This method is common in **tomato**, **brinjal**, **chilli**, **capsicum**, **okra**, **melons**, **cucumber**, and **other gourds**, as it produces strong plants that combine the rootstock's disease and stress resistance with the scion's yield and fruit quality. It is quick, nursery-friendly, and gives high success rates when performed at 25-30°C.

Benefits of Grafting

Protection from Pest and Bacterial Wilt

30-40% More Yield

Flood & Salt Tolerance

Lower usage of pesticides

Why automate grafting and what we do ?

Grafting offers significant business opportunities for nurseries and farmers, but challenges like labor shortages, inconsistent quality, difficulties in meeting high production demand, and the repetitive nature of the task have hindered its potential. To overcome these obstacles, **Grafito** has developed **fully** and **semi-automated grafting machines.**

Key features of grafting machine

01 **Electrical actuation** for precise and smooth operation

02 Optimized for **splice grafting**

03 Ready for machine-vision integration

04 Programmable operation parameter

05 **Adjustable cutting angle** and **heights**

06 **Single-operator** requirement

08 Real-time monitoring and logging

07 Compatible with most commercial grafting clips

09 Modular **tool change** for other grafting methods

10 **Consistent** accuracy

Technical Specification

Power Consumption less than 100W

Control Interface: Touchscreen + IoT

Grafting Speed: > 500 grafts per hour+

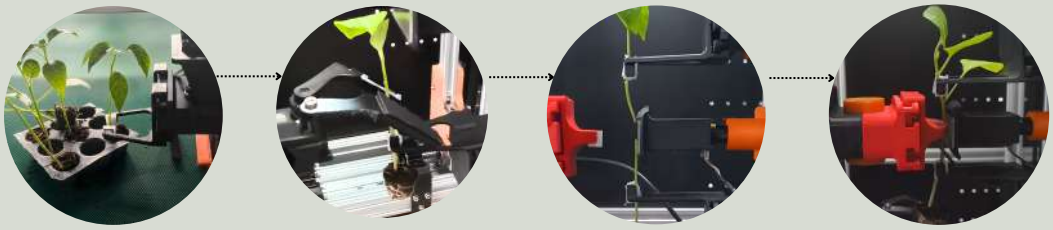
Power Supply: 220V AC

Footprint: 80 cm × 80 cm × 80 cm

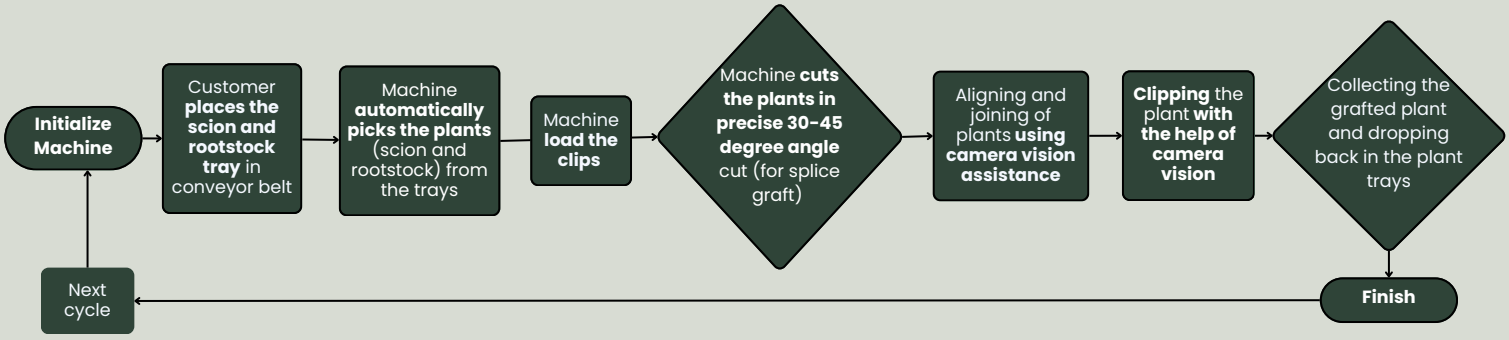
Scan for demo

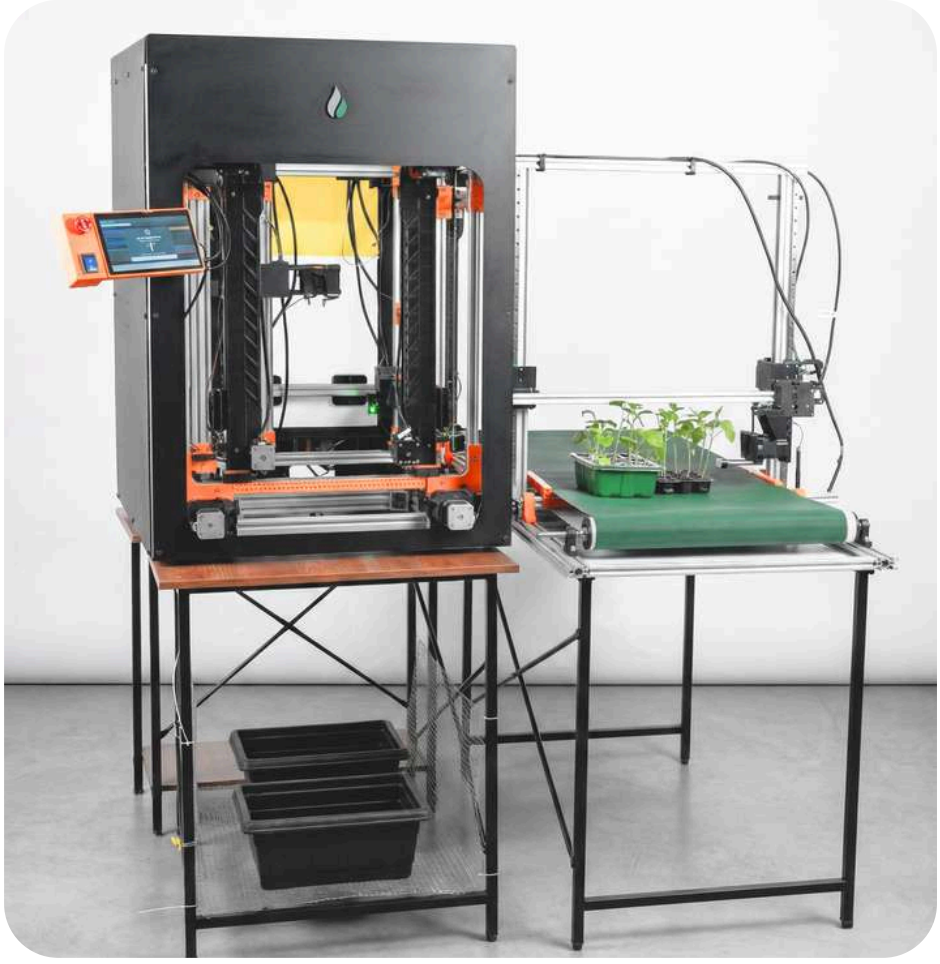
How Our Grafting Machine Works ?

Our grafting machine offers two flexible modes to suit different nursery needs. In the **semi-automated mode**, the operator simply feeds the rootstock, scion, and clips while the machine takes care of all the precision steps- cutting, aligning, and joining so every graft is uniform and reliable
For larger operations, the **fully automated mode** provides a complete robotic workflow, automatically picking seedlings from trays and clips without any manual effort, making it perfect for high-volume, continuous production.



Picking Cutting Aligning Clipping





Pricing

Grafting as a Service

Rs **25,000**/month

+

One time setup fee

Semi-Automated System

Rs **5,00,000**

- Manual loading
- Auto cutting, alignment and clipping

Fully-Automated System

Rs **6,50,000**

- Automatic **seedling loading**
- Automatic **clip** loading

Cost comparison of grafted and non grafted plants (through Manual grafting) - Case study

Grafting eggplant onto *Solanum torvum* (Turkey Berry / Wild Brinjal) rootstock significantly improves plant vigor, resistance to soil-borne diseases, and overall yield.

