Be an Agripreneur

PAU Technologies for Licensing

- Affordable Cost
- Technical Mentoring by Experts
- Non-exclusive Mode

Opportunities for:

- Seed Producers
- Progressive Farmers
- Entrepreneurs
- Agriculture Start Ups
- Food Processing Industry
- Farm Machine Manufacturer
- Employment for Youth
- FPO/NGO/SHG's/Societies

Hybrids: Maize, Sunflower, Brinjal, Chilli, Muskmelon, Onion, Pumpkin etc.
Varieties: Field, Vegetable & Ornamental Crops
Specialty Varieties for Processing/Nutrition: PAU Magaz Kadoo-1, PBW1Zn, PBW1 *Chapati* etc.

Farm Machines: PAU Super SMS, Happy Seeder, Lucky Seed Seed Drill, Nursery Transplanter etc.
Renewable Energy: Solar Dryers, Bio Gas Plants etc.
Processing: Maize Dryer, Honey Filtration, Vegetable Washing etc.
Rooftop Gardening & Poly-house Structures

Food Processing: Juices, Beverages, Multigrain Products, Energy Bars, Leathers, Pro & Pre Biotic Foods, Baked Products, Mushroom Paste, Wheat Grass Powder etc.

Starter cultures, vinegars & other fermentation technologies

Others:
Bio-fertilizers, Water & Food Testing Kits, Mosquito Repellent Fabric, Protective Gears for Farm Workers, Thermo Cervical Collar etc.

For detailed brochure go to:

www.pau.edu

Email: drpau@pau.edu; tmiprc@pau.edu; Phone: +911612401221

Support to be Provided

- Parental seeds of hybrids and varieties
- Starter cultures for fermented products and bio-fertilizers
- Hands on training, where ever necessary
- Designs and specifications of the machines
- Incubation facilities (to be arranged separately)

Field Crops

- Speciality Types
- *Bt*-cotton
- Hybrids

Wheat: PBW1Chapati

- **Chapatti Score: 8.0/10.0**
- **Keeping quality of Chapatti: 4.8/5.0**
- **Phenol reaction (Dough shelf life w.r.t. colour): 2.1**
- **Total sugars: 48.8 (mg/g)**
- **Plant height: 103 cm**
- **Days to maturity: 154**
- **Grain yield: 17.2 q/acre**
- **Stripe rust: Moderetly Resistant**
- **Leaf rust: Resistant**

Specialty trait: **Premium chapati quality of white colour which stay fresh trait longer time**

Released for Punjab 2021

Wheat: PBW 1 Zn

- **Grain zinc**: ~20% higher than checks
- **Plant height**: 103 cm
- **Days to maturity**: 151
- **Grain yield**: 22.5 q/acre
- **Disease reaction**: Resistant to rusts

Specialty trait: **Biofortified variety with higher zinc (important micronutrient for human health)**

Identified for Punjab, Haryana, Delhi, Western UP, Rajasthan, Uttarakhand, HP and J&K in 2017

Barley: PL 891

- **Grains:** Hulless (naked)
- **Plant height:** 102 cm
- **Days to maturity**: 144
- **Grain yield**: 16.8 q/acre
- **Disease reaction**:Resistant to rusts

Specialty trait: **Hulless food barley variety possessing higher β-glucan content** (Soluble dietary fibre good for human health)

Identified for Punjab, Haryana, Delhi, Western UP, Rajasthan, Uttarakhand, HP and J&K in 2019

PAU Bt 2

- **Seed cotton yield:** 2851 kg/ha
- **Ginning outturn:** 34.5%
- **Upper half mean length:** 27.6 mm

Specialty trait :

Moderately resistant to cotton leaf curl disease, fungal foliar diseases, resistant to bacterial leaf blight and tolerant to jassid, whitefly and bollworms

Identified for Punjab, Haryana, and Rajasthan in 2019

PAU Bt 3

- **Seed cotton yield: 3095 kg/ha**
- **Ginning outturn: 36.5%**
- **Upper half mean length: 26.2 mm**

Specialty trait: **Moderately resistant to cotton leaf curl disease, fungal foliar diseases, resistant to bacterial leaf blight and tolerant to jassid, whitefly and bollworms**

Identified for Punjab, Haryana and Rajasthan in 2019

Maize: PMH 13 (Hybrid)

- **Grain Yield**: 24 q/acre
- **Days to maturity**: 97
- **Kernel colour**: Light orange

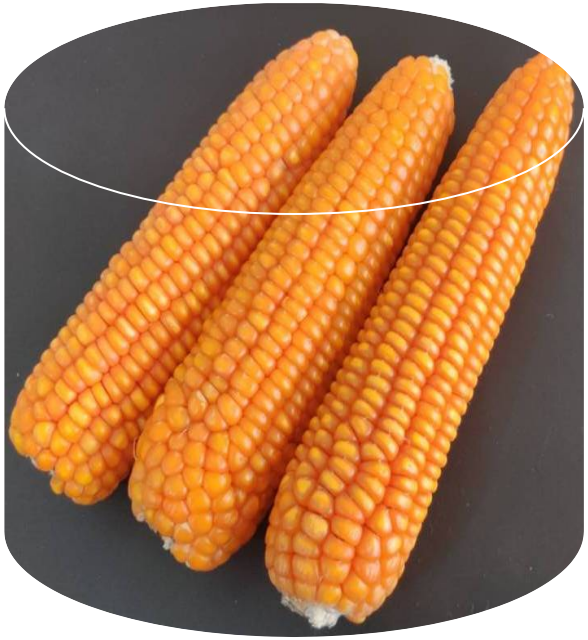
Specialty trait:

- **High yielding, Moderately resistant to Maydis leaf blight, charcoal rot and maize stem borer**

Released for cultivation in Punjab in 2021

Maize: JC 4 (Composite)

- **Grain Yield**: 13 q/acre
- **Days to maturity**: 90
- **Kernel colour**: Deep orange
- **β-carotene**: 3.12 ppm



Specialty trait: **Very good quality of *roti***

Released for cultivation in Punjab in 2021

Canola Gobhi Sarson Hybrid : PGSH 1707

- **Erucic acid in oil:** 0.9%
- **Oleic acid in oil:** 65.3%
- **Glucosinolates in defatted meal:** 14.1 mm/g
- **Grain yield:** 22.0 q/ha
- **Oil content:** 41.0%
- **Oil yield:** 9.0 q/ha
- **Duration:**162 days

Specialty trait:

- Resistant to white rust.
- More PUFA (omega 6 and omega 3) than in olive oil

Released for Punjab in the Year 2020

Canola quality Raya Hybrid : RCH 1

- **Erucic acid in oil: 1.5%**
- **Oleic acid (MUFA) in oil: 41%**
- **Glucosinolates in defatted meal: 25 mm/g**
- **Grain yield: 23.0 q/ha**
- **Oil content: 39.4%**
- **Oil yield: 9.1 q/ha**
- **Duration: 152 days**

