

# ICAR-IIOR

Industry Interface Meet



February 12, 2024

OILSEED

Technologies



भारत अनुसंधान संस्थान-भारतीय तिलहन अनुसंधान संस्थान  
ICAR-Indian Institute of Oilseeds Research

राजेन्द्रनगर, हैदराबाद-500 030, तेलंगाना

Rajendranagar, Hyderabad-500 030, Telangana

An ISO 9001 : 2015 Institute



# **ICAR-IIOR Industry Interface Meet**

**February 12, 2024**



## **Oilseed Technologies**

**भाकृअनुप - भारतीय तिलहन अनुसंधान संस्थान**  
**ICAR-Indian Institute of Oilseeds Research**  
**Rajendranagar, Hyderabad – 500 030**

**ISO 9001:2015 Certified**

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# **Hybrids/Varieties of Oilseeds**

# Sunflower

## TilhanTech-SUNH-1

<b>Maturity</b>	<b>90-100 days</b>
<b>Seed yield</b>	<b>2000 kg/ha (RF) 2600 kg/ha (IR)</b>
<b>Oil content</b>	<b>37-41%</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Telangana, AP, Tamil Nadu, Gujarat, Uttarakhand</b>
<b>Special features</b>	<b>Resistant to Downy mildew; moderately resistant to leafhopper</b>
<b>Year of release</b>	<b>2021</b>



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## TilhanTec-SUNH-2

<b>Maturity</b>	<b>85-90 days</b>
<b>Seed yield</b>	<b>1800 kg/ha (RF) 2500 kg/ha (IR)</b>
<b>Oil content</b>	<b>37-39%</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Telangana, AP, Tamil Nadu, Gujarat</b>
<b>Special features</b>	<b>Resistant to Downy mildew; moderately resistant to leafhopper</b>
<b>Year of notification</b>	<b>2023</b>

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## **KBSH-78**

### **Salient Features:**

- **High seed yield (1700-2300 kg/ha)**
- **Early duration (82-85 days)**
- **Low hull content (24.6%)**
- **High oil content (39-41%)**



**Recommended States/Areas:** Karnataka

## **KBSH-85**

### **Salient Features:**

- **High seed yielding (1800-2200 kg/ha)**
- **High oil yielding (600-700 kg/ha)**
- **Medium duration (90-95 days)**
- **Resistant to downy mildew disease**
- **Moderately resistant to leafhoppers**



**Recommended States/Areas:** Uttarakhand, JK, Gujarat, Maharashtra, Karnataka, AP, Tamil Nadu and Telangana

**Contact Details:** Director of Research, University of Agricultural Sciences, Bengaluru - 560 065

**Email:** [dr@uasbangalore.edu.in](mailto:dr@uasbangalore.edu.in)

**Contact No:** 080-2330153 Ext 331



## **KBSH-88**

### **Salient Features:**

- High seed yielding (1500-2000 kg/ha)
- High oil yielding (550-650 kg/ha)
- Early duration (85-86 days)
- Resistant to downy mildew disease
- Moderately resistant to leafhoppers



**Recommended States/Areas:** Uttarakhand, Jammu and Kashmir, Gujarat, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and Telangana State

## **KBSH-90 (Pipeline)**

### **Salient Features:**

- Duration (days): 80 – 82
  - Seed yield (kg/ha) Rainfed: 1000 - 1200 kg/ha
  - Irrigated : 2300 - 2500 kg/ha
- Oil content (%): 39-40%
- Oil yield (kg/ha): 900-950
- Special Features: Downey mildew Resistant, Higher seed yield and oil yield



**Recommended States/Areas:** Karnataka

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## **RSFH-700**

### **Salient Features:**

- **High seed yielding (1800-2200 kg/ha)**
- **Low hull content (28.2%)**
- **High oil content (38-40%)**
- **Medium duration (95-100 days)**
- **Tolerant to bud necrosis disease and Alternaria leaf spot**



**Recommended States/Areas:** Karnataka

**Contact Details:** University of Agricultural Sciences, Raichur-584 104

## **CoH-3**

### **Salient Features:**

- **High seed yielding (2200-2400 kg/ha)**
- **High volume weight (47 g/100 ml)**
- **High oil content (42%)**
- **Medium duration (92-95 days)**



**Recommended States/Areas:** Tamil Nadu

**Contact Details:** The Professor and Head, Department of Oilseeds, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore-641 003 Phone: 0422-2450812

## CoH-4

### **Salient Features:**

- High seed yielding (2182 kg/ha)
- High volume weight (46 g/100 ml)
- High oil content (40-42%)
- Medium duration (90-95 days)
- Moderately resistant to powdery mildew, Alternaria leaf spot and sucking pest



**Recommended States/Areas:** Tamil Nadu

**Contact Details:** The Professor and Head, Department of Oilseeds, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore-641 003 Phone: 0422-2450812

## PSH-2080

### **Salient Features:**

- Medium maturing, Medium tall hybrid suitable for cultivation during spring season
- Seed yield : 2441 kg/ha
- Oil content : 43.7%
- Oil yield : 1081kg/ha



**Recommended States/Areas:** Tamil Nadu

**Contact Details:** Dr. V.S. Sohu, Head, Department of Plant Breeding and Genetics, Punjab Agricultural University, Ludhiana-141 004; Email: [hodpbg@pau.edu](mailto:hodpbg@pau.edu); Contact No: 0161-2401960 Extn.224

# Safflower

## **ISF-1**

### **First high oleic safflower variety**

<b>Maturity</b>	<b>125-130 days</b>
<b>Seed yield</b>	<b>1200 kg/ha (RF) 1800 kg/ha (IR)</b>
<b>Oil content</b>	<b>31%</b>
<b>Recommended areas</b>	<b>All safflower growing areas of India</b>
<b>Special features</b>	<b>High oleic (76%)</b>
<b>Year of release</b>	<b>2020</b>



**Benefits/Utility: If a premium is paid for its high oleic content, then it can help spread of the variety**

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## ISF-764

### High seed yielding variety

<b>Maturity</b>	<b>125-130 days</b>
<b>Seed yield</b>	<b>1500 kg/ha (RF) 2200 kg/ha (IR)</b>
<b>Oil content</b>	<b>31%</b>
<b>Recommended areas</b>	<b>All safflower growing areas of India</b>
<b>Special features</b>	<b>Moderately resistant to wilt &amp; Alternaria</b>
<b>Year of release</b>	<b>2019</b>



**Benefits/Utility:** High seed yield can help better remuneration to farmers  
highly popular, fast spreading in MH and Telangana

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## **ISH-402**

### **High seed and oil yielding hybrid**

<b>Maturity</b>	<b>120-125 (RF) 140-145 (IR)</b>
<b>Seed yield</b>	<b>2300 kg/ha</b>
<b>Oil content</b>	<b>31%, oil yield of 723 kg/ha</b>
<b>Special feature</b>	<b>First CGMS based public sector hybrid, resistant to wilt</b>
<b>Recommended areas</b>	<b>All safflower growing areas of India</b>
<b>Year of release</b>	<b>2023</b>



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## **ISF-300**

### **High oil content safflower variety**

<b>Maturity</b>	<b>125-130 days</b>
<b>Seed yield</b>	<b>1800 kg/ha</b>
<b>Oil content</b>	<b>38.2 %, 700 kg/ha oil yield</b>
<b>Special feature</b>	<b>Resistant to wilt</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Andhra Pradesh, Telangana, Madhya Pradesh and Chhattisgarh</b>
<b>Year of release</b>	<b>2023</b>



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## **A-2020 (ANG-17-102)**

<b>Maturity</b>	<b>120-125 (RF) 140-145 (IR)</b>
<b>Seed yield</b>	<b>1740 kg/ha (RF) 2150 kg/ha (IR)</b>
<b>Oil content</b>	<b>28.6%</b>
<b>Recommended areas</b>	<b>Karnataka, Maharashtra, Andhra Pradesh, Telangana</b>
<b>Year of release</b>	<b>2021</b>



### **Contact Details:**

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## **DSAF-1 (ANG-18-02)**

<b>Maturity</b>	<b>125-130 days</b>
<b>Seed yield</b>	<b>1740 kg/ha (RF) 2160 kg/ha (IR)</b>
<b>Oil content</b>	<b>28.2%</b>
<b>Special feature</b>	<b>Moderately resistant to Fusarium wilt</b>
<b>Recommended areas</b>	<b>Karnataka, Maharashtra, Andhra Pradesh, Telangana</b>
<b>Year of release</b>	<b>2021</b>



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**IGKV Kusum (RSS 2016-03)**  
**High oil and high yielding variety**

<b>Maturity</b>	<b>138-140 days</b>
<b>Seed yield</b>	<b>2710 kg/ha (IR)</b>
<b>Oil content</b>	<b>34.3%</b>
<b>Special feature</b>	<b>Moderately resistant to Fusarium wilt</b>
<b>Recommended areas</b>	<b>Chhattisgarh plains and Madhya Pradesh</b>
<b>Year of release</b>	<b>2021</b>



**Contact Details:**

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**Raj Vijay Safflower 18-1 (RVSAF-18-1)**  
**Highest seed oil content variety**

<b>Maturity</b>	<b>127-131 days</b>
<b>Seed yield</b>	<b>1746 kg/ha (IR)</b>
<b>Oil content</b>	<b>39 %</b>
<b>Special feature</b>	<b>Moderately resistant to Fusarium wilt</b>
<b>Recommended areas</b>	<b>Karnataka, Maharashtra, Telangana, Andhra Pradesh, Madhya Pradesh, Chhattisgarh and Jharkhand</b>
<b>Year of release</b>	<b>2023</b>



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## **PBNS-184**

<b>Maturity</b>	<b>120-124 days</b>
<b>Seed yield</b>	<b>1746 kg/ha (IR)</b>
<b>Oil content</b>	<b>31.3%</b>
<b>Special feature</b>	<b>Moderately resistant to Fusarium wilt, Alternaria, and aphid</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka and Telangana under rainfed conditions</b>
<b>Year of release</b>	<b>2022</b>



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## **Phule Nira (SSF-12-40)**

<b>Maturity</b>	<b>120-124 days</b>
<b>Seed yield</b>	<b>1476 kg/ha (RF) 2065 kg/ha (IR)</b>
<b>Oil content</b>	<b>32.9%</b>
<b>Special feature</b>	<b>Moderately tolerant to aphid</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Andhra Pradesh and Telangana</b>
<b>Year of release</b>	<b>2020</b>



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## **Phule Bhivara (SSF-13-71)**

<b>Maturity</b>	<b>125 days</b>
<b>Seed yield</b>	<b>1621 kg/ha (RF) 2575 kg/ha (IR)</b>
<b>Oil content</b>	<b>29.5%</b>
<b>Special feature</b>	<b>Moderately tolerant to aphid and wilt, tolerant to Alternaria leaf spot</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Andhra Pradesh and Telangana</b>
<b>Year of release</b>	<b>2020</b>