Parameter	Non-Grafted Crop	Grafted Crop (S. torvum)
Land Preparation	₹15,000	₹15,000
Nursery Cost	₹6,970 (5×2 ft)	₹29,040 (5×3 ft, grafted)
Labour Cost	90,000	1,20,000
Other Costs	₹1,13,000	₹1,43,000
Total Expense	₹2,24,970	₹3,07,040
Expected Yield	40 MT @ ₹10/kg = ₹4,00,000	80 MT @ ₹10/kg = ₹8,00,000
Total Income	₹4,00,000	₹8,00,000
Total Savings	₹1,75,030	₹3,92,960

Benefit cost ratio- 1:2

For every ₹1 invested they generated ₹2 in return. Overall, grafted eggplant delivered 20–25% higher net yield and achieved a Return of Investment of 2.0–2.2 times more, demonstrating that grafting is commercially viable, scalable, and strongly beneficial for long-term farm profitability.

Economics of grafting

ICRISAT launched a grafted vegetable program in Rayalaseema (AP) to tackle soil-borne diseases, salinity, and heat-related yield losses. The goal was to promote grafted seedlings across 400 hectares in three years. With support from the Department of Horticulture and Heirloom Plants Pvt. Ltd., farmers from multiple districts received grafted seedlings and training through village-based "learning sites" near the Center of excellence (CoE) . Farmers soon observed clear benefits, including lower pest and disease incidence and yield increases of 20–150% compared to normal seedlings.

Crop	Non-Grafted Seedlings Produced	Area Covered (acres)
Tomato	9,18,734	122.5
Brinjal	2,48,500	33.13
Bitter gourd	46,774	12.64
Bottle gourd	3,057	0.83
Cabbage	6,319	0.53
Capsicum	34,822	1.39
Chilli	5,73,732	47.81
Drumstick	1,643	0.53
Ridge gourd	3,315	0.9
Snake gourd	550	–
Watermelon	21,160	–
Snake gourd	3,961	1.07

Crop	Grafted Seedlings	Area Covered (acres)
Tomato	1,56,859	20.91
Brinjal	1,09,821	14.64
Bitter gourd	52,656	14.23
Bottle gourd	32,424	8.76
Cabbage	–	–
Capsicum	–	–
Chilli	15,893	1.32
Drumstick	20,264	20.26
Ridge gourd	–	2.71
Snake gourd	–	2.14
Watermelon	–	0.15
Snake gourd	–	5.72

comparison of seedlings produced(both grafted and non grafted) in certain area (source: ICRISAT Annual report on Grafted vegetables)

During 2019–20, grafted seedlings were distributed to farmers in 14 blocks across 9 districts.
In the second year, the project produced 3.86 lakh grafted seedlings and 19 lakh non-grafted seedlings, benefiting hundreds of farmers across large areas.

Cost breakdown of Grafted and Non grafted plants - Case Study from Kuppam Region (AP)

Area: 0.3 acre

Seedlings: 2,000

Yield: 13.6 tons in 0.3 acre

Financial Analysis: Investment vs. Return

Investment (Cost)