Specialty trait:

- **More PUFA (omega 6 and omega 3) than olive oil**

Released for Punjab in Year 2019

Raya Hybrid : PHR 126

- **Grain yield:** 22.7 q/ha
- **Oil content:** 40.2%
- **Oil yield:** 9.1 q/ha
- **Maturity:** 145 days

Specialty trait

- **Brown seeded non canola hybrid**

Released for Punjab in Year: 2019

Sunflower Hybrid : PSH 2080

- **Grain yield:** 24.5 q/ha
- **Oil content:** 43.7%
- **Oil yield:** 10.7 q/ha
- **Maturity:** 97 days
- **Plant height:** 151 cm
- **100 Grain weight**: 5.8 g

Specialty trait:

- Higher oil content, drooping head, lesser bird damage

Released for Punjab in Year 2019

Fodder Sorghum: Punjab Sudax Chari 4 (F1)

- **Fodder yield (q/ha):** 1112
- **Shoot fly reaction:** MR
- **Crude protein(%):** 9.0
- **Leaf diseases reaction:** MR

Specialty trait:

- **Gives three cuttings with high TSS**

Released for Punjab in Year 2015

Vegetable Crops

Chilli: CH-27(F_1)

- **Fruit length** : 7.6 cm
- **Fruit colour**: Light green
- **Capsaicin** : 0.8%
- **Yield:** 96 q/acre

Specialty trait:

- **Resistance to Leaf curl virus, fruit rot and root knot nematodes**
- **Suitable for Processing/powder making**

Released for Punjab, Bihar, UP, Jharkhand in Year 2019

Chilli: CH-52(F_1)

- **Fruit length: 9.8 cm**
- **Fruit colour: Deep green**
- **Capsaicin: 0.9%**
- **Yield: 106 q/acre**

Specialty traits :

- **Moderately resistance to leaf curl virus, fruit rot and root knot nematodes**
- **Suitable for low tunnel cultivation**
- **Suitable for Processing / powder making**

Released for Punjab in Year 2021

Chilli: Punjab Sindhuri

- **Fruit length**: 7.5 cm
- **Fruit colour**: Dark green
- **Capsaicin**: 1%
- **Yield**: 76q/acre

Specialty trait:

- Tolerant to leaf curl virus
- Suitable for fresh market and distant transportation

Released for Punjab in Year 2013

Chilli: Punjab Tej

- **Fruit length: 6.80 cm**
- **Fruit colour: Light green**
- **Capsaicin: 1.32%**
- **Yield: 56q/acre**

Specialty trait:

- **Tolerant to leaf curl virus**
- **Suitable for processing / powder making**

Released for Punjab in Year 2013

Bell pepper: PSM-1

- **Fruit colour**: Dark green
- **Fruit shape**: Blocky
- **Number of lobes**: 3-4
- **Fruit weight**: 82g
- **Yield**: 246q/acre

Specialty trait:

- **High temperature tolerance**

Released for Punjab in Year 2018

Onion: POH-1 (F_1)

- **Bulb Colour:** Light Red
- **Bulb Shape:** Globular
- **Bulb Weight:** 110 g
- **Maturity:** 142 days
- **Bolting:** Tolerant
- **Yield:** 554 q/ha

Specialty trait:

- **High yield and longer storage**

Released for Punjab in year 2020

Onion: PRO-7

- **Bulb Colour:** Red
- **Bulb Shape:** Round
- **Bulb Weight:** 76 g
- **Maturity:** 120 days
- **Bolting:** Tolerant
- **Yield:** 397 q/ha

Specialty trait:

- Early maturity
- Longer storage

Released for Punjab in Year 2019

Onion: PYO-1

- **Bulb Colour:** Yellow
- **Bulb Shape:** Globular
- **Bulb Weight:** 82 g
- **Maturity:** 141 days
- **Bolting:** Tolerant
- **Yield:** 410 q/ha

Specialty trait:

- High yield
- Longer storage
- Suitable for export

Released for Punjab in Year 2019

Onion: PWO-2

- **Bulb Colour:** White
- **Bulb Shape:** Round
- **Bulb Weight:** 72 g
- **Maturity:** 139 days
- **Bolting:** Tolerant
- **Yield:** 388 q/ha

Specialty trait:

- High yield
- Longer storage
- Suitable for processing

Released for Punjab in Year 2019

Brinjal: PBH-3(F_1)

- **Fruit Shape:** Small-oblong
- **Fruit Colour:** Shining Purple
- **Fruiting Habit:** Clustering
- **Fruit Weight(Av.):** 60 g
- **Yield:** 640 q/ha

Specialty trait:

- **High and early yield**

Released for Punjab, Bihar, UP, Trai area of Uttarakhand, Haryana, Rajasthan & Gujarat in Year 2013

Brinjal: PBH-4(F_1)

- **Fruit Shape:** Medium-long
- **Fruit Colour:** Purple-black
- **Fruiting Habit:** Clustering
- **Fruit Weight(Av.):** 76 g
- **Yield:** 665 q/ha

Specialty trait:

- **High & early yield**

Released for Punjab, Bihar, UP & Trai area of Uttarakhand in Year 2015

Brinjal: PBH-5(F_1)

- **Fruit Shape:** Medium-long
- **Fruit Colour:** Shining-Purple
- **Fruiting Habit:** Clustering
- **Fruit Weight(Av.):** 86 g
- **Yield:** 638 q/ha

Specialty trait:

- **High & early yield**

Released for Punjab, Bihar, UP and Trai area of Uttarakhand in Year 2017

Brinjal: PBHR-41(F_1)

- **Fruit Shape:** Round
- **Colour:** Purple
- **Fruiting Habit:** Single
- **Fruit Weight(Av.):** 210 g
- **Yield:** 648 q/ha

Specialty trait:

- Suitable for ***Bhartha*** Making

Released for Punjab, Bihar, UP & Trai area of Uttarakhand in Year 2016

Brinjal: PBHR-42(F_1)

- **Fruit Shape:** Round
- **Colour:** Purple-black
- **Fruiting Habit:** Single
- **Fruit Weight(Av.):** 200 g
- **Yield:** 635 q/ha

Specialty trait:

- **Suitable for Bhartha Making**

Released for Punjab in Year 2016

Brinjal: Punjab Raunak

- **Fruit Shape:** Long
- **Colour:** Purple-black
- **Fruiting Habit:** Single/double
- **Fruit Weight:** 70 g
- **Yield:** 607 q/ha

Specialty trait:

- **High & early yield**

Released for Punjab, Bihar, UP & Trai area of Uttarakhand in Year 2018

Brinjal: Punjab Bharpoor

- **Fruit Shape:** Small-oblong
- **Colour:** Purple-black
- **Fruiting Habit:** Cluster
- **Fruit Weight:** 46 g
- **Yield:** 560 q/ha

Specialty trait:

- Heavy clustering
- Resistant to bacterial wilt
- high yield

Released for Punjab in Year 2020

Tomato: PTH-2 (F_1)

- **Plant habit: Determinate**
- **Fruit shape: Round**
- **Fruit weight: 75g**
- **Number of locules: 3-4**
- **Yield: 270q/acre**

Specialty trait:

- **Resistant to Late blight and root knot nematodes**
- **Suitable for processing**

Released for Punjab in Year 2018

Tomato: Punjab Varkha Bahar-4

- **Plant habit**: Determinate
- **Fruit shape**: Round
- **Fruit weight**: 90 g
- **Yield**: 245 q/acre

Specialty trait:

- Resistance to leaf curl virus
- Suitable for rainy season

Released for Punjab in Year 2015

Tomato: Punjab Gaurav

- **Plant habit**: Indeterminate
- **Fruit shape**: Oval
- **Fruit weight**: 90 g
- **Number of locules**: 3
- **Fruits in cluster**: 7-9
- **Yield**: 934 q/acre

Specialty trait:

- Leaf curl virus resistance
- Suitable for protected cultivation

Released for Punjab in Year 2015

Tomato: Punjab Swarna

- **Plant habit** : Indeterminate
- **Fruit shape:** Oval
- **Fruit colour:** Orange
- **Fruit weight**: 80g
- **Number of locules**: 3
- **Fruits in cluster**: 7- 9
- **Yield:** 1087q/acre

Specialty trait:

- Resistant root knot nematode
- High carotenoid (14mg/100g)
- Suitable for protected cultivation

Released for Punjab in Year 2017

Tomato: Punjab Red Cherry

- Plant habit : Indeterminate
- Fruit shape: Round
- Fruit weight: 12g
- Fruits in cluster: 18-20
- Yield: 437q/acre

Specialty trait:

- Resistant leaf curl virus
- Suitable for protected cultivation and use as salad

Released for Punjab in Year 2015

Tomato: Punjab Sona Cherry

- **Plant habit** : Indeterminate
- **Fruit shape**: Oval
- **Fruit weight**: 11g
- **Fruit colour**: Yellow
- **Fruits in cluster**: 20-25
- **Yield**: 425q/acre

Specialty trait:

- **High carotenoids (13mg/100g)**
- **Suitable for protected cultivation and use as salad**

Released for Punjab, UP, Bihar, Jharkhand, Haryana, Delhi, Rajasthan, Gujarat, Sikkim, Meghalaya, Manipur, Nagaland, Mizoram, Tripura, Arunachal Pradesh, Andaman and Nicobar Island in Year 2020

Tomato: Punjab Kesar Cherry

- **Plant habit** : Indeterminate
- **Fruit shape**: Oval
- **Fruit weight**: 11g
- **Fruit colour**: Orange
- **Fruits in cluster**: 18-23
- **Yield**: 402q/acre

Specialty trait:

- High carotenoid (3mg/100g)
- Suitable for protected cultivation and use as salad

Released for Punjab in Year 2016

Pea: Punjab-89

- **Days to first pod picking:** 90-95
- **Seeds per pod:** 9-10
- **Pods/node:** Double
- **Shelling :** 55 %
- **Shelled pea:** Sweet
- **Yield :** 150 q/ha

Specialty trait:

- Mid maturity
- Suitable for mechanization

Notified and Released for Punjab in Year 2014

Muskmelon: MH-51

- **Vine length:** 2.20 m
- **Days to 1st harvest:** 62
- **Fruit Weight(Av.):** 890 kg
- **Yield:** 222 q/ha
- **TSS:** 12.2%

Specialty trait:

- **Early maturity**
- **New GMS line MS-5 is easy to identify for male sterility**

Released for Punjab in Year 2017

Pumpkin: PPH-1(F_1)

- Vine length: **83 cm**
- Node no for 1st flower: **2.5**
- Days to 1st female flower: **27**
- Days to 1st harvest: **45**
- Fruit Weight: **800 g**
- Yield: **206 q/ha**

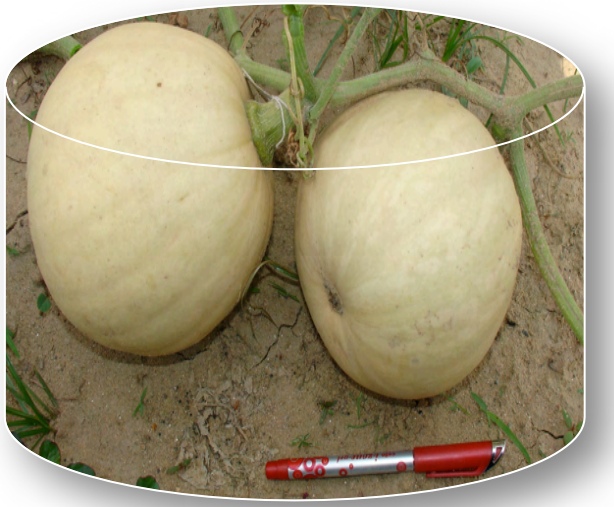
Specialty trait:

- **Extra early maturity**
- **Small size fruit**

Released for Punjab in Year 2015

Pumpkin: PPH-2(F_1)

- Vine length: **88 cm**
- Node no for 1st flower: **2.6**
- Days to 1st female flower: **27**
- Days to 1st harvest: **47**
- Fruit Weight: **900 g**
- Yield: **222 q/ha**



Specialty trait:

- **Extra early maturity**
- **Small size fruit**

Released for Punjab in Year 2015

Pumpkin: Punjab Nawab

- Vine length: **2.29m**
- Node no for 1st flower: **12.5**
- Days to 1st harvest: **70**
- Fruit Weight: **2.00 kg**
- Yield: **343 q/ha**

Specialty trait:

- **Resistant to Pumpkin yellow vein mosaic diseases**
- **Suitable for rainy season**

Released for Punjab in Year 2019

Pumpkin: PAU Magaz Kadoo-1

- Vine length: 110 cm
- Days to harvest: 73
- Seed Yield: 2.9 q/ha
- Omega-6(%): 32.2
- Oil content (%): 27.5
- Oleic acid(%): 54.1

Specialty trait:

- Hull-less seed suitable for snacks

Released for Punjab in Year 2018

Cucumber: Punjab Kheera-1

- Number of fruits/vine : 23
- Fruit weight : 122 g
- Fruit length : 15 cm
- Fruit diameter : 33 mm
- Fruits bitter free, don't need peeling
- Yield : September sown: 760 q/ha
  January sown : 925 q/ha