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## **Phule Gold (SSF-15-65)**

<b>Maturity</b>	<b>122 days</b>
<b>Seed yield</b>	<b>1621 kg/ha (RF) 2575 kg/ha (IR)</b>
<b>Oil content</b>	<b>34.6 %</b>
<b>Special feature</b>	<b>Moderately resistant to Fusarium wilt</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Andhra Pradesh and Telangana</b>
<b>Year of release</b>	<b>2021</b>



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## **Phule Kiran (SSF-16-02)**

<b>Maturity</b>	<b>132 days</b>
<b>Seed yield</b>	<b>1184 kg/ha (RF) 1855 kg/ha (IR)</b>
<b>Oil content</b>	<b>30.5 %</b>
<b>Special feature</b>	<b>Moderately tolerant to aphid</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Andhra Pradesh and Telangana, Madhya Pradesh, Chattisgarh</b>
<b>Year of release</b>	<b>2021</b>



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## **CG Kusum-1**

<b>Maturity</b>	<b>122-125 days</b>
<b>Seed yield</b>	<b>1677 kg/ha</b>
<b>Oil content</b>	<b>32-33 %</b>
<b>Special feature</b>	<b>Moderately tolerant to Alternaria leaf spot, white flower at maturity</b>
<b>Recommended areas</b>	<b>Chattisgarh (Rice based late sown irrigated condition)</b>
<b>Year of release</b>	<b>2021</b>



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## **CG Kusum-2**

<b>Maturity</b>	<b>135 days</b>
<b>Seed yield</b>	<b>2000 kg/ha</b>
<b>Oil content</b>	<b>35 %</b>
<b>Special feature</b>	<b>Red flower colour at maturity</b>
<b>Recommended areas</b>	<b>Chattisgarh (Rice based late sown irrigated condition)</b>
<b>Year of release</b>	<b>2021</b>



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## **IGKV Kusum (RSS 2016-03)**

<b>Maturity</b>	<b>138-140 days</b>
<b>Seed yield</b>	<b>2710 kg/ha</b>
<b>Oil content</b>	<b>34 %</b>
<b>Recommended areas</b>	<b>Chattisgarh (Rice based late sown irrigated condition)</b>
<b>Year of release</b>	<b>2021</b>



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## **Varieties in pipeline**

### **ISF-123-sel-15 - A High oil content selection**

<b>Maturity</b>	<b>135 days</b>
<b>Seed yield</b>	<b>1650-2000 kg/ha, 5.6 to 6.8 q/ha oil yield</b>
<b>Oil content</b>	<b>34.3 %</b>
<b>Special feature</b>	<b>Resistant to wilt</b>
<b>Recommended areas</b>	<b>Rainfed areas</b>

### **ISF-328 - A High oleic and high oil inbred**

<b>Maturity</b>	<b>120 days</b>
<b>Seed yield</b>	<b>1500 kg/ha</b>
<b>Oil content</b>	<b>41 %</b>
<b>Special feature</b>	<b>74% oleic acid</b>
<b>Recommended areas</b>	<b>Rainfed areas</b>

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# Sesame

## TilhanTec Til-1

<b>Maturity</b>	<b>90 days</b>
<b>Seed yield</b>	<b>950 kg/ha</b>
<b>Oil content</b>	<b>45%</b>
<b>Recommended areas</b>	<b>Karnataka, Maharashtra, Telangana, Odisha, West Bengal, Tamil Nadu</b>
<b>Special features</b>	<b>Moderately resistant to root and stem rot, leaf spots, leaf webber and capsule borer, leaf hopper</b>
<b>Year of release</b>	<b>2023</b>



<b>Contact</b>	<b>Dr. R.K. Mathur, Director, ICAR-Indian Institute of Oilseeds Research</b> Tel: +91-40-24598444, 24016141 Mobile : +91- 944044196, director.iior@icar.gov.in
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## G.Til 11 (AT 324)

**Recommended area (states)** : **Zone-I (Telangana, Maharashtra, Karnataka), Zone-II (West Bengal, Madhya Pradesh, Bihar, Andhra Pradesh) and Zone-III (West Bengal, Tamil Nadu) and for all India**

**Suitability** : **Irrigated/Timely sown**

**Salient features** : **Average grain yield : 8.42 q/ha  
Maturity 92 days  
Seeds are black and bold, Oil content 47.47 %  
Moderately resistant to *Macrophomina* stem & root rot and resistant to *Alternaria* leaf spot, *Cercospora* leaf spot and Phyllody**

**Contact Person** **Dr.V.N. Gohil,**  
Breeder (Sesame), Agril. Res. Station, Gujarat Agril. University,  
Junagarh Email: vanrajgohil1@gmail.com



## JCS 3202 (Telangana Til-I)

**Recommended area** : **Zone I (Maharashtra, Karnataka and Telangana)**

**Suitability** : **Rabi/Summer- Irrigated**

**Salient features** : **➤ High yielding 8.51 q/ha (8.20-9.80 q/ha) late maturity, white seeded Maturity : 92 days (91-95 days) late maturity  
➤ Plant height : 96.43 cm (89-106 cm)  
➤ Oil content : 44.2 % (44-49%)  
➤ Oil Yield : 355.2 kg/ha  
➤ Quality traits: (medium size seed)  
➤ Moderately resistant to *Macrophomina* stem and root rot, *Alternaria* leaf spot, *Cercospora* leaf spot and phyllody)**

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## MT-2013-3(BUAT Til-1)

**Recommended area**

**States- U.P**

**Suitability**

**Rainfed**

**Salient features**

**Average grain yield ( q/ha) : 4.5-5.5q/ha**

**Maturity: 83-85 days**

**White seeded, Bold**

**Resistant to Mucrohomina, Cercospora leaf spot, Leafcurl and Bacterial leaf spot Diseases and resistant to Pod borer insect pest**

**Contact Details**

**Dr. Vijay Sharma, Breeder, BUAT, Banda UP**



## VRI-4

**Year of Notification**

**2022. No.SO. 4065 (E) dated 31.08.2022**

**Parentage**

**VRI Sv 2 / GT 10**

**Duration**

**85-90 days**

**Season**

**Suitable for Rabi / Summer cultivation in all sesame growing zones of India**

**Yield**

**957 kg/ha**

**Reaction to major pests and disease**

**Moderately resistant to phyllody and dry root rot diseases and sucking pests**

**Special features**

- **Brown seed**
- **Oil content: 50%**
- **Oil yield: 380 kg/ha**

**Contact Details**

**Dr. A. Mahalingam, Asst. Prof. (PBG), AICRP on Sesame Regional Research Station, Vriddhachalam Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu)**



## Gujarat Til 7 (Banas Gaurav)

<b>Productivity (kg/ha.)</b>	<b>957</b>
<b>Days to maturity</b>	<b>90 (Range: 88-94)</b>
<b>Plant height (cm)</b>	<b>130 (Range:125-149 cm)</b>
<b>No. of branches/plant</b>	<b>4.4 (Range: 3.84-6.00 )</b>
<b>No. of capsules/plant</b>	<b>81 (Range: 74-85)</b>
<b>Length of capsule (cm)</b>	<b>2.7 (Range: 2.5-2.8)</b>
<b>Seeds/capsule</b>	<b>72 (Range: 64-76)</b>
<b>1000-seed weight (g)</b>	<b>3.48 (Range: 3.19-3.50)</b>
<b>Oil content %</b>	<b>49.06 (Range: 48.55-49.82)</b>
<b>Special Features</b>	<b>High yielding, profuse branching, white bold seeded and high oil content Suitable for kharif season</b>
<b>Contact Details</b>	Research Scientist (Castor-Mustard) Castor-Mustard Research Station, S. D. Agricultural University, Sardarkrushinagar Dist : Banaskanth



Locules number per capsule  
(Four)



Seed : Coat colour (white)

## **VRI 5 (VS 19036)**

**Recommended area** Tamil Nadu

**Suitability** Irrigated and Rainfed cultivation

**Salient features**

- Average seed yield: 795 kg/ha
- Maturity: 75-80 days
- White seed
  - Monostem / shy branching sesame type
  - Suitable for high density sowing
  - 52% Oil and 23.8% protein content
  - Moderately resistant to stem and dry root rot, phyllody and powdery mildew diseases
  - Moderately resistant to sucking pests and capsule borer

**Contact person**

**Dr. A. Mahalingam**, Asst. Prof. (PBG), AICRP on Sesame  
Regional Research Station, Vriddhachalam Tamil Nadu Agricultural  
University, Coimbatore (Tamil Nadu)



## **Jagtial Til 2 (JCS 2454)**

**Seed coat colour**    **White**

**Salient features**  
Suitable for Rabi summer cultivation  
Yield - 947-1030 kg/ha during summer  
Quality traits viz., Iron -130.07 mg/kg, Zinc - 69.8 mg/kg and Calcium - 12630 mg/kg  
Duration: 90-95 days  
Oil Content: 46.0 - 48.7 %  
Moderate Resistance to Powdery mildew and tolerance to Alternaria leaf spot.

**States proposed for**  
Zone I :Maharashtra, Telangana, Karnataka,  
Zone II :Andhra Pradesh, Bihar, Madhya Pradesh and  
Zone III: Odisha, Andhra Pradesh, West Bengal and Tamil Nadu

**Contact Detail**    **Dr. D. Padmaja**, Scientist (Plant Breeding), AICRP on sesame  
RARS, Polasa, Jagtial Email:suhanigpb@gmail.com



## **PCUS-18-1(Unnat Rama)**

**Seed coat colour**      **Dark Brown**

**Maturity**              **85-90 days**

**Suitable for Rabi summer cultivation.**

**Days to maturity: 86-90**

**Yield: 9.51 q/ha**

**Salient features**

**Oil content: 46.35%**

**Mod. resistant to Macrophomina stem and root rot and Alternatia leaf spot, Cercospora leaf spot, mod. resistant to leaf Webber, Capsule borer, leaf hopper and mirid bug**

**States proposed for**

**Zone I :Maharashtra, Telangana, Karnataka,**

**Zone II :Andhra Pradesh, Bihar, Madhya Pradesh and**

**Zone III: Odisha, Andhra Pradesh, West Bengal and Tamil Nadu**

**Contact Detail**

**Dr. Rajani Bisen, Principal Scientist, Project Coordinating Unit (Sesame & Niger), JNKVV Jabalpur 482004. Email: [rajanitomar20@gmail.com](mailto:rajanitomar20@gmail.com), 9425483648**



## **OUAT Kalinga Sesame-1/Ashrit(OSM-22)**

**Recommended area** Zone-III (For Odisha)

**Name of Proposing Centre** AICRP on Sesame, Dhenkanal, Odisha

**Suitability** Summer

**Salient features**

- Medium plant height (100cm)
- Duration: 87-93days
- Moderately resistance to *Alternaria* leaf spot, Phyllody, Powdery mildew, *Macrophomina* stem and root rot, *Cercospora* leaf spot .
- Moderately resistant to leaf roller and capsule borer, leaf hopper and mirid bug.
- Synchronous maturity, Late shattering type
- Oil content- 45 to 48 %
- Reddish brown colour seed
- No. of Locules -Six