Grafted Seedlings: **₹ 14,000**
Non grafted : **₹ 3,000**

Net Extra Cost : ₹ 11,000

for 2,000 seedlings

Net Profit Generation

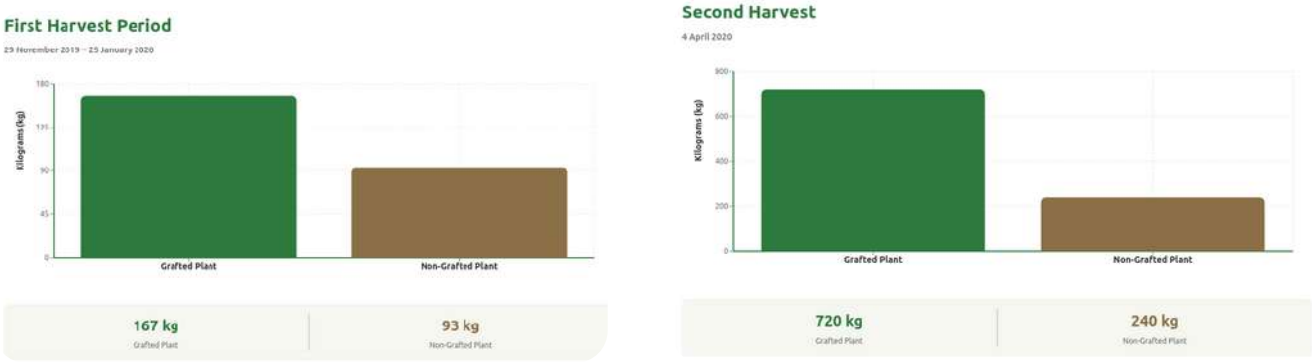
Yield Gain Income: **₹ 76,000**
Net extra cost : **₹ 11,000**

Net Profit: ₹ 65,000

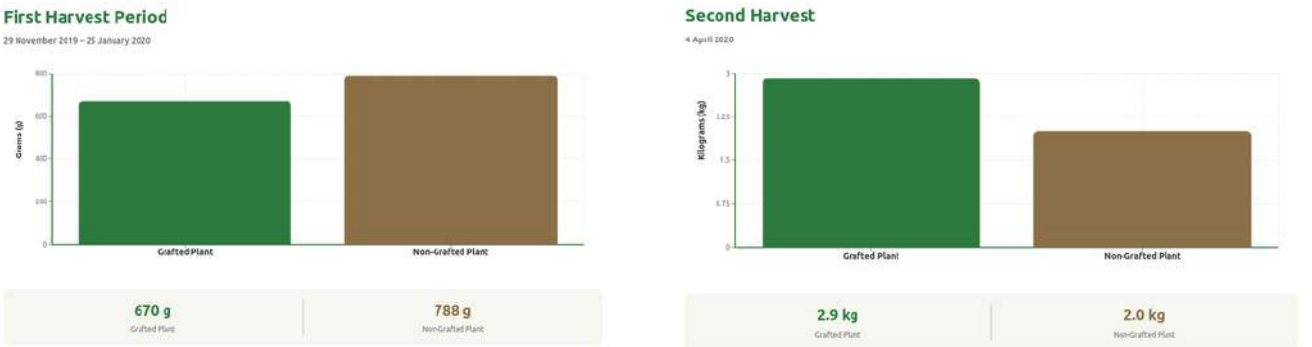
per 0.3 acre

BOTTOM LINE: For every ₹ 1 invested in grafting farmeres earns approximately ₹ 6

Yield comparison of Grafted and Non grafted plants - Case study from a nursery in Punjab



total harvest



per plant average

Grafted plants produced 40–60% higher yield than normal plants at the same harvest stage.

Economics of manual grafting vs robotic grafting

Manual Grafting

Labour Productivity

Grafts per worker per day: 500
Number of workers: 5
Total grafts per day: 5 × 500 = 2,500 grafts/day

Total Production Capacity

Daily production: 2,500 grafts
Yearly production: 2,500 × 20 × 12 = 6,00,000 grafted seedlings per year

Labour cost

Salary per worker per day: ₹800
Salary for 5 workers per day:
5 × 800 = ₹4,000/day
Monthly labour cost (20 working days):
4,000 × 20 = ₹80,000/month
Annual labour cost:
80,000 × 12 = ₹9,60,000/year

Profit Per Seedling

- Production cost per seedling: ₹10
- Selling price per seedling: ₹12
- Profit per seedling: 12 – 10 = ₹2 profit per seedling
- Total seedlings per year: 6,00,000
- Total profit: 6,00,000 × ₹2 = ₹12,00,000

Net Profit (After All Costs)