Specialty trait:

- Parthenocarpic
- Suitable for poly-net house cultivation only

Released for Punjab in Year 2018

Bittergourd: Punjab Karela-15

- Days to 1st harvest: 71
- Fruit colour: Dark green
- Fruit Skin: Matt type
- Yield: 128 q/ha

Specialty trait:

- Moderately resistant to mosaic disease

Released for Punjab in Year 2019

Sponge gourd: Punjab Nikhar

- **Vine length:** 8.40 m
- **Days to 1st harvest:** 45
- **Fruit Weight(Av.):** 110 g
- **Fruit colour:** Light green
- **Seed colour:** Cream-white
- **Yield:** 207 q/ha

Specialty trait:

- Early harvest
- Soft skin

Released for Punjab in Year 2020

Round Gourd: Punjab Tinda 1

- Days to 1st harvest: 54
- Fruit colour: Green
- Fruit shape: Round
- No. of fruits per vine: 13
- Fruit weight (Avg.): 60 g
- Vine length: 2.8 m
- Yield: 180 q/ha

Specialty trait:

- Earliness & high yield

Released for Punjab in Year 2018

Bottlegourd: Punjab Bahar

- Days to 1st harvest: **73**
- Fruit colour: **Light green**
- Fruit shape : **Round**
- Yield: **555 q/ha**

Specialty trait:

- **Fruits tender, shining and pubescent**

Released for Punjab in Year 2016

Bottlegourd: Punjab Barkat

- **Days to 1st harvest: 71**
- **Fruit colour: Light green**
- **Fruit shape : Long cylindrical**
- **Yield: 565 q/ha**

Specialty trait:

- **Moderately resistant to mosaic disease**

Released for Punjab in Year 2014

Bittergourd: Punjab *Jhaar Karela*-1

- **Days to 1st harvest: 67**
- **Fruit colour: Green**
- **Fruit shape: Spindle**
- **Yield: 88 q/ha**

Specialty trait:

- **Root knot nematode & virus resistance**

Released for Punjab in Year 2017

Carrot : Punjab Black Beauty

- **Roots:** Purple-black
- **Anthocyanin:** 182 mg/100 g
- **TSS content:** 7.5%
- **Dry matter:** 11%
- **Juice content:** 580 ml/kg
- **Yield:** 196 q/acre

Specialty trait:

- Rich in anthocyanins

Released for Punjab in Year 2013

Carrot : PC-161

- **Roots:** Deep red
- **Root length:** 30 cm
- **Root weight:** 126 g
- **β-carotene:** 8.9 mg/100 g
- **Sugar content:** 8.7 %
- **Juice content:** 575 ml/kg
- **Yield:** 255 q/acre

Specialty trait:

- Rich in β-carotene & juice

Released for Punjab in Year 2020

Okra: Punjab Suhawani

- **Pod Colour:** Dark Green
- **Pod appearance:** Smooth, tender, five ridged
- **Yield:** 123 q/ha

Specialty trait:

- **Tolerant to yellow vein mosaic virus**

Released for Punjab in Year 2017

Floricultural Crops

Marigold: Punjab Gainda No. 1

- **Days to flowering:** 82 days
- **Plant height** : 69 cm
- **Yield :** 44 q/acre

Specialty trait:

- Orange colour
- Tolerant to high temperature
- Suitable for summer and rainy season

Released for Punjab State in Year 2017

Gladiolus: Punjab Glad-1

- **Days to flowering:** 99
- **Spike length:** 85 cm
- **Florets/spike:**15
- **Vase life:** 16 days
- **Cormels/corm:** 44

Specialty trait:

- **Orange colour**
- **Use as cut flower**

Released for Punjab in Year 2013

Gladiolus: Punjab Glad-2

- **Days to flowering:** 93
- **Spike length:** 86 cm
- **Florets/spike:** 17
- **Vase life:** 16 days
- **Cormels/corm:** 47

Specialty trait:

- Yellow colour
- Use as cut flower

Released for Punjab in Year 2016

Gladiolus: Punjab Glad-3

- **Days to flowering:** 100
- **Spike length:** 103 cm
- **Florets/spike:**17
- **Vase life:** 17 days
- **Cormels/corm:** 22

Specialty trait:

- Yellow colour
- Use as cut flower
- Extra long spike

Released for Punjab in Year 2019

Gladiolus: Punjab Pink Elegance

- Days to flowering: 90
- Spike length: 85 cm
- Florets/spike:18
- Vase life: 17 days
- Cormels/corm: 38

Specialty trait:

- Pink colour
- Use as cut flower

Released for Punjab in Year 2010

Gladiolus: Punjab Glance

- Days to flowering: 78
- Spike length: 85cm
- Florets/spike:12
- Vase life: 12 days
- Cormels/corm: 12

Specialty trait:

- Orange colour
- Landscaping and cut flower

Released for Punjab in Year 2010

Chrysanthemum: Punjab Shingar

- **Days to flowering:** 122 days
- **Yield :** 72 q/acre
- **Shelf life :** 6 days

Specialty trait:

- **Cream colour**
- **Loose flower production**

Released for Punjab State in Year 2018

Chrysanthemum: Punjab Mohini

- **Days to flowering:** 93 days
- **Plant height:** 15 cm
- **Flowers per plant:** 330

Specialty trait:

- Cream colour
- Pot Culture (no pinch no stake)

Released for Punjab State in Year 2018

Chrysanthemum: Punjab Shyamli

- Days to flowering: **117 days**
- Cut stems per plant: **4**
- Length of cut stem: **66 cm**
- Vase life: **19 days**

Specialty trait:

- **Purple-pink colour**
- **Cut flower**

Released for Punjab State in Year 2015

Chrysanthemum: Ratlam Selction

- Days to flowering: 138 days
- Yield : 70 q/acre
- Shelf life : 5.00 days

Specialty trait:

- Cream colour
- Loose flower production

Released for Punjab State in Year 1997

Chrysanthemum: Mother Teresa

- **Days to flowering:** 119 days
- **Plant height:** 37 cm
- **Flowers per plant:** 136

Specialty trait:

- Cream colur
- Pot Culture (no pinch no stake)

Released for Punjab State in Year 2008

Chrysanthemum: Royal Purple

- **Days to flowering:** 141 days
- **Plant height:** 45 cm
- **Flowers per plant:** 200

Specialty trait:

- Pinkish-purple colour
- Pot Culture

Released for Punjab State in Year 2007

Renewable Energy

Forced Circulation Solar Dryer

- **Product dried:** Vegetables and spices
- **Loading capacity:** >100 kg/batch
- **Drying time:** 55% of open sun
- **Electricity requirement:** Main grid/ SPV panel