**Contact Details**

**Dr. DibyaRanjan Mishra, Jr. Breeder, Deptt. of Plant Breeding and Genetics, Orissa University of Agril. & Tech., Dhenkanal**  
Email:



## **OSC-79(Kalinga Sesame 3-1)**

**Recommended area** Zone-III (For Odisha)

**Suitability** *Kharif*

**Salient features**

- Average seed yield of 569 Kg/ha (Potential-740Kg/ha)
- Medium maturity duration (80-83 days)
- Medium plant height (85.5 to 112.9 cm)
- Resistant to *Alternaria* leaf spot, moderately resistant to *Macrophomina* stem and root rot, *Phytophthora* blight, Powdery mildew, *Cercospora* leaf spot and Bacterial leaf spot.
- Late shattering type
- Oil content- 45 to 52 %
- Cream colour seed

**Contact Details**

**Dr. DibyaRanjan Mishra**, Jr. Breeder, Deptt. of Plant Breeding and Genetics, AICRP on Sesame, Orissa University of Agril. & Tech., Dhenkanal





## **SVT-222**

- Potential yield: 1115 kg/ha
- Seed yield : 560-650 kg/ha Responded favourably to 100% RDF.
- Resistance to macrophomina stem and root rot, phyllody and resistance to alternaria leaf spot, bacterial leaf spot, powdery mildew and cercospora leaf spot diseases.
- Bold seed (1000 seed wt. of 3.2g) with shiny white colour.
- Oil content 46.8%.

**Contact person: Mr. Ved Prakash Arya, Managing Director, Shakti Vardhak Hybrid Seeds Pvt. Ltd., Hisar**

### **Vivid Presentation of Sesame Variety SVT-222**



**Single Plant**



**Seed**



**Field View**

## **Sabour Til-1 (BRT-04)**

<b>Seed Coat</b>	<b>Black seeded</b>
<b>Maturity</b>	<b>84-90 days</b>
<b>Seed yield</b>	<b>992 kg/ha (950-1050 kg/ha)</b>
<b>Oil yield</b>	<b>42-44%</b>
<b>States proposed</b>	<b>Zone II: Bihar, West Bengal, Madhya Pradesh, Andhra Pradesh</b>
<b>Proposed by</b>	<b>Bihar Agricultural University, Sabour, Bihar</b>
<b>Features</b>	<b>Mod. resistant to <i>Macrophomina</i> stem and root rot, <i>Alternaria</i> leaf spot, <i>Cercospora</i> leaf spot and phyllody</b>
<b>Contact person</b>	<b>Dr Sima Sinha, Scientist, BAU, Sabour</b>



## **RT 372**

**Recommended area** **Zone I (Rajasthan, Haryana, Punjab, Gujarat, Himachal Pradesh, U.P, Maharastra, Nagaland and parts of Karnataka and Telangana states)**

**Suitability** **Rainfed, Kharif, both high and low fertility conditions.**

**Salient features** **Seed yield of 610 kg/ha, Shining white seed colour, 86 – 90 days (Days to maturity), It is moderately resistant to macrophomina stem & root rot, phyllody and resistant to alternaria leaf spot, cercospora leaf spot, bacterial leaf spot and powdery mildew. Moderately resistant to leaf webber and capsule borer (*Antigastra*), Oil content 47.8%**

**Contact Details** **Dr. Sita Ram Kumhar, Professor (PBG) & Sesame Breeder  
Agricultural Research Station (Agriculture University, Jodhpur)  
Mandor, Jodhpur - 342304, Rajasthan Mob. 9413251053,  
9784821500 Email: srkumhar@gmail.com**



Single Plant RT 372



RT 372 seed photo



Field View of RT 372

## **AAUDR 9304-14-4-1 (AST-1)**

**Recommended area** **Zone I (Rajasthan, Haryana, Punjab, Gujarat, Himachal Pradesh, U.P, Maharastra, Nagaland and parts of Karnataka and Telangana states)**

**Suitability** **As *kharif* til in upland situation**

**Salient features** **Tolerant to lodging, responsive to fertilizer, suitable for upland situation Seed yield of 875 kg/ha, Days to maturity 65-75 days.**

**Contact Details** **Dr. Ashutosh Roy, Chief Scientist Regional Agricultural Research Station Diphu Mob: +91 94 358 23 601  
Email:ashutosh\_rars@yahoo.com**



## **JLT-408-2 (Phule Purna)**

**Recommended area** Summer in *Khandesh* and adjoining areas of *Marathwada* region of Maharashtra

**Suitability** Summer- Irrigated

**Salient features**

- High yielding 7.05 q/ha (7.00-8.00 q/ha) with bold white seeded variety
- Maturity : 92 days (84-97 days)
- Oil content : 49.02 % (45-49%)
- Quality traits: (medium size seed)
- Resistant to Diseases: Resistant to *Macrophomina* stem and root rot, *Alternaria* leaf spot, *Cercospora* leaf spot and moderately resistance to phyllody

**Contact Person:** Principal Scientist, Oilseeds Research Station, Mahatma Phule Krishi Vidyapeeth, Jalgaon -425 001 (M.S.)



## **Jagtial Til 1 (JCS 1020)**

**Recommended area** Telangana State

**Suitability** Summer

**Salient features** Yield: 1050-1100 kg/ha  
White seeded, Oil content 46-49%  
Duration-85-95 days  
Mod. resistant to powdery mildew, cercospora leaf spot and phyllody

**Contact Details** Dr. D. Padmaja, Scientist (Plant Breeding), AICRP on sesame  
RARS, Polasa, Jagtial Email:suhanigpb@gmail.com



# Niger

## JNS -2016-1115

- Suitability** : Suitable for rainfed and irrigated condition
- Salient features** : Tolerant to cercospora leaf spots, alternaria leaf spots & powdery mildew diseases. Moderately tolerant to aphids, semilooper and caterpillar.  
Maturity 96 – 102 days  
Average yield 650-700 kg/ha, oil content: 39-40%

**Recommended area** : All India

**Contact Details** : Breeder  
AICRP on Niger, Zonal Agricultural Research Station, JNKVV, Chhindwara (Madhya Pradesh)



## JNS -2015-9

- Suitability** : Suitable for rainfed as well as irrigated hills and plain condition.
- Salient features** : Moderately tolerant to aphids, semilooper and caterpillar. Tolerant to cercospora and Alternaria leaf spots & powdery mildew diseases under field conditions.  
Maturity 99 – 103 days; oil content 37-38%  
Average yield 550-600 kg/ha.

**Recommended area** : Madhya Pradesh

**Contact Details** : Breeder  
AICRP on Niger, Zonal Agricultural Research Station, JNKVV, Chhindwara (Madhya Pradesh)





## JNS -521

**Suitability** : Suitable for rainfed as well as irrigated hills and plain condition.

**Salient features** : Shining black seed, tolerant to Alternaria leaf spots & powdery mildew diseases under field condition.  
Tolerant to aphids, semilooper and caterpillar  
Maturity 99 – 109 days  
oil content 37-38%  
Average yield 550-600 kg/ha.

**Recommended area** : Madhya Pradesh

**Contact Details** : Breeder  
AICRP on Niger, Zonal Agricultural Research Station,  
JNKVV, Chhindwara (Madhya Pradesh)



## JNS -2016-1413

**Suitability** : Suitable for rainfed as well as irrigated hills and plain condition.

**Salient features** : Suitable for: Kharif Season  
Yield: 630.4 (av) [650 -750 kg/ha]  
Maturity: 95 day (av.)  
Tolerant to cercospora, Alternaria leaf spot, Powdery mildew, Niger caterpillar, White fly and leaf hopper  
High oil content (%) =39.5%

**Recommended area** : Chhattisgarh and Jharkhand

**Contact Details** : Breeder  
AICRP on Niger, Zonal Agricultural Research Station,  
JNKVV, Chhindwara (Madhya Pradesh)



## GNIG-4

**Suitability** : **Late Kharif season**

- Salient features** :
- The proposed genotype belongs to mid late group (109-133 days)
  - The seeds are black and bold with test weight of 4.08 g
  - It gave an average seed yield of 543 kg/ha under Gujarat condition with an seed yield advantage of 41.40%, 34.07% and 43.65% higher over IGPN-2004-1, GNNIG-3 and GN-2, respectively.
  - It also recorded seed yield of 597 kg/ha in CVT trials (average of 9 locations) with an yield increment of 12.64% and 8.15% over the national checks, IGPN-2004-1 and JNS-9 .
  - Proposed genotype contains 37.77% oil with oil yield of 205 kg/ha with an oil yield advantage of 65.32 % and 57.69 % over IGPN-2004-1 and GNNIG-3
  - It was found to be resistant against *Alternaria* and *Cercospora* leaf spot diseases and pests like semilooper and caterpillar

**Recommended area** : **GUJARAT**

**Contact Details** : **Dr. Prashant K. Jagtap,**  
Jr. Breeder  
Niger Research Station, NAU  
Vanarasi-396 580  
Tal. Vansda, Dist. Navsari  
Cell 09428688744  
email [pacific7@rediffmail.com](mailto:pacific7@rediffmail.com)



# Castor

## **Castor Hybrid Tilhan Tec ICH-6**

<b>Maturity</b>	<b>Early (DF-50-60 DAS, DM-100-110 DAS)</b>	<b>Seed yield</b>	<b>1-1.5 t/ha</b>
<b>Recommended for</b>	<b>Andhra Pradesh, Telangana, Karnataka, TamilNadu, Odisha, Gujarat, Rajasthan, Haryana</b>	<b>Special traits</b>	<b>Early, short, resistance to wilt, tolerant to sucking pests</b>



## **Castor Hybrid ICH-5**

<b>Maturity</b>	<b>Medium (95-105 DAS)</b>	<b>Seed yield</b>	<b>1.7 t/ha</b>
<b>Recommended for</b>	<b>Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Odisha-rainfed conditions</b>	<b>Special traits</b>	<b>Resistance to wilt, root rot and leafhopper</b>



<b>Contact</b>	<b>Dr. R.K. Mathur, Director, ICAR-Indian Institute of Oilseeds Research Tel: +91-40-24598444, 24016141 Mobile : +91- 944044196, director.iior@icar.gov.in</b>
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## Castor Hybrid ICH 66

<b>Maturity</b>	<b>Early to Medium (95-105 DAS)</b>	<b>Seed yield</b>	<b>1.5 t/ha</b>
<b>Recommended for</b>	<b>Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, Odisha- rainfed conditions</b>	<b>Special traits</b>	<b>Resistance to wilt and leafhopper</b>



<b>Contact</b>	<b>Dr. R.K. Mathur, Director, ICAR-Indian Institute of Oilseeds Research</b> Tel: +91-40-24598444, 24016141 Mobile : +91- 944044196, <a href="mailto:director.iior@icar.gov.in">director.iior@icar.gov.in</a>
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## M-574 Castor pistillate/female parental line

### Potential of technology

- M-574 has a wider adaptability, stable yield (0.3-0.5 t/ha)
- M-574 based hybrids have a stable performance (1-2.5 t/ha) all over the country while other hybrids based on DPC-9, SKP-84 have specific or regional adaptability.
- Good source for development of new pistillate lines and hybrids.