Net Profit = Total Profit – Labour Cost – Additional Cost

Assuming additional cost = ₹1,00,000

Calculation

Total profit = ₹12 L
Labour cost = ₹9.6 L
Additional cost = ₹1 L

Net Profit = ₹12 L – ₹9.6 L – ₹1 L

Net Profit = ₹1.4 L per year

Robotic Grafting

Investment Cost

One-time cost of robot: ₹5,00,000

Machine Productivity

Grafts per robot per day: 4,000
Total grafts per month (20 working days):
4,000 × 20 = 80,000 grafts/month
Total grafts per year:4,000 × 20 × 12 = 9,60,000 grafted seedlings/year

Labour Cost

Worker required: 1
Salary per worker per day: ₹800
Monthly labour cost:
800 × 20 = ₹16,000/month
Annual labour cost: 800 × 20 × 12 = ₹1,92,000
(Rounded to ₹2,00,000 for calculation)

Profit Per Seedling

- Profit per grafted seedling: ₹2
- Total seedlings per year: 9,60,000

Total annual profit:9,60,000 × ₹2 = ₹19,20,000

Net Profit (After All Costs)

Net Profit = Total Profit – Robot Cost – Labour Cost – Additional Cost

Assuming additional cost = ₹1,00,000

Calculation

Total profit = ₹19.2 L
Robot cost = ₹5 L
Labour cost = ₹2 L
Additional cost = ₹1 L
Net Profit = ₹19.2 L – ₹5 L – ₹2 L – ₹1 L

Net Profit = ₹11.2 L per year

How Grafito's Grafting Machine Can Be Used as a Research Platform ?

Grafito Innovations' grafting machine is currently making a big impact in vegetable research and studies, offering a precise and flexible platform to handle different crops in future. The smart system can be used in field of various research helping to use as a tool for researchers, nurseries, and seed companies looking to improve crop breeding, quality, and automation .

- Modular & Programmable Platform with AI Integration Capability
- Flexible design with easily swappable parts for different crops and research needs.
- Adjustable cutting angle, pressure, and height for consistent results.
- Programmable settings for reliable and repeatable experiments.

Crop Research Opportunities now and in near future

Vegetables

Tomato, brinjal, chilli, cucumber, gourds, okra, focusing on rootstock compatibility, disease resistance, and stress tolerance.

Ornamentals & Flowers

Roses, bonsai, bougainvillea, adenium, and others, exploring unique flower colors and multi-scion tree development.

Fruits

Citrus, pomegranate, litchie, dragon fruit, guava, etc with applications in orchard standardization and exotic fruit propagation.

Future Trials with Monocots

Experimental grafting on Rice, other cereals, grasses and other crops using specially designed attachments.

Hydroponics & Controlled Environment Agriculture

Developing disease-resistant and salt-tolerant rootstocks in vertical farming systems. Grafted plants develop stronger root systems, which perform better in hydroponics.

Other products

Hand grafting tool : Splice Grafting Made Easy

Splice Grafting for vegetables made easy

Our Hand Grafting Tool is built to give clean, precise cuts with minimal effort, making grafting easier and more reliable for nurseries, growers, and horticulture professionals. Designed for accuracy and comfort, it helps users perform grafting smoothly while ensuring strong, healthy graft unions and consistently high success rates