Specialty feature:

- Low spoilage & hygienic,
- No attention during rain

Commercialized in Year 2016

Evacuated Tube Collector Solar Dryer

- **Product dried:** Vegetables and spices
- **Loading capacity:** 30 kg/batch
- **Electricity requirement:** No
- **Drying time:** 30% of open sun

Specialty feature:

- Low spoilage & hygienic,
- No attention during rain

Commercialized in Year 2019

Advanced Domestic Solar Dryer

- **Product dried:** Vegetables and spices
- **Loading capacity:** 3 kg/batch
- **Electricity requirement:** No
- **Drying time:** 33% of open sun

Specialty feature:

- Low spoilage & hygienic,
- No attention during rain

Commercialized in Year 2019

Solar Onion Curing System

- **Product dried:** Kharif Onion
- **Loading capacity:** 500 kg
- **Curing room:** 3.9m x 3.3m x 2.0m
- **Curing temperature:** 30°C
- **Electricity requirement:** 3kW
- **Curing days:** 9

Specialty feature:

- Low spoilage & hygienic,

Approved by REC in year 2020

Paddy Straw based Biogas Plant

- **Paddy straw consumption/batch: 16 q**
- **Cattle dung consumption/batch: 4 q**
- **Biogas yield: 3-4 m^3/day**

(2-*3 cylinders of LPG /month*)

Digester

Gas Holder

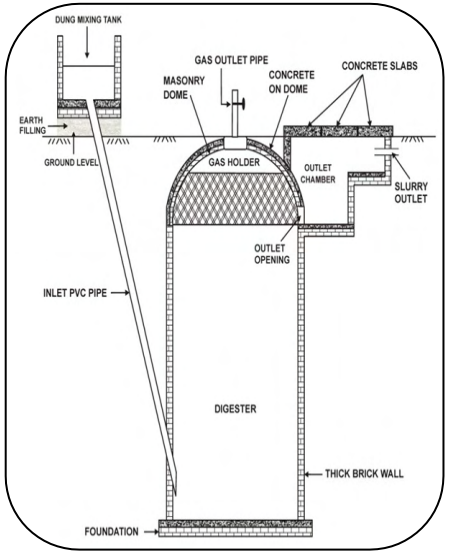
Specialty feature:

- **Biogas generation capacity for 3 months**

Commercialization in Year 2021

Modified PAU fixed Dome Type Janta Model Biogas Plant

- **Feeding material:** Animal waste like cattle dung, poultry droppings etc.
- **Low cost technology:** 60–70 % of the conventional
- **Financial help:** Provision of Government subsidy



Specialty feature:

- Capacity of Plant: 25-500 m^3/day

Commercialization in Year 2021

Farm Machinery

PAU Super Straw Management System (Super SMS)

Salient Features

- **Attached at the rear of combine harvester for chopping and even distribution of loose straw dropping from straw walker**
- **Precursor for happy seeder and other residue management machinery. Field capacity of happy seeder increases by 18-20%**
- **Saving in pre-sowing irrigation *(rauni)* due to retaining of residual soil moisture after paddy harvest**
- **Helps in reducing environmental pollution, provides economic benefits to farmers and improves soil health**

Happy Seeder

Salient Features

- **Function: Direct seeding of wheat in combine harvested paddy fields**
- **Benefit: Saving of diesel and other resources**
- **Power Required: 50 hp or above tractor**
- **Field Capacity: 0.50 - 0.60 acre/h**

Happy Seeder (with press wheel)

Salient Features

- **Function: Direct seeding of wheat in combine harvested paddy fields while pressing chopped straw in rows**
- **Benefit: Saving of diesel and other resources**
- **Power Required: 50 hp or above tractor**
- **Field Capacity: 0.50 - 0.60 acre/h**

Direct Seeding of Rice (Lucky seed drill)

Salient Features

- **Function: Direct seeding of rice and simultaneous application of pre-emergence herbicides**
- **Benefit: Saves operation of knapsack sprayer for herbicide application**
- **Power Required: 35 hp or above tractor**
- **Field Capacity: 0.75 - 1.0 acre/h**

Super Seeder

Salient Features

- **Function: Direct seeding of wheat in combine harvested paddy fields**
- **Power Required: 55 hp or above tractor**
- **Field Capacity: 0.6 - 0.7 acre/h**

Paddy Straw Chopper-cum-Spreader

Salient Features

- **Function: Chopping and spreading of paddy straw**
- **Power Required: 45 hp or above tractor**
- **Field Capacity: 0.75 acre/h**

PAU Straw Cutter-cum-Spreader

Salient Features

- **Function: Chopping and spreading of straw (loose + standing stubbles)**
- **Power Required : 35 hp or above tractor**
- **Field Capacity: 1.5-2.0 acre/h**

Sub Surface Drip Line Laying Machine

Salient Features

- **Function: Underground laying of drip laterals**
- **Power Required: 45 hp or above tractor**
- **Depth: 15 - 30 cm**
- **Field Capacity: 0.20 - 0.28 acre/h**

Sugarcane Trench Planter

Salient Features

- **Function: Cuts, plants (in paired row of 30 cm spacing) and cover the billets of whole cane along with fertilizer**
- **Benefit: Cost saving - 25%, Labour saving - 58%**
- **Power Required: 45 hp or above tractor**
- **Field Capacity: 2-3 acre/day**

Tractor Operated Rotary Weeder

Salient Features

- **Function: Weeding/interculture in wider row crops Benefit:Cost and labour saving**
- **Power Required: 35 hp or above tractor**
- **Field Capacity: 1.0 – 1.25 acre/h**

Automatic Controlled Offset Rotavator

Salient Features

- **Function: Weeding/interculture operation in fruit trees and agro-forestry**
- **Power Required: 35 hp or above tractor**
- **Field Capacity: 0.5 - 0.6 acre/h**
- **Weeding Index: 84.0 - 98.8%**

Vegetable Nursery Transplanter (vertical cup type)

Salient Features

- **Function: Bed making along with transplanting of plug type seedlings like tomato, chilli and brinjal etc.**
- **Benefit: Cost saving - 28%, Labour saving - 85%**
- **Power Required: 50 hp or above tractor**
- **Field Capacity: 0.28 – 0.45 acre/h**

Boom Sprayer Mounted on 4-WD Paddy Vehicle

Salient Features

- **Function: Uniform spraying in row crops like wheat, paddy etc.**
- **Benefit: Judicious spraying in narrow crops and more annual use of paddy transplanter**
- **Power Required: 17 hp engine**
- **Field Capacity: 2.0 - 3.4 acre/h**

PAU Multi-purpose High Clearance Sprayer

Salient Features

- **Function: To spray in row crops like cotton, sugarcane, maize and vegetables at different growth stages**
- **Power Required:35 hp or above tractor**
- **Field Capacity: 2.5 - 5.0 acre/h**
- **Ground Clearance: 1.10 m**

Processing and Food Engineering

PAU Portable Maize Dryer

Salient features

Capacity (Tons/batch)	3.0
Power (35 hp Tractor/Electricity, kW)	15
Drying Air Temperature (^{0}C)	60-75
Drying Time (h)	6-9
Diesel Consumption (L/h)	3
Seed Grain Germination (meets ISCS)	Yes

- Designed as per international norms
- Indirect, three pass, diesel fired air heating system
- Waste heat recovery system for higher fuel economy.
- Dry grains gently @ 1.25%/h with maximum rate of 2.66%/h
- Provision for operation both by tractor PTO power or by grid power
- VFD controlled air blower, inlet and exhaust air temperature.
- Can be used for drying grains for commercial purpose as well as for seed purpose.