## **Castor Hybrid GNCH-1**

<b>Maturity</b>	<b>Medium (110-130 DAS)</b>	<b>Seed yield</b>	<b>2.6 t/ha</b>
<b>Recommended</b>	<b>Gujarat</b>	<b>Special traits</b>	<b>Resistance to wilt &amp; leafhopper</b>
<b>Contact details</b>	<b>Dr. Ronak Bhakta</b> , Castor Breeder, C/o Nodal Officer (Mega-seed) & Unit Head, Pulses & Castor Research Station, Navsari Agricultural University, Navsari-396450. Mobile : +91-9825417415. castornau@gmail.com		



## **Castor Hybrid GCH-8**

<b>Maturity</b>	<b>Medium</b>	<b>Seed yield</b>	<b>1.9-3.6 t/ha</b>
<b>Recommended for</b>	<b>Andhra Pradesh, Telangana, Karnataka, TamilNadu, Odisha, Gujarat, Rajasthan, Haryana</b>	<b>Special traits</b>	<b>Resistance to wilt, leafhopper, tolerant to root rot</b>
<b>Contact</b>	<b>Dr. L. D. Parmar</b> , Research Scientist, Centre for Oilseeds Research, S. D. Agricultural University, Sardarkrushinagar - 385 506, District- Banaskantha (Gujarat), Mo. 7226860114. rscandm@sdau.edu.in		



## **Castor Hybrid GCH-9**

<b>Maturity</b>	<b>Medium (110-130 DAS)</b>	<b>Seed yield</b>	<b>3.8 t/ha</b>
<b>Recommended for</b>	<b>Gujarat</b>	<b>Special traits</b>	<b>Resistance to wilt, root rot, profuse branching</b>
<b>Contact</b>	<b>Dr. R. B. Madariya, Dean of Research, Junagadh Agricultural University, Junagadh, GUJARAT- 362 001. <a href="mailto:rajesh_2770@jau.in">rajesh_2770@jau.in</a>. +91-9429322929</b>		



## **Castor Hybrid YRCH-2**

<b>Maturity</b>	<b>Medium (100-110 DAS)</b>	<b>Seed yield</b>	<b>2.1 t/ha</b>
<b>Recommended for</b>	<b>Tamil Nadu</b>	<b>Special traits</b>	<b>Resistance to wilt</b>
<b>Contact</b>	<b>Dr. Venkatachalam R, Professor and Head, Tapioca and Castor Research Station, Yethapur, P.G. Palayam - 636 119. Salem District. Tamil Nadu, Phone : 04282-293526, <a href="mailto:arsyethapur@tnau.ac.in">arsyethapur@tnau.ac.in</a></b>		



## **Castor Variety YTP-1**

<b>Maturity</b>	<b>Annual to perennial</b>	<b>Seed yield</b>	<b>1 t/ha (annual)-3 kg/pl/yr (perennial)</b>
<b>Recommended for</b>	<b>Tamil Nadu</b>	<b>Special traits</b>	<b>Resistance to wilt, bold seed</b>
<b>Contact</b>	<b>Dr. Venkatachalam R</b> , Professor and Head, Tapioca and Castor Research Station, Yethapur, P.G. Palayam - 636 119. Salem District. Tamil Nadu, Phone : 04282-293526, <a href="mailto:arsyethapur@tnau.ac.in">arsyethapur@tnau.ac.in</a>		



### **SUMMARY OF THE CASTOR HYBRIDS/ VARIETIES RELEASED**

#### **DURING 2018-2022**

#### **HYBRIDS**

<b>Name</b>	<b>Year of release</b>	<b>Yield (kg/ha)</b>	<b>Oil (%)</b>	<b>Days to first picking (DAS)</b>	<b>Major traits /Res./Tol.</b>	<b>Recommended states</b>
<b>GCH-8</b>	<b>2018</b>	<b>3590 (IR)</b>	<b>48</b>	<b>100-130</b>	<b>W, RR, LH</b>	<b>All over India</b>
<b>YRCH-2</b>	<b>2018</b>	<b>2090 (RF)</b>	<b>48</b>	<b>110-115</b>	<b>W</b>	<b>Tamil Nadu</b>
<b>GCH-9</b>	<b>2018</b>	<b>3820 (IR)</b>	<b>48-50</b>	<b>110-120</b>	<b>W, RR</b>	<b>Gujarat</b>
<b>GNCH-1</b>	<b>2018</b>	<b>2545 (IR)</b>	<b>47-48</b>	<b>100-115</b>	<b>W, LH</b>	<b>Gujarat</b>
<b>ICH-66</b>	<b>2019</b>	<b>1580 (RF) 3375 (IR)</b>	<b>46-49</b>	<b>95-100</b>	<b>W, LH</b>	<b>AP, TG, TN, KN, Odisha</b>
<b>GCH-10</b>	<b>2020</b>	<b>3900 (IR)</b>	<b>50</b>	<b>90-110</b>	<b>W, LH</b>	<b>Gujarat</b>
<b>ICH-5</b>	<b>2021</b>	<b>1670</b>	<b>48</b>	<b>95-110</b>	<b>W, RR, LH</b>	<b>AP, TG, TN, KN, Odisha, MH</b>



<b>Tilhan Tec ICH-6</b>	<b>2023</b>	<b>1000 (RF) 1500 (IR)</b>	<b>47-48</b>	<b>90-110</b>	<b>W, tolerant to sucking pests</b>	<b>All over India</b>
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AP-Andhra Pradesh, TG-Telangana, TN-Tamil Nadu, KN-Karnataka, MH-Maharashtra

W-Wilt, RR-Root rot, LH-Leafhopper

IR-Irrigated, RF-Rainfed

## VARIETIES

<b>Name</b>	<b>Year of release</b>	<b>Yield (kg/ha)</b>	<b>Days to first picking (DAS)</b>	<b>Oil content (%)</b>	<b>Major traits/Res.to</b>	<b>Recommended states</b>
<b>JC-4</b>	<b>2018</b>	<b>2640</b>	<b>100-130</b>	<b>50</b>	<b>Medium maturity</b>	<b>Chindwara</b>
<b>JC-24</b>	<b>2018</b>	<b>2745</b>	<b>95-110</b>	<b>46</b>	<b>Early maturity</b>	<b>Chindwara</b>
<b>YTP- 1</b>	<b>2019</b>	<b>1460</b>	<b>115-120</b>	<b>49</b>	<b>Annual or perennial, WR</b>	<b>Tamil Nadu</b>
<b>GAC- 11</b>	<b>2021</b>	<b>3230</b>	<b>100-130</b>	<b>48</b>	<b>Early</b>	<b>Gujarat</b>

# Linseed

## **Utera Alsi 2 (RLC-153) (S.O.1498(E)/ 2019)**

### **Salient Features:**

- Utera Alsi 2 is suitable for rice fallows of Zone II & III
- It matures in 115-120 days and yields at an average of 519 kg/ha
- Oil content of 34.8% is reported
- Resistant to rust; Moderately resistant to wilt & bud fly

### **Recommended domain :**

**Uttar Pradesh, Bihar, West Bengal, Assam  
Madhya Pradesh, Chhattisgarh, Odisha,  
Maharashtra & Karnataka**

### **Contact Address :**

**Dr Nandhan Mehta,**  
Principal Scientist, AICRP Linseed  
IGKV, Raipur, Chhattisgarh



## **Surya (LCK-1404) (S.O.3220(E)/2019)**

### **Salient Features:**

- Surya is suitable for irrigated conditions of Zone I
- It matures in 165-170 days and yields at an average of 1431 kg/ha
- Oil content of 35.5% is reported
- Resistant to rust; Moderately resistant to wilt

### **Recommended domain :**

**Himachal Pradesh, Punjab, Haryana,  
Jammu & Kashmir**

### **Contact Address :**

**Dr. Nalini Tewari,**  
Linseed Breeder, AICRP Linseed  
CSAUA&T, Kanpur



## LSL- 93 (S.O.3220(E)/2019)

### Salient Features:

- LSL-93 is suitable for rainfed conditions of Maharashtra
- It matures in 90-95 days and yields at an average of 962 kg/ha
- Oil content of 38% is reported
- Resistant to rust; moderately resistant to wilt, powdery mildew & bud fly
- More than 55% of ALA is reported in seeds

**Recommended domain :** Maharashtra

### Contact Address :

**Dr. M.V. Dhuppe,**  
Oilseeds Specialist,  
VNMKV, Parbhani (Latur)



## TL 99 (S.O.99 (E)/ 2020)

### Salient Features:

- TL 99 is suitable for irrigated conditions of zone II
- It matures in 130-135 days and yields at an average of 1274 kg/ha
- Oil content of 36.5% is reported and it is the lowest ALA variety available (2-5%)
- Resistant to rust & wilt; Moderately resistant to bud fly

**Recommended domain :** Uttar Pradesh, Bihar, West Bengal & Assam

### Contact Address :

**Dr. J. G. Manjaya,**  
Head, Experimental Gamma Field Facility  
Section,  
BARC, Trombay



## Him Palam Alsi -1 (KL-241) (S.O.99 (E)/ 2020)

### Salient Features:

- Him Palam Alsi-1 is suitable for *Utera* conditions of HP
- It matures in 180-190 days and yields at an average of 661 kg/ha
- Oil content of 36.15% is reported
- Resistant to rust, powdery mildew & wilt; moderately resistant to bud fly

**Recommended domain :** Himachal Pradesh

### Contact Address :

**Dr. Gurudev Singh,**  
Scientist (GPB) & Incharge, AICRP Linseed,  
HPKVV, Palampur



## Rajan (LCK 1009) (S.O.1498(E)/2020)

### Salient Features:

- Rajan is suitable for irrigated conditions of UP
- It matures in 130-135 days and yields at an average of 1528 kg/ha
- Oil content of 38% is reported
- Resistant to rust; moderately resistant to *Alternaria* & bud fly

**Recommended domain :** Uttar Pradesh

### Contact Address :

**Dr. Nalini Tewari,**  
Linseed Breeder, AICRP Linseed  
CSAUA&T, Kanpur



**Kota Barani Alsi 5 (RL-29005)  
(S.O.99 (E)/2020)**

**Salient Features:**

- Variety is suitable for rainfed conditions of Rajasthan
- It matures in 135-140 days and yields at an average of 1150 kg/ha
- Oil content of 36% is reported
- Moderately resistant to wilt, *Alternaria* & bud fly