Precision 30°–45° Angle Cut

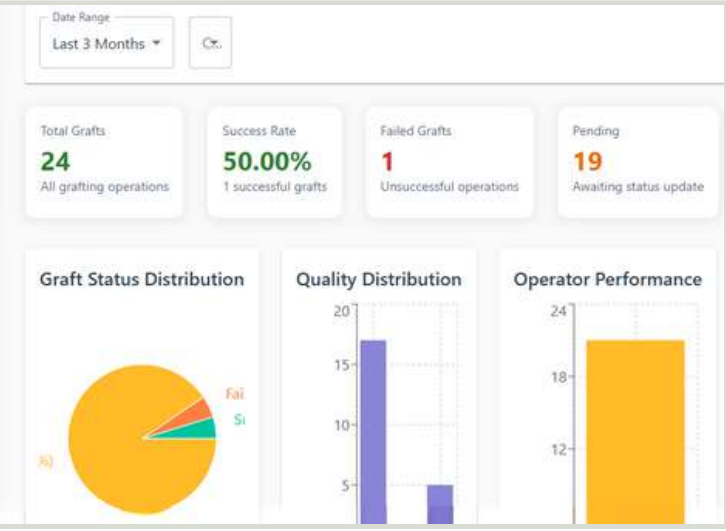
Uses Normal Razor Blade

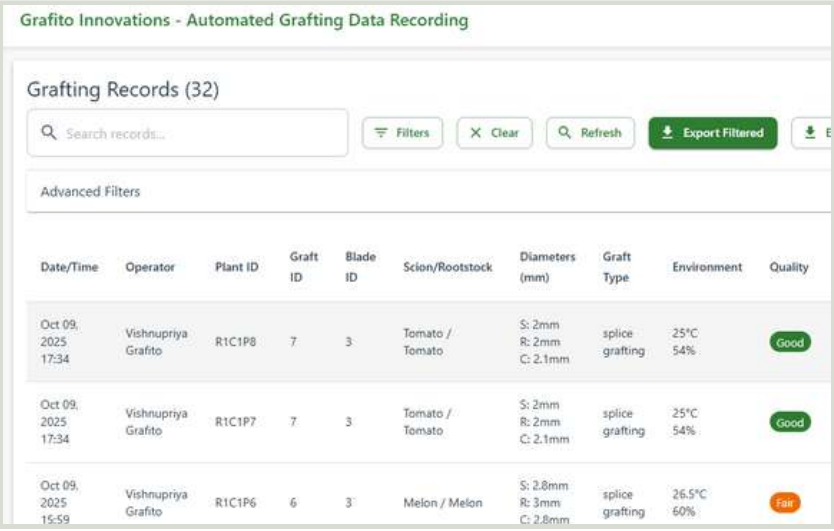
Ergonomic Design

GrafTrack

Application designed to record and manage all grafting data in one place.

- Stores pre-graft and post-graft details along with temperature, humidity, and other micro-climatic conditions.
- Fully customizable to suit any nursery or research workflow.
- Simple interface makes it easy to store, track, and review data anytime.
- This makes grafting documentation more organized, reliable, and efficient.