Fruit and Vegetable Washing Machine

Salient features

- **Overall dimension**: **860 x 760 x 1140 mm**
- **Weight: 200 kg**
- **Prime mover: Electric motor**
- **Power: 1 hp**
- **Man power: One**
- **Land: 4 m x 4 m**
- **Unit cost of machine: Rs 90,000-1,00,000**
- **Unit cost of Operation: Rs 2-15/q**

A wide range of fruit and vegetables (carrot, potato, radish, turnip, ginger, okra, tomato, spinach, turnip, kinnow, pears and turmeric) can be mechanically washed and can replace the prevalent practice of washing which involves drudgery and unhygienic conditions. The same machine can be used for turmeric polishing also.

Developed/released for national level adoption in the Year 2005

Honey Heating-cum-Filtration System

Salient features

- **Operational capacity**: 50 kg/batch (2.0 q/day)
- **Overall dimension**: 686 x 686 x 1524 mm
- **Weight:** 110 kg
- **Man power:** 1
- **Land:** 1 x 1m
- **Energy used by Technology**: Electrical
- **Operating cost per kg:** Rs 3.0
- **Unit cost (per machine)**: Rs 90,000

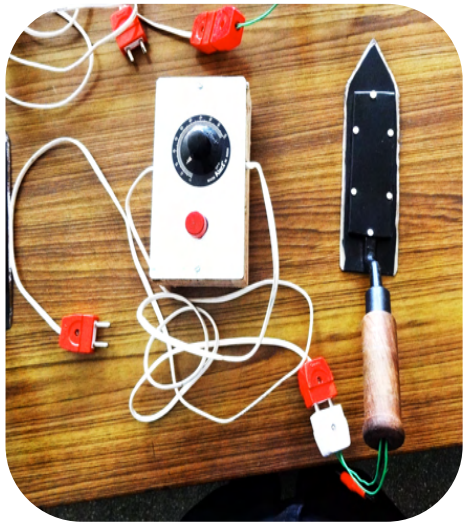
Specialty: **The machine is compact have ease of operation, time saving and maintain hygiene and quality.**

Developed/released for national level adoption in the Year 2013

Honey Wax Uncapping Knife

Salient features

- **Input/raw material**: Honey comb frame
- **Dimensions**: 238 x 71 x 3 mm (Knife blade)
- **Weight:** 542 gm
- **Prime mover:** Electric and Battery
- **Power:** 220 V AC /12 V DC Supply
- **Man power**: One
- **Land:** Working place for one person
- **Unit Cost of machine:** Rs 2000
- **Unit cost of operation:** Rs 0.50/frame



Specialty: **Fatigue less operation and will result in more number of frames to be uncapped in less time and can replace the prevalent practice of uncapping with non scientific and unhygienic conventional knives.**

Developed/released for national level adoption in the Year 2009

Radial Honey Extractor

Salient features

- **Input/raw material**: Honey combs
- **Output Capacity**: 180-190 kg/h
- **Dimensions**: 805 x 805 x 1310 mm
- **Weight**: 106 kg
- **Prime mover**: Electric Power
- **Power**: 0.5 hp
- **Man power**: 2
- **Land**: 1x 1 m
- **Unit Cost of machine**: Rs 60,000
- **Unit cost of operation**: Rs 15/q

Extract honey from combs using centrifugal force. Easy to operate, saves time, maintain hygiene

Developed/released for national level adoption in the Year 2009

Pectin Extraction Plant

Salient features

- **Suitable for Kinnow/Musambi peel**
- **Operational capacity: 50 kg peel/batch**
- **Man power: 1**
- **Land required: 10'x10'**
- **Energy used by Technology: Electrical**
- **Extraction Method: Chemical**
- **Total operational cost : Rs 980 /batch**
- **Profit per batch: Rs. 1920**
- **Cost of pilot plant: Rs 5.0 Lakhs**

The pilot plant is batch type have ease of operation, time saving, drudgery free operation, maintaining of hygiene and profitable venture for the budding entrepreneurs

Developed/released for national level adoption in the Year 2018

Food Technologies and Products

Bottled Sugarcane Juice

- Prepared with natural ingredients i.e. mint, ginger and lime juice.
- No added artificial preservative, colour or flavour.
- Healthy and hygienic; thermally processed product
- Shelf stable at room temperature for more than one year

Specialty: **Shelf stable natural product**

Frozen Vegetables

- Blast frozen product; suitable for small and medium-sized enterprises (SMEs)
- Near to fresh; shelf life more than 12 months.
- Convenient ready to use product;
- Suitable for use in curried preparations and specialty products

Specialty: Shelf stable; convenient Product for SMEs

Formulation for Rollable Maize *Chapati*

- **Gluten free and easily rollable product; otherwise maize *chapatti* is difficult to roll.**
- **Prepared using maize with potato starch, whey protein and stabilizers.**
- **Shelf stable for six months at room temperature.**

Specialty trait: **Convenient, Easily Rollable**

Multgrain Instant Porridge

- Convenient ready-to-eat wholesome traditional breakfast food.
- Made from blends of different food grains.
- Shelf stable for more than 5 months with better nutritional and sensory quality.