**Recommended domain : Rajasthan**

**Contact Address :**

**Dr. Sandhya Kulhari,**  
Junior Linseed Breeder & In charge,  
AICRP Linseed, Kota, Rajasthan



**Suvee (RLC 161)  
(S.O.3482 (E )/2020)**

**Salient Features:**

- Suvee is suitable for rainfed conditions of zone-I
- It matures in 165-170 days and yields at an average of 1262 kg/ha
- Oil content of 32% is reported
- Resistant to rust; moderately resistant to bud fly

**Recommended domain : Himachal Pradesh, Punjab, Haryana, Jammu & Kashmir**

**Contact Address :**

**Dr Nandhan Mehta,**  
Principal Scientist, AICRP Linseed  
IGKVV, Raipur, Chhattisgarh



## **Kota Alsi-6(RL 13165) (S.O.500(E)/2021)**

### **Salient Features:**

- **Kota Alsi-6 is suitable for irrigated conditions of zone-II**
- **It matures in 130-135 days and yields at an average of 1259 kg/ha**
- **Oil content of 36.4% is reported**
- **Moderately resistant to rust, wilt, powdery mildew, *Alternaria* & bud fly**

**Recommended domain :** **Uttar Pradesh, Bihar, West Bengal, Assam**

### **Contact Address :**

**Dr. Sandhya Kulhari,**  
Junior Linseed Breeder & In charge,  
AICRP Linseed, Kota, Rajasthan



## **Kota Barani Alsi-6 (RL-15584) (S.O.500(E)/2021)**

### **Salient Features:**

- This variety is suitable for rainfed conditions of zone-I**
- **It matures in 150-155 days and yields at an average of 1224 kg/ha**
  - **Oil content of 31.87 % is reported**
  - **Moderately resistant to rust, wilt, powdery mildew, *Alternaria* & bud fly**

**Recommended domain :** **Himachal Pradesh, Punjab, Haryana, Jammu & Kashmir**

### **Contact Address :**

**Dr. Sandhya Kulhari,**  
Junior Linseed Breeder & In charge,  
AICRP Linseed, Kota, Rajasthan



## **BUAT Alsi 4 (LMS-2015-31) (S.O.500(E)/2021)**

### **Salient Features:**

- This variety is suitable for irrigated conditions of zone-III
- It matures in 130-35 days and yields at an average of 1700 kg/ha
- Oil content of 37.0 % is reported
- Moderately resistant to powdery mildew, *Alternaria* & bud fly

### **Recommended domain :**

**Madhya Pradesh, Chhattisgarh, Odisha, Maharashtra & Karnataka, Bundelkhand**

### **Contact Address :**

**Dr. C.M. Singh,**  
Linseed Breeder, AICRP Linseed,  
BUA&T, Mauranipur, UP



## **Aparna (LCK 1611) (S.O.500(E)/2021)**

### **Salient Features:**

- Aparna is suitable for irrigated conditions of zone-I
- It matures in 165-170 days and yields at an average of 1342 kg/ha
- Oil content of 31.87 % is reported
- Resistant to rust & *Alternaria*; moderately resistant to wilt, powdery mildew, & bud fly

### **Recommended domain :**

**Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir**

### **Contact Address :**

**Dr. Nalini Tewari,**  
Linseed Breeder, AICRP Linseed  
CSAUA&T, Kanpur





## RLC 164 (S.O.500(E)/2021)

### Salient Features:

- RLC 164 is suitable for rainfed conditions of zone-I
- It matures in 160-165 days and yields at an average of 1161 kg/ha
- Oil content of 32.6% is reported
- Resistant to rust & *Alternaria*; moderately resistant to wilt, powdery mildew, & bud fly

**Recommended domain :** Himachal Pradesh, Punjab, Haryana, Jammu & Kashmir

### Contact Address :

**Dr Nandhan Mehta,**  
Principal Scientist, AICRP Linseed  
IGKV, Raipur, Chhattisgarh



## RLC 167 (S.O.500(E)/2021)

### Salient Features:

- RLC 167 is suitable for irrigated conditions of zone-I
- It matures in 160-165 days and yields at an average of 1161 kg/ha
- Oil content of 34.2% is reported
- Resistant to rust; moderately resistant to wilt, powdery mildew & bud fly

**Recommended domain :** Himachal Pradesh, Punjab, Haryana, Jammu & Kashmir

### Contact Address :

**Dr Nandhan Mehta,**  
Principal Scientist, AICRP Linseed  
IGKV, Raipur, Chhattisgarh



## Sabour Tisi-3 (BRLS 107-1) (S.O. 8(E)/2021)

### Salient Features:

- Sabour Tisi-3 is suitable for *Utera* conditions of zone-II&III
- It matures in 115-120 days and yields at an average of 547 kg/ha
- Oil content of 38.2% is reported
- Resistant to wilt & powdery mildew; moderately resistant to rust

**Recommended domain :** Uttar Pradesh, Bihar, West Bengal, Assam  
Madhya Pradesh, Chhattisgarh, Odisha,  
Maharashtra & Karnataka

### Contact Address :

Dr. R.B.P. Nirala,  
Jr. Breeder & In charge,  
AICRP Linseed, BAU, Sabour, Bihar



## SHUATS ALSI 2 (SHA-2) (S.O. 8(E)/2021)

### Salient Features:

- SHA-2 is suitable for irrigated conditions of UP
- It matures in 120-125 days and yields at an average of 1110 kg/ha
- Oil content of 37.4% is reported
- Resistant to Powdery mildew & rust and moderately resistant to wilt and *Alternaria* blight

**Recommended domain :** Uttar Pradesh

### Contact Address :

Dr Indranil Bhattacharjee,  
Assistant Director Research,  
SHUATS, Naini, UP



## Sabour Tisi-2 (BRLS 101) (S.O. 8(E)/2021)

### Salient Features:

- Sabour Tisi-2 is suitable for irrigated conditions of Bihar
- It matures in 120-130 days and yields at an average of 1883 kg/ha
- Oil content of 37.8% is reported
- Resistant to rust & powdery mildew; moderately resistant to *Alternaria* & bud fly

### Recommended domain :

**Bihar**

### Contact Address :

**Dr. R.B.P. Nirala,**  
Jr. Breeder & In charge,  
AICRP Linseed, BAU, Sabour, Bihar



## Birsa Tisi-1 (BAU-15-03) (S.O. 8(E)/2021)

### Salient Features:

- Sabour Tisi-2 is suitable for rainfed conditions of Jharkhand
- It matures in 155-165 days and yields at an average of 1141 kg/ha
- Oil content of 41.8% is reported
- Resistant to wilt & powdery mildew; moderately resistant to *Alternaria* blight, rust and bud fly

### Recommended domain : **Jharkhand**

### Contact Address :

**Dr. R.B.P. Nirala,**  
Jr. Breeder & In charge,  
AICRP Linseed, BAU, Sabour, Bihar



**RLC 171 (Varsha Alsi-2)  
(S.O. 1056(E)/06.03.2023)**

**Salient Features:**

- RLC 171 is suitable for rainfed conditions of zone I & II
- It matures in 140-145 (Z-I) & 125-130 (Z-II) days and yields at an average of 1175 kg/ha
- Oil content of 34.27% is reported

**Recommended domain :**

**Uttar Pradesh, Bihar, West Bengal, Assam, Himachal Pradesh, Punjab, Haryana, Jammu & Kashmir**

**Contact Address :**

**Dr Nandhan Mehta,**  
Principal Scientist, AICRP Linseed  
IGKV, Raipur, Chhattisgarh

# **Biopesticide Technologies**

## *Trichoderma harzianum* Th4d SC (Triguard Th-L)

- 1. Name of the technology and its microbial constituent:** The technology offered is the Suspension Concentrate (SC) formulation of *Trichoderma harzianum* Th4d (NAIMCC-F-02188) which is first of its kind in the country with shelf life of more than 24 months and production process for improved yield of *Trichoderma* biomass (Patented process, Indian Patent No. 316651). The process involves the multiplication of *Trichoderma harzianum* Th4d in modified molasses-soya medium by biphasic method, harvesting desiccation tolerant viable propagules of 9.47 log CFU/g. Further this process aided in development of liquid-based *Trichoderma harzianum* Th4d SC formulation. The SC formulation will have a minimum of  $2 \times 10^6$  cfu/ml even at 18<sup>th</sup> month after storage in room temperature.
- 2. Target diseases, crops and delivery system:** The technology has been validated against Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt of safflower and castor, Botryotinia gray mold of castor and Alternariaster leaf blight and powdery mildew of sunflower. The formulations can be used for seed treatment @ 1ml/kg seed or 500 ml in 500 litre of water/ha and foliar spray.
- 3. Target agroecological zones/states:** Telangana, Tamilnadu, Maharashtra
- 4. Validation and commercialization:** Technology validated over 5 years in multi-location field trials conducted under AICRP on Castor, Sunflower and Safflower revealed its effectiveness against Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt of safflower, Botryotinia gray mold of castor, Alternariaster blight and powdery mildew of sunflower.
- 5. Whether licensed to private companies, If yes, details thereof:** The technology has been licensed (2015-2018) to 4 private companies between viz., 1. M/s Dhampur Sugars Pvt. Ltd., Dhampur, UP, 2. M/s Shri Ram Bioorganics, Jaspur, UK, 3. M/s Vidarbha Biotech, Yavatmal, MS, 4. M/s Agricos Pvt. Ltd., Yavatmal, MS.
- 6. Benefits:** *Trichoderma* formulation has longer shelf life (more than 24 months), dosage required is very low (1 or 2 ml/kg seed/L water), the strain is effective against many plant diseases (broad host range), symbiotic root colonizer, induces defense response in plants against pathogen and promotes plant growth. The production process supports high yield and desiccation tolerant viable propagules. *Trichoderma harzianum* Th4d SC liquid formulation can be produced at a low cost.



**Triguard Th-L**



**Triguard Th-L treated**



**Control**

**Field Trial at Parbhani (MS) in safflower crop during 2015-16 (Var. PBNS 12)**

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

## ***Trichoderma harzianum* Th4d WP (Triguard Th-P)**

- 1. Name of the technology and its microbial constituent:** The technology offered is the biocontrol agent *Trichoderma harzianum* Th4d 1.5% WP formulation with shelf life of more than 18 months and production process for improved yield of *Trichoderma* biomass (patented process, Indian Patent No. 316651). The process involves the multiplication of *Trichoderma harzianum* Th4d in modified molasses-soya medium by biphasic method, harvesting desiccation tolerant viable propagules of 9.47 log CFU/g. Further this process aided in development of *Trichoderma harzianum* Th4d wettable powder formulation where dry conidial spores harvested through modified fermentation production process were aseptically mixed with pre sterilized carrier and adjuvants. The formulation will have a minimum of  $2 \times 10^6$  cfu/gm even at 18<sup>th</sup> month after storage in room temperature.
- 2. Target disease, crops and delivery system:** The technology has been validated against Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt of safflower and castor, Aspergillus root rot in groundnut. The formulation can be used for seed treatment @10g/kg.
- 3. Target agroecological zones:** Telangana, Tamilnadu, Maharashtra
- 4. Validation and commercialization:** Technology validated over 8 years in multi-location field trials conducted under AICRP on Castor and Safflower revealed its effectiveness against Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt diseases.  
The technology is ready for commercialization.
- 5. Whether licensed to private companies, if yes, details thereof:** LOI has been obtained from two private firms and the technology will be licensed after completing technology transfer formalities.
- 6. Benefits:** *Trichoderma* WP formulation has longer shelf life (more than 18 months), effective against many plant diseases (broad host range), *Trichoderma* strain is symbiotic root colonizer, induces defense response in plants against pathogen and promotes plant growth. The production process supports high yield and desiccation tolerant viable propagules. *Trichoderma harzianum* Th4d WP formulation can be produced at a low cost.