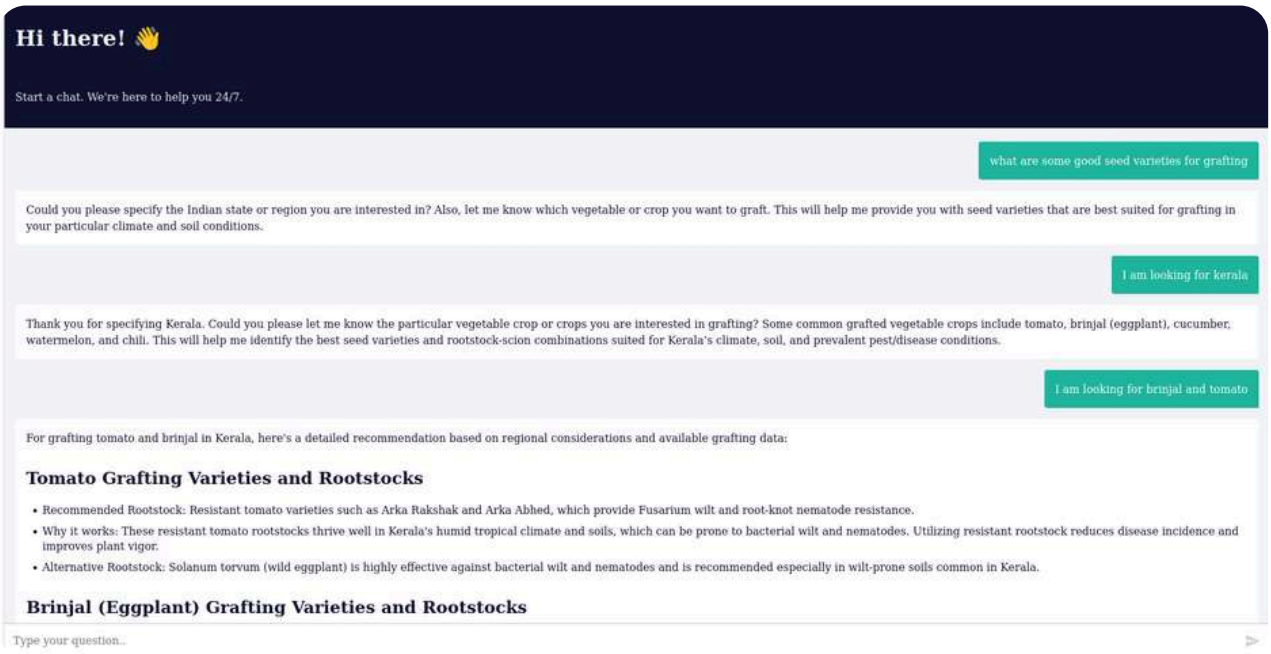


Grafito's AI Grafting Chat Bot

Grafito's AI-powered chatbot is designed to guide growers with accurate, research-backed recommendations for every stage of plant grafting.

Helps users identify the ideal environmental conditions, choose the right rootstock–scion combinations for each state, and select varieties that offer resistance to specific diseases or stress factors.

Built using authentic, verified sources and extensive research reports and hence the chatbot ensures that users receive precise, reliable answers unlike other chatbots that often provide incorrect or incomplete information.



Business & Innovation Opportunities

Enables on-farm research setups for nurseries and hydroponic farms to boost plant production and experimentation.

Opens doors for collaborations with seed companies, Nurseries and universities for joint breeding programs and multi-location trials and also we provides our machine on rental basis for experimentations and trials.

Encourages development of innovative grafting tools such as specialized clips, AI-based systems in different conditions, and other technologies to enhance grafting efficiency.

FAQs

How to make machine compatible for other grafting methods and plants (like fruits, flowers and medicinal plants)?

Reach out our team for customizations and further modifications

Does grafting affect nutritional quality?

Grafting does not reduce nutritional quality; in many cases, it can improve it. A stronger rootstock allows better nutrient and water uptake, which supports healthier plant growth. This results in fruits and vegetables with improved quality, firmness, and consistency. Enhanced resistance to diseases and stress also helps maintain better overall nutritional value.

How grafted plants are different from hybrid seeds ?

Grafted plants are made by joining two plants (rootstock + scion) so they grow as one, mainly for disease resistance, stress tolerance, and stronger growth.
Hybrid seeds are produced by crossing two parent plants to create a new seed with combined traits, mainly for higher yield and uniformity.

How much power and cost of electricity does the machine consume per day?

It will cost less than 10 Rupee for electricity per day for the units consumed by machine

How to know which varient of the rootstock should I grow in my region ?

Choose the rootstock variety that matches your region's soil problems and climate, which is proven by local growers and nurseries, and is recommended by experts at Krishi Bhavan or your nearest KVK

What will be the return of Investment for the buyer using this machine?

ROI will be 2-4 times more compared to manual grafting technique

What is the expected lifespan of the grafting machine?

Since all spare parts are readily available and the machine can be serviced whenever needed, its lifespan can be extended significantly with proper maintenance.

Where is Graftio based in ?

Grafito is an agritech product based deeptech startup based in Kochi, Kerala working on agricultural automation solutions

What are the procedure to buy automated grafting machine

You can submit your interest via **www.grafito.in**, WhatsApp 9074056134, or email hello@grafito.in; we'll schedule a demo or onsite visit and configure & install the machine as per your requirements.

Grafito Innovations

Transform your nursery operations with advanced automation-pre order your grafting machine today!

Keep in touch with our social media handles and visit our websites for further details, new interesting Blogs and Newsletters

linktr.ee/grafito.in

Have any query or want to know more about our products? Reach out us

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