Specialty: Convenient, Shelf stable nutritional product

Wheatgrass Powder

Health benefits:

- High in chlorophyll, minerals and vitamins
- Rich in phytochemicals with high antioxidant potential
- Usage: Supplementation in biscuits, bread and food sprinkler

Speciality: **Wheatgrass powder standardized for harvesting and drying conditions for maximum nutrition**

A convenient and effective substitute of fresh wheatgrass

Karonda Candy and Powder

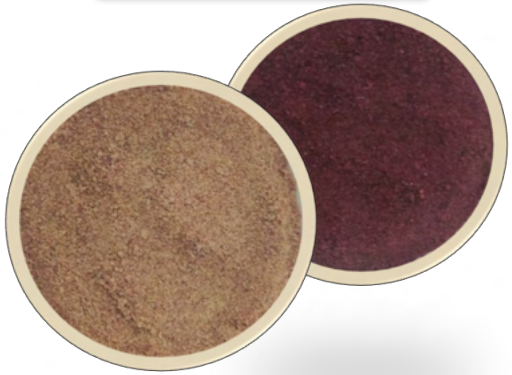
Health benefits:

- **Rich in iron**
- **Rich in phytochemicals with high antioxidant potential**

Shelf life: **4-6 months**

Usage: **Karonda powder as substitute of Amchur**

Speciality: **Underutilized indigenous fruit**



Dried mulberry and mulberry leather

Health benefits

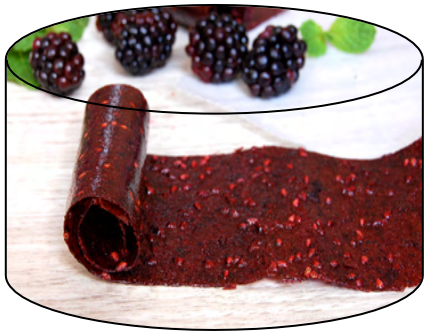
Rich in phytochemicals with high antioxidant potential

Shelf life

4-6 months

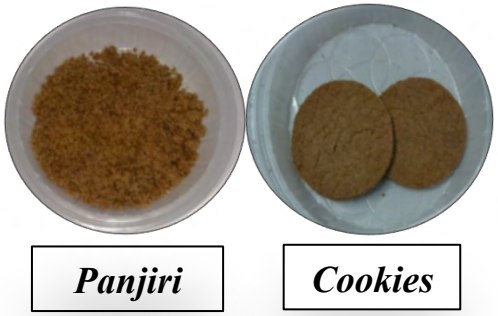
Speciality

Underutilized indigenous fruit



Pumpkin Seed Flour

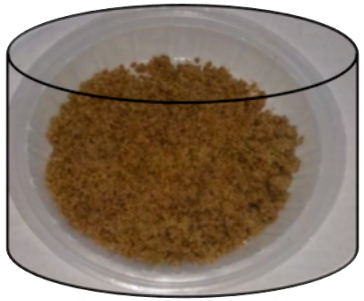
- **Benefits:** Good source of protein, fat, fibre, minerals, antioxidants and phyto-chemicals.
- **Economics:** Cost effective.
- **Usage:** Bakery and traditional food products
- **Supplementation** : 30-40% of raw and roasted pumpkin seed flour into food products .
- **Procurement:** Food industries making vegetable sauce.



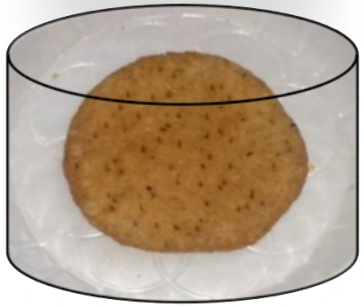
Panjiri *Cookies*

Vitamin-D Enriched Mushroom Powder

- **UV treated mushroom powder**: Good source of protein,
- Vitamin D and minerals.
- **Best for vegetarians** : Mushrooms are the only vegetarian food that contains pro-Vitamin D and the quantity can be enhanced (228 folds increase in button mushrooms and 141 folds increase in oyster mushrooms) by exposing to UV radiations .
- **Yield:** 150g powder/ 1 Kg of fresh mushrooms.
- **Usage:** Bakery and traditional products (*panjiri, mathi*).
- **Retention of Vitamin D** : In supplemented food products .



Panjiri

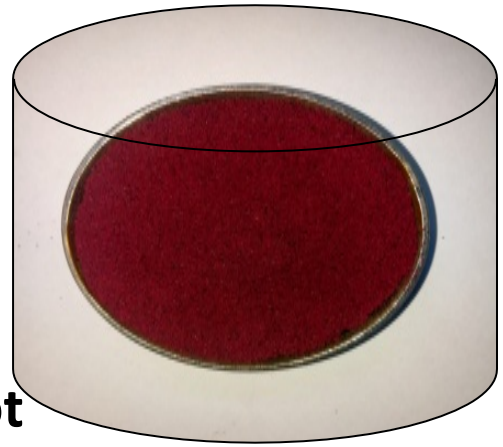


Mathi

Crop: Button Mushrooms and Oyster Mushrooms (PAU varieties)

Beetroot Powder: Natural Colorant

- **Beetroot powder**: Natural colorant
- **Economics**: Cost effective
- **Benefits**: Nutritionally superior
- **Usage**: Bakery products
- **Self life**: Six months
- **Output**: 100 g powder per Kg Beetroot



Natural Vinegars from Sugarcane, Grapes, Apple, Apple+Sugarcane, Jamun

- **Substrate used:** Sugarcane, Grapes, Apple, Apple-Sugarcane, Jamun
- **Cultures used:**
  Yeast: *Saccharomyces cerevisiae*
  Bacteria: *Acetobacter aceti*
- **Preparation time:** approx. 1 month
- **Final product:** Naturally brewed vinegar
- **Specialty:** Enriched with vitamins, amino acids, esters, minerals and organic acids

Red Wine

- **Substrate used:** Red Grapes-MACS Purple
- **Yeast used:** *Saccharomyces cerevisiae*
- **Preparation Time:** approx. 3 months
- **Final Product:** Red wine

- *Specialty:* **Functional fermented beverage enriched with health beneficial properties**

Low Alcoholic Naturally Carbonated Beverages

- **Substrate used:** Citrus fruits (Lemon, Orange, Kinnow), Guava
- **Yeast:** *Clavispora lusitaniae*
- **Fermentation time:** 36 Hours
- **Final product:** Naturally carbonated(1.5 bar CO_2) low alcoholic (≤ 1.0% v/v) beverage
- *Specialty:* **Nutraceutically enriched low alcoholic naturally carbonated beverage, Preservative free**

Year of development 2015

Lactic acid fermented beverages

- **Substrate used:** Turmeric-powder, Rhizomes, Amla, Black carrots
- **Cultures used:** Consortium of ten lactic acid bacteria
- **Fermentation time:** 48 Hours
- **Final product:** Functional lactic acid beverage

- *Specialty:* **Preservative free, shelf stable, endowed with polyphenols, flavonoids and antioxidants**

Released for all over India in Year 2020

Bio-fertilizers

Biofertilizers

- *Azosprillum* : Rice
- Microbial consortium: Wheat, Maize, Potato, Onion, Sugarcane & Turmeric
- *Burkholderia* : Forage cowpea
- *Rhizobium*: 7 Leguminous crops (Berseem, Lucerne, Mung, Mash, Lentil, gram, pea)
- *Rhizobium* + Plant growth promoter rhizobacteria: 7 Leguminous crops- (Berseem, Lucerne, Mung, Mash, Lentil, gram, pea)