**Triguard Th-P**



**Triguard Th-P**



**Control**



**Control Treated**

### **Field Trial at Palem (TS) in groundnut crop during 2018-19 (Var. K-6)**

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 2459818

## ***Trichoderma asperellum* TaDOR 7316 5%WP (Triguard Ta-P)**

- 1. Name of the technology and its microbial constituent:** The technology offered is wettable powder formulation of thermotolerant strain of *Trichoderma asperellum* Tv 7316 5% WP. *Trichoderma asperellum* TaDOR7316 (MTCC 5623) at its hyphal stage was also able to tolerate high temperature (patented process, Indian Patent No. 359123) due to accumulation of more quantities of osmoprotectants. *T. asperellum* 7316 able to colonize root cortex and induce defense response in treated plants. *Trichoderma asperellum* Ta DOR 7316 WP formulation retains shelf life of more than 18 months. The formulation will have a minimum of  $2 \times 10^6$  cfu/gm even at 18<sup>th</sup> month after storage in room temperature.
- 2. Target diseases, crops and delivery system:** The technology has been validated against Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt of safflower. The formulation can be used for seed treatment @ 10 g/kg.
- 3. Target agroecological zones:** Telangana, Tamilnadu, Maharashtra
- 4. Validation and commercialization:** Technology validated over 5 years in multi-location field trials conducted under AICRP on Safflower revealed its effectiveness against Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt diseases.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** The wettable powder of thermotolerant strain of *Trichoderma asperellum* TaDOR7316 when applied as seed treatment in safflower under drought condition able to control soilborne diseases in safflower and gave high seed yield.



**Triguard Ta-P**



**Triguard Ta-P**

**Control**

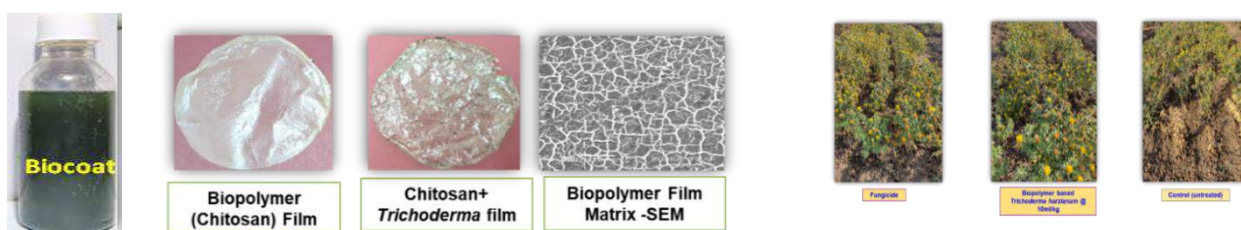
**Field Trial at Solapur (MS) in safflower crop during 2013-14 (var. *Phule Kusum*)**

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180



## Biopolymer based *Trichoderma harzianum* Th4d (1% w/v) blend

- 1. Name of the technology:** Biopolymer-based *Trichoderma harzianum* Th4d (1% w/v) blend. Chitosan biopolymeric blend which was developed in IIOR using cross-linking technique were used for the entrapment of beneficial microbes like *Trichoderma*. The present technology is an eco-friendly strategy for obtaining healthy and robust seedlings, which can reduce the usage of chemical fungicides for seed treatment and thereby minimize the risks associated with fungicides on the environment and non-target organisms, including human beings.
- 2. Target diseases, crops and delivery system:** Seed and soil borne diseases are the major constrains in crop production. Seed treatment with microbial agents and chemicals is one of the best options to protect any crop from pests and disease and to grow healthy plant. The seed dressing is usually done with plant protection chemicals and biocontrol agents. Apart from this, efficient delivery system by seed coating in conjunction with seed coat polymers leading to seed enhancement and mitigation of moisture stress during seed germination in dry land crops. Seed and seedling stresses can be managed upto 45-60 DAS effectively without much efforts.
- 3. Target agroecological zones (if any):** The technology can be commercialized in all agricultural crop and areas of India where soil and seed borne pathogens are a serious problem as a seed coating technology.
- 4. Validation and commercialization:** The developed biopolymers in combination with *Trichoderma* were evaluated for their viability, performance under laboratory, green house and field conditions against seed and soil borne diseases in oilseed crops. Seed treatment with chitosan blend in combination with *Trichoderma* has increased seed germination and seedling vigor both in vitro and greenhouse conditions. In field experiments conducted at different locations and seasons in selected oilseed crops a disease reduction of more than 50% disease incidence and increase in seed yields and high B:C ratio was observed compared to control. The technology can be commercialized in all agricultural crop and areas of India where soil and seed borne pathogens are a serious problem as a seed coating technology.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** The technology enables easy seed coating of microbes mostly *Trichoderma* through solvent casting method. This has resulted in advantages viz., uniform film formation with polymer matrices and resulting uniform seed coating, polymeric films having capacity of entrapment efficiency (85%) of active ingredient for seed coating, viability of *Trichoderma* in the polymeric film compositions has observed 24 months without much decrease from the initial load, reducing wastage of active ingredient during application for effective kill of pathogen, efficient use of beneficial microbes by precision management, raw materials used are eco-friendly which are origin of natural derivatives and less laborious.



Biopolymer based *Trichoderma harzianum* Th4d (1% w/v) blend

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad

## Preparation of crosslinked biopolymeric film composition

- 1. Name of the process/product/technology:** Preparation of crosslinked biopolymeric film composition. Biocontrol approaches using beneficial microbes like *Trichoderma* and *Pseudomonas* face limitations in high temperatures and limited soil moisture. To address these challenges, emerging technologies like tailor-made polymers are being explored.
- 2. Target crops and delivery system:** Modern agriculture faces challenges in managing various stresses such as fungal diseases, viral infections, insect pests, drought, salinity, and soil fertility issues. Conventional solutions involving synthetic pesticides, nutrients, and other agrochemicals often result in environmental concerns due to volatilization, leaching, and toxicity. The technology offers controlled release system for agrochemicals, minimizing environmental impact. The current technology represents an environmentally friendly approach to cultivating robust and healthy seedlings. By reducing the need for chemical fungicides in seed treatment, it helps mitigate the associated risks to the environment and non-target organisms.
- 3. Target agroecological zones:** This technology holds potential for widespread commercialization across all agricultural crops and regions in India where soil and seed borne pathogens are a serious problem as a seed coating technology.
- 4. Validation and commercialization:** At IIOR, efforts are underway to synthesize tailor-made polymers for seed coating, serving as carriers for crop inputs like pesticides and beneficial microbes, providing a more sustainable and efficient approach to crop protection. The technology resulted high entrapment efficiency of crop inputs.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** These polymers offer a controlled release system for agrochemicals, minimizing environmental impact. Non-toxic, biodegradable polymers such as polysaccharides and proteins are gaining importance, reducing reliance on petrochemical-based synthetic polymers. This can able to form thin films after seed coating. It has ability for water vapour transmission and water absorption capacity and has optimum tensile strength without affecting seed germination. Synthesis involves easy, ecofriendly and cheap raw materials.

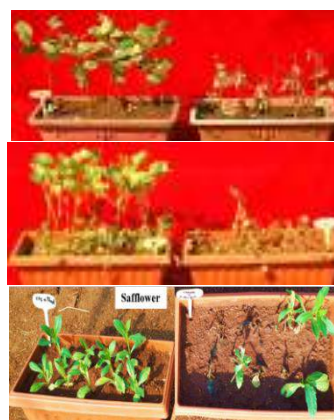


## Preparation of crosslinked biopolymeric film composition

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

## Biopolymer cellulose-based *T. harzianum* Th4d films

- 1. Name of the process/product/technology:** Biopolymer cellulose-based *T. harzianum* Th4d films. The viscous cross-linked cellulose biopolymer solutions were prepared by physico-chemical crosslinking polymerization technique by employing cross-linker and fungal spores. The fungal spores are in an amount in the range of 1.0 wt. % having cfu in the range of  $10^9$  to  $10^{12}$  with respect to the total weight of the cross-linked polymer solution. The fungal spores are selected from *Trichoderma* species. The fungal spores are entrapped in the cross-linked polymer solution. The entrapment efficiency of the cross-linked polymer solution is in the range of 96% of the fungal spores.
- 2. Target crops and delivery system:** The technology can be commercialized in all agricultural crop and areas of India where soil and seed borne pathogens are a serious problem as a seed coating technology.
- 3. Target agroecological zones:** This technology holds potential for widespread commercialization across all agricultural crops and regions in India where soil and seed borne pathogens are a serious problem as a seed coating technology.
- 4. Validation and commercialization:** Tailor made biopolymers which are developed in IIOR using cross linking technique were used for entrapment of beneficial microbes like *Trichoderma*. The developed biopolymers in combination with *Trichoderma* were further evaluated for their viability, performance under laboratory, green house and field conditions against seed and soil borne diseases in oilseed crops. Seed treatment with biopolymer films in combination with *Trichoderma* has increased seed germination and seedling vigor both *in vitro* and greenhouse conditions. In field experiments conducted at different locations and seasons in selected oilseed crops a disease reduction of more than 50% disease incidence and increase in seed yields and high B:C ratio was observed compared to control.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** The Polymeric films having capacity of high entrapment efficiency (96%) of active ingredient for seed coating. Reducing wastage of active ingredient during application for effective kill of pathogen. Efficient use of beneficial microbes by precision management. Microclimate of seed can be managed. Raw materials used are eco-friendly which are origin of natural derivatives. Seed and seedling stresses can be managed upto 45-60 DAS effectively without much efforts. Shelf life with minimal reduction of cfus from initial count even after 24 months of storage.



**Biofilms (Biopolymer-Trichoderma films)**

**Effectiveness in oilseed crops (treated & control)**

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

## Lignin based seed pelleting for sesame and linseed

- 1. Name of the product/technology:** Lignin based seed pelleting for sesame and linseed.
- 2. Target crops and delivery system:** Low-volume oilseed crops like sesame and mustard face difficulties in modern farming due to their small size seeds, leading to non-uniform plant stands and labour-intensive thinning operations. Traditional sowing methods contribute to seed wastage, weed dominance, and pest infestations, particularly affecting smallholder farmers. To overcome these challenges and achieve sustainable production, there is a need for research on precision planting techniques, such as seed pelleting, integrated with site-specific sowing and plant protection measures. This approach aims to ensure uniform plant stands, efficient resource use, and improved overall crop output.
- 3. Target agroecological zones:** For seed pelleting in low volume crops and also vegetable crops and seed industry.
- 4. Validation and commercialization:** Precision farming is crucial for resource efficiency, productivity, and environmental sustainability. The quality of seeds significantly impacts agricultural outcomes, with good quality seeds alone enhancing yields by 15-20%. However, small and marginal farmers often face technology gaps and insufficient transfer of knowledge and inputs. Poor-quality seeds, coupled with environmental stresses and cultivation challenges, result in losses for farmers. Using this technology, seed size can be increased and crop protection inputs can be given in integrated manner.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** Seed pelleting serves as a beneficial practice for both low-volume crops and vegetable crops, offering advantages to the seed industry by promoting uniform plant growth, reducing wastage, and enhancing overall crop yield. Using this technology, low volume seed crops can be utilized for precision and mechanized sowing, seed rate can be reduced and labour cost can be decreased.

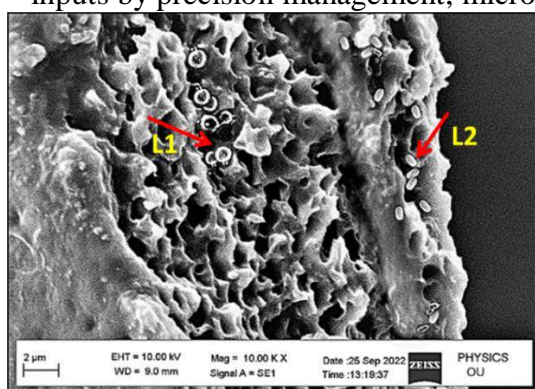


## Lignin based seed pelleting for sesame and linseed

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

## Design of multilayer seed coating composition and a process for its preparation in a layer-by-layer strategy

1. **Name of the process/product/technology:** Design of multilayer seed coating composition and a process for its preparation in a layer-by-layer strategy.
2. **Target crops and delivery system:** This technology has the potential for widespread commercialization in all agricultural crops and regions across India for biotic and abiotic stress management which pose significant challenges. It serves as an effective seed coating solution to address these multiple issues using multi crop inputs.
3. **Target agroecological zones:** This technology has the potential for widespread commercialization in all agricultural crops and regions across India.
4. **Validation and commercialization:** Each gram of seed containing multilayer and double layer biopolymeric films has entrapment efficiency of *Trichoderma* and *Rhizobium* was 92-97% and for insecticides and fungicides was 90-95%. Entrapment efficiency of crop inputs in single films as such was 93-96% for *Trichoderma* and *Rhizobium* and 89-94% for insecticide and fungicide. Seed load in a gram of seed was 7.3-7.7 log CFUs for *Trichoderma* and *Rhizobium* and for insecticides and fungicides was 0.996 mg to 1.5 mg. Active ingredient (% w/v) in biopolymers was 9.36% w/v for fungicide, 14.1% w/v for insecticide, 0.96% w/v for *Trichoderma* and 4.85% w/v for *Rhizobium*.
5. **Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
6. **Benefits:** Quality of seed plays a prominent role in augmenting agricultural productivity as well as production. Present existing seed coating methods in single layer manner are also successful, but that too lacks a multi stress management strategy and there also success and failure stories of mixing of multiple crop inputs and treating the seed before the field sowing without any prior knowledge like synergistic or antagonistic or compatibility issues. This technology address these constraints in a synchronized manner to find integrated biotic and abiotic stress management solutions. The technology reduces the dose of active ingredient for seed treatment, reducing wastage of multiple active ingredients during application for synchronized manner of biotic and abiotic stress management, efficient use of multiple crop inputs by precision management, microclimate of seed can be managed.



Design of multilayer seed coating



Different seed coating combinations with and without polymers

## Design of multilayer seed coating composition and a process for its preparation in a layer-by-layer strategy

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

## ***Bacillus thuringiensis* var. *kurstaki* DOR Bt-1 W.P. (Knock Bt-WP)**

- 1. Name of the technology and its microbial constituent:** Wettable powder (W.P.) formulation of *Bacillus thuringiensis* var. *kurstaki* Strain - DOR Bt-1, Serotype 3a3b3c (NAIMCC-B-01118)
- 2. Target pests, crops and delivery system:** Pod borer, *Helicoverpa armigera* on pigeon pea (polyphagous pest) and semilooper (*Achaea janata*) on castor
- 3. Target agroecological zones/states:** All pigeon pea growing areas of India
- 4. Validation and commercialization:** Registered in 2005 under 9(3b) section with CIBRC vide registration no. CIR-511/2005(256). Generated data on Toxicity, Chemistry, Bio-efficacy, Container Content Compatibility & Ecotoxicity for 9(3) registration (Permanent)
- 5. Whether licensed to private companies, If yes, details thereof:** Technology licensed to more than 50 companies. Technology license fee: Rs. 6 lakhs + 18% GST.
- 6. Benefits:** Target specific & efficacious; Ecologically safe with no toxicity to humans, animals, non-targets including beneficial insects; Causes immediate feeding cessation & brings larval mortality within 2-4 days; Not phytotoxic, biodegradable and does not pollute the environment.

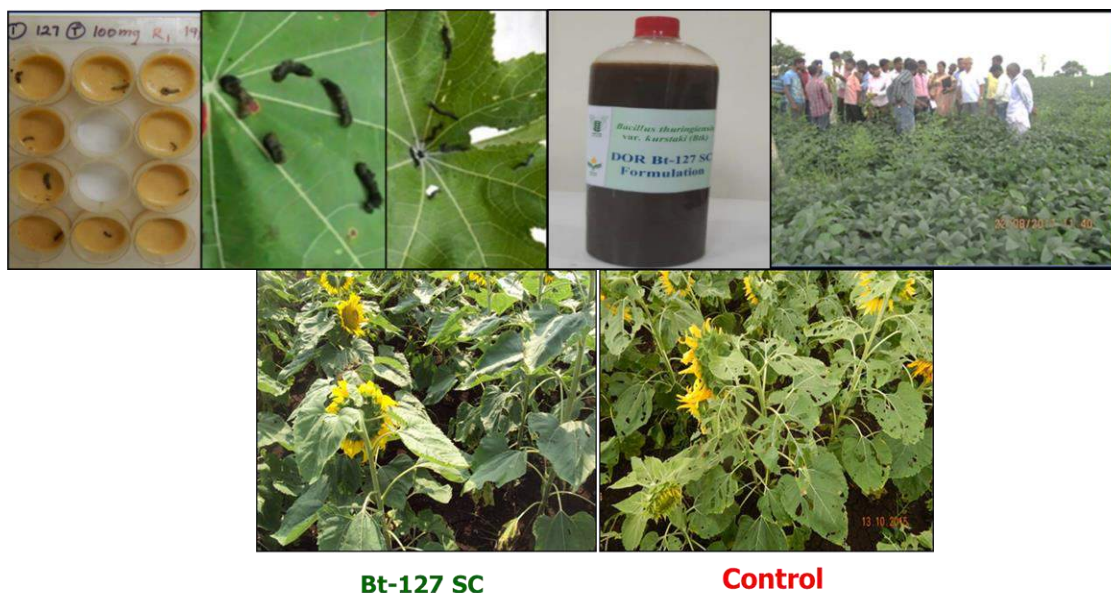


## ***Bacillus thuringiensis* var. *kurstaki* DOR Bt-1 W.P. (Knock Bt-WP)**

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad -500030; Phone-040-24598100, 24598180

## Suspension Concentrate (SC) formulation of DOR Bt-127

- 1. Name of the technology and its microbial constituent:** Suspension Concentrate (SC) formulation of *Bacillus thuringiensis* var. *kurstaki* strain DOR Bt 127 (MTCC 5976/NAIMCC-B-01463); Suspension Concentrate formulation with mineral oil as carrier.
- 2. Target pests, crops and delivery system:** *Spodoptera litura*, *Helicoverpa armigera*, *Thysanoplusia orichalcea*, *Achaea janata*. Can be extended to other lepidopteran pests viz., *H. armigera* on pigeon pea, *Cnaphalocrocis medinalis* on rice, *Plutella xylostella* on cauliflower and cabbage etc.
- 3. Target agroecological zones/states (if any):** All oilseed crops growing areas of India. It can be extended to other pulses and horticultural crops also against lepidopteran pests.
- 4. Validation and commercialization:** Evaluated under AICRP on soybean, sunflower, castor, groundnut and cotton against *Spodoptera litura* and other defoliators for 3 years and the formulation found effective against lepidopteran pests. Studies for determination of potency completed. Safety to natural enemies and phytotoxicity studies completed. Shelf-life studies for formulation stored at 2 locations (Hyderabad & Akola) completed for 24 months. Analytical test report for physicochemical and biological parameters generated including endotoxin quantification. Eco-toxicity data generated (mother culture & formulation) as per CIBRC 9(3) registration.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** DOR Bt-127 strain is effective at high temperatures (till 40°C), hence will be very useful in the context of climate change. It was found to have a broad host range with potencies of 34833 IU/mg, 50200 IU/mg, 46205 SU/mg and 71,722 SU/ mg against *Helicoverpa armigera*, *Achaea janata*, *Spodoptera exigua* and *S. litura* respectively.



## Suspension Concentrate (SC) formulation of DOR Bt-127

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

## **Suspension Concentrate (SC) formulation of *Beauveria bassiana***

- 1. Name of the technology and its microbial constituent:** Suspension Concentrate (SC) formulation of entomopathogenic fungi (EPF), *Beauveria bassiana*; 30% Suspension Concentrate formulation with mineral oil as carrier
- 2. Target pests, crops and delivery system:** Pod borer, *Helicoverpa armigera* on pigeon pea (polyphagous pest)
- 3. Target agroecological zones/states:** All pigeon pea growing areas of India.
- 4. Validation and commercialization:** Evaluated for efficacy against pod borer, *Helicoverpa armigera* and other lepidopteran pests on pigeon pea under AICRP (Pigeon pea). Data for provisional registration under section 9(3b) generated. Eco-toxicity data needs to be generated as per registration guidelines to enable licensing data for complete registration.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** The formulation is not phytotoxic, eco-friendly and safe to non-target organisms and beneficial insects. Shelf-life 24 months when stored in HDPE bottles at room temperature.



**Suspension Concentrate (SC) formulation of *Beauveria bassiana***

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180



## **Combination SC formulations of Bt with entomopathogenic fungi (*Metarhizium rileyi* / *Beauveria bassiana*)**

**1. Name of the technology and its microbial constituent:** Oil based Suspension concentrate (SC) formulations of Bt-127 in combination with the entomofungal pathogens, *Metarhizium (Nomuraea) rileyi* and *Beauveria bassiana*. First report of storable combination formulation of Bt with fungus (Indian Patent No. 315134 dt. 28.6.2019).