Specialty:

- Provides nutrients and improves soil health
- Low cost production technology

Year of development 2011

Diagnostic Kits

Bacteriological Water Testing Kit

- **Used for:** Bacteriological testing of potable water
- **Detects:** Pathogens causing water-borne diseases
- **Time:** 48-72 Hours
- **Result:** Yellowing – Positive
  Pink – Negative

- *Specialty*: **Affordable, User Friendly, Auto-analytic**

Year of development 2013

Bacteriological Food Testing Kit

- **Used for:** Bacteriological analysis of food samples
- **Detects:** food-borne pathogens
- **Time:** 48-72 Hours
- **Result:** Change in color - Positive
  No change – Negative

- *Specialty:* **Auto-analytic, Highly sensitive, Cost effective , User Friendly**

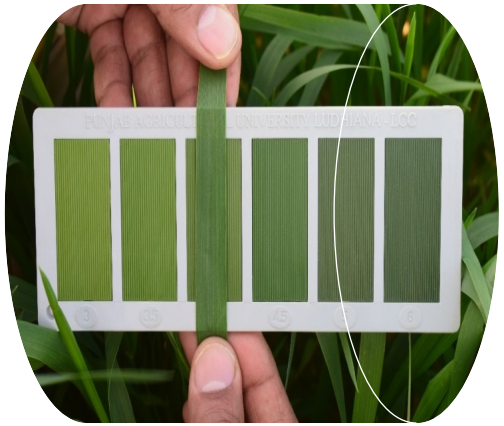
Released for all over India in Year 2020

PAU-Leaf Color Chart

Speciality: Six-panel leaf colour chart (numbered as 3, 3.5, 4, 4.5, 5 and 6.0)

Benefits For Farmers

- Nitrogen fertilizer saving
- Reduced insect pest incidence
- Reduced insecticides/pesticides consumption
- Reduced lodging losses
- Reduced cost of production
- High yields
- High profits



Usage:

- Developed namely for judicious use of fertilizer N in field crops
- Has been established and validated for rice, wheat, maize and cotton

Developed in 2012

Apparels Products

Protective Gloves for Okra Pluckers

- Stretchable knitted fabric
- Breathable, comfortable and durable.
- Double layered for protection against pricking and lesions.

- *Specialty:* Protect against pricking

Mosquito Repellent Fabric

- Microencapsulated eucalyptus essential oil
- Effective against - *Ades, Anopheles and Culex* mosquito species.
- Efficacy lasts for fifteen home launderings
- Can be used for developing articles like shirts, wristbands, pillow cover, handkerchiefs etc.

- Safeguard against dengue, malaria and chikengunia

Thermo Cervical Collar

- Works on the principle of heat therapy for relieving pain.
- Microwaveable gel pack pocketed in PVC and casement fabric.
- Cost effective and useable in workplaces.

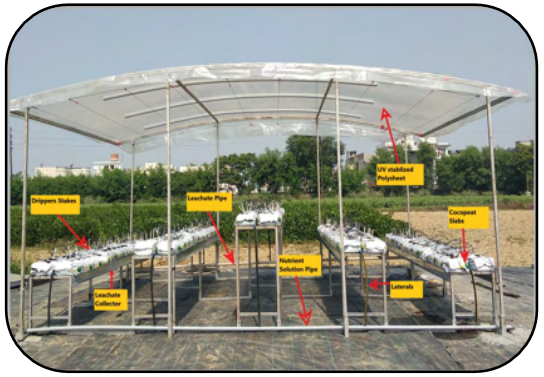
- Provides long term relief from cervical pain

Roof Top Gardening

Rooftop Vegetable Nutrition Garden Model

- For urban and peri- urban population using soil-less media
- A 5 row Rooftop vegetable garden model requires an 12.6 sq m (net area = 4.2 m x 3.0 m) and a gross area of 20 sq m (5.5 m x 3.6 m)
- Vegetables produced will be sufficient for a family of 2-4 persons
- Automated supply of nutrient solution

- Provision of fixing a shade net over the UV stabilized sheet during summer season



Herbal gulal, a value-added product from different ornamentals

- **Substrate used:** Arrowroot powder, flower decoction, citric acid
- **Storage:** Upto one year
- **Safety:** Skin safe and non-toxic
- **Sustainability:** Floral waste repurposed
- **Features:** Natural colours with floral essence

Specialty: Waste-to-value innovation

Kombucha - a fermented tea

- **Substrate used: Sweetened black tea brew**
- **Culture used: SCOBY (Symbiotic culture of Bacteria & Yeast)**
- **Preparation time: 7 days**
- **Shelf Life under refrigeration: 7 weeks**
- **Final product: Kombucha with proven health benefits like : treatment and prevention of diabetes, reduction of cholesterol and triglyceride levels.**

***Speciality*: Highly nutritive beverage with high vitamin C, phenolic compounds and antioxidants.**

Baker's Yeast

- **Substrate used: Molasses**
- **Culture used: Baker's Yeast (*Saccharomyces cerevisiae*)**
- **Preparation time: 36 Hours**
- **Final product: High dough raising, contaminant-free, Baker's yeast.**
- ***Speciality*** **: Protein rich product loaded with minerals like Zn, Fe, P, Ca and limiting amino acids (Tryptophan, methionine and Cysteine)**

(A) Commercial (B) FJ1

Plate 1 (A and B) shows the comparison in the crust characteristics of final bread 2023-24

(A) Commercial (B) FJ1

Plate 2 (A and B) shows the comparison in the crumb characteristics of final bread 2023-24

Guava- wine

- **Substrate used: Guava (Punjab Grown cultivars)**
- **Yeast used: *Saccharomyces cerevisiae***
- **Preparation time: 12-15 days (Aging time – 3 months)**
- **Final product: Guava-wine with 11.2 ± 0.4 (% v/v) ethanol content**

***Speciality*: Highly nutritive Guava-wine with high vitamin C, phenolic compounds and antioxidants.**

PAU Protection Kit for stored pulses

Salient features

- Suitable for all type of stored pulses
- Effective for pulse stored in household containers, retail packets and bulk stored drums
- Kit comprises of cellulose strips, vial of organic solution, dropper; fume dispenser

Recommended dosage: 6 drops/kg of storage unit

Shelf life of solution: More than one year at room temperature

Toxicity: Non toxic

Application tips: Maintain air tight conditions for at least 2 days in storage unit

Specialty: User friendly, Cost effective, Retains quality, Safe to environment and human beings

PAU Armour 1

- A CLCuD resistant introgression line of American Cotton
- CLCuD resistance derived from wild *G. armourianum* (D_{2-1})

Specialty trait:

Resistance to cotton leaf curl disease