**2. Target pests, crops and delivery system:** Effective against polyphagous lepidopteran pests viz., *Spodoptera litura*, *Helicoverpa armigera*, *Thysanoplusia orichalcea*, *Achaea janata*. The formulation can be used against lepidopteran pests in several agricultural and horticultural crops.

**3. Target agroecological zones/states:** All oilseed crops growing areas of India. It can be extended to other agricultural and horticultural crops also against lepidopteran pests.

**4. Validation and commercialization:** Formulations effective against lepidopteran pests on sunflower (RARS-Nandyal and ORS-Latur) and on castor (RARS, Palem and TCRS, Yethapur). Data generation for CIB registration is under way (CIBRC guidelines 23.5.2022 for Registration of Consortium of Bio-pesticides).

**5. Whether licensed to private companies, If yes, details thereof:** The patent can be licensed to interested firms.

**6. Benefits:** The formulation is not phytotoxic, eco-friendly and safe to non-target organisms and beneficial insects. Shelf-life 24 months when stored in HDPE bottles at room temperature.



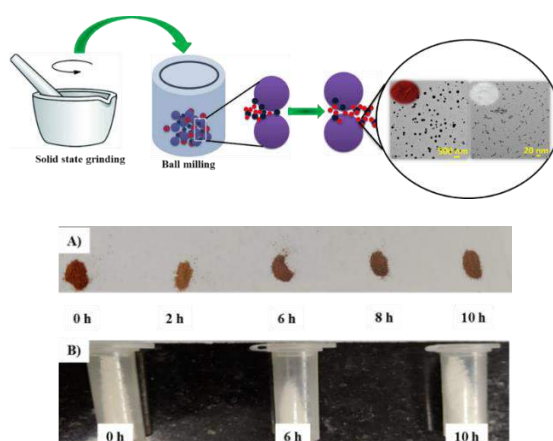
**Combination SC formulations of Bt with entomopathogenic fungi (*Metarhizium rileyi* / *Beauveria bassiana*)**

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

# Nano Fertilizer

## Fe and Zn based nanocitrates as efficient plant nutrient sources

- 1. Name of the process/product/technology:** Fe and Zn based nanocitrates as efficient plant nutrient sources. A simple, direct and highly scalable solid-state synthesis approach followed by ball milling for obtaining Fe and Zn nanocitrates from respective nitrates and citric acid with the removal nitric acid fumes was adopted. The solid-state synthesis method and followed by ball milling avoids the using of organic solvents, high temperature, and expensive equipment. Iron and zinc were micronutrients which are selected for this study due to its important role in plants. Citric acid was used as chelator due to prominence in plant rhizosphere.
- 2. Target crops and delivery system:** This technology has the potential in all agricultural crops.
- 3. Target agroecological zones:** This technology has the potential for widespread commercialization in all regions across India.
- 4. Validation and commercialization:** With the increasing awareness of sustainable agriculture and the need for improved food quality, there is a growing demand for nanonutrients for plant application. Companies focusing on nano or micronutrient formulations, precision agriculture technologies, and customized nutrient solutions stand to benefit from this expanding market. Additionally, the emphasis on organic and balanced crop nutrition further underscores the business potential of micronutrients in modern agriculture.
- 5. Whether licensed to private companies, If yes, details thereof:** Technology ready for transfer.
- 6. Benefits:** Crop nutrition is an integral component of modern agriculture and fertilizers comprise a major agro-input in this context. However, the real potential of fertilizers being applied remains unutilized primarily due to bottlenecks of leaching, runoff, fixation and reactivity in the soil leading to less plant use efficiency. Hence, the developed nanocitrates reduces soil application losses due to environmental conditions, slow-release behaviour, less leaching and more availability, less toxic effects on microflora in soil and reduces number of applications.



## Fe and Zn based nanocitrates as efficient plant nutrient sources

**Contact:** Director, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad - 500030; Phone-040-24598100, 24598180

# **Post-harvest and Value-added Technologies of Oilseeds**

## Roasted and salted flax seed

### Salient Features:

- This is natural source of important micronutrients such as calcium, magnesium and potassium etc. and lignin (phytoestrogen).
- Just 2 healthy spoons-full of FLAXSEEDS provides 3-5 g of Omega 3 fatty acid (Alpha Linolenic Acid)
- Plain flaxseed can be consumed in the form of Sprouted, Roast and Grind, chutney

**FSSAI0624 Lic. No. 1151903500**

### Contact details:

- AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043.  
E-mail: [anand.zanwar@bharatividyaapeeth.edu](mailto:anand.zanwar@bharatividyaapeeth.edu)



- Rs. 40.00/100 gm
- Bulk price: 350.00/kg

## Flaxseed oil

### Salient Features

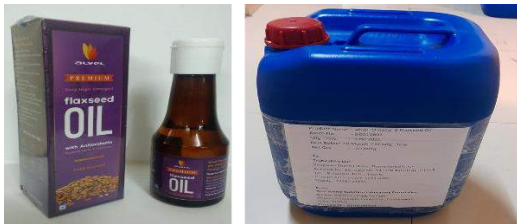
Flaxseed oil is vegetarian, virgin, is cold press extracted and sealed under nitrogen ensure very high purity and rancidity.

Omega 3 oil can be used for salad dressings, chapattis, dal, rice, ghee, mayonnaise, sauce, curds, milkshakes, honey, curd and yoghurt etc.

Nutritive values:

Omega-3 FA: 50-55 %

Vitamin E: 1%, FSSAI Lic. No. 1151603500506



Product cost:

- Rs. 125.00/100 ml
- Bulk price: 505.00/kg
- Minimum order quantity (oil bottle): 50 nos.
- Minimum order quantity (bulk): 200 kg
- Packing, forwarding and taxes at actual
- Contact details:
- AICRP-Flaxseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: [anand.zanwar@bharatividyaapeeth.edu](mailto:anand.zanwar@bharatividyaapeeth.edu)

## Velmega Softgel Capsules

Salient Features:

- VELMEGA Softgel is easy to consume, easy to carry linseed oil in soft gel form, and it has all the goodness of a vegetarian omega-3 oil
- With added vitamin E, it is protected from oxidation with in the soft gel and also ensures better utility in human body.
- Application/Dosage Guidelines: 1 to 2 capsules per day



**Ayurvedic Lic. No. GA/505**

**Product cost:**

**Rs. 600.00/90 capsule bottle**

**Rs. 235.00/30 blister capsule pack**

**Minimum order quantity: 25 packs**

**Packing, forwarding and taxes at actual**

**Contact details:**

**AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: [anand.zanwar@bharatividyaapeeth.edu](mailto:anand.zanwar@bharatividyaapeeth.edu)**

### **Fibre and Lignan Rich Hull Powder**

**Salient Features:**

**Defatted (mechanically pressed) hull fraction of flaxseed mainly containing lignan and dietary fibre.**

**Highly concentrated form of flaxseed to supplement lignan and dietary fibre.**

**Nutritive value:**

**Dietary fibre: 35-40%**

**Lignan: upto 1%**

**Protein: 15-20%**



**FSSAI Lic. No. 11519035000624**

**Product cost:**

- **Rs. 50.00/100 grams pack**
- **Minimum order quantity: 25 packs**
- **Packing, forwarding and taxes at actual**
- **Contact details:**
- **AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: [anand.zanwar@bharatividyaapeeth.edu](mailto:anand.zanwar@bharatividyaapeeth.edu)**



## Flaxseed Oil Emulsion

### Salient Features:

- **Water soluble form of omega-3 fatty acid enriched with multivitamins to fulfill the needs of growing children.**
- **Further this can be used in fortification of other food products such as chocolates, sweets, jam, bakery and dairy products**
- **Nutritive value:**
  - **Fat: 30 %**
  - **Omega-3 FA: 13-15 %**



**FSSAI Lic. No. 1151603500506**

### Product cost:

- **Rs. 155.00/100 ml bottle**
- **Minimum order quantity: 25 packs**
- **Packing, forwarding and taxes at actual**
- **Contact details:**
- **AICRP-Flaxseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: [anand.zanwar@bharatividyaapeeth.edu](mailto:anand.zanwar@bharatividyaapeeth.edu)**

## Omega-3 Chocolates

### Salient Features:

- Omega-3 chocolate is enriched with vegetarian omega-3 fatty acids and is tasty delicious
- 5-10 Chocolates/pack and customized pack sizes as per bulk requirement.

### Nutritive value:

- Fat: 20%
- Protein: 40%
- Omega-3 FA: 1-2%



**FSSAI loan Lic. No. 21521181000736**

### Product cost:

- Rs. 70.00/10 piece pack
- Minimum order quantity: 50 packs
- Packing, forwarding and taxes at actual

### Contact details:

- AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: [anand.zanwar@bharativedyapeeth.edu](mailto:anand.zanwar@bharativedyapeeth.edu)

## Omega-3-Eggs

- Salient Features:
- Layer chicks fed on omega-3 enriched feed mix (EFM) lay eggs with over 200±20% mg of omega-3 (ALA+DHA) per egg
- Eggs retain all the goodness of regular egg, good amount of protein and vitamins
- 5 part of EFM need to be mixed with 95 parts of regular poultry feed and the mixture to be fed to layer birds to produce omega-3 eggs



### Product cost:

- Rs. 120.00/kg (for feed)
- Minimum order quantity: 1 tone

- **Packing, forwarding and taxes at actual**

**Contact details:**

- **AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: [anand.zanwar@bharativedyapeeth.edu](mailto:anand.zanwar@bharativedyapeeth.edu)**

# **Farm Machinery and Equipment**

## Pneumatic High Clearance Tyres and Intercultivation

<b>1. Name of Product / technology:</b>	<b>Pneumatic High Clearance Tyres and Intercultivation</b>
<b>2. Salient Features:</b> Prototype design was fabricated at AICRP on Castor & AICRPDA, ARS, Ananthapuramu	<ul style="list-style-type: none"> <li>○ High clearance tyres and raising chassis of mini tractor – 100 cm</li> <li>○ Can be operated up to 60 DAS depending upon the plant height /hybrid etc.</li> <li>○ Inter cultivation and conservation furrows can be done</li> <li>○ Weed control efficiency : 92 %, Diesel consumption: 1.8lph</li> </ul>
<b>3. Recommended domain :</b>	Suitable for castor and pigeonpea in for rainfed ecologies up to 60 DAS, Irrigated ecologies- 30-45 DAS
<b>4. Contact Address :</b>	Principal Scientist & Head , Agricultural Research Station Mobile: 9989625222 Email: <a href="mailto:ars.anantapur@angrau.ac.in">ars.anantapur@angrau.ac.in</a>



## Castor-Inter cropping Planter

<p><b>1. Name of Product / technology:</b></p>	<p>Castor-Inter cropping Planter</p>
<p><b>2. Salient Features:</b>          Prototype design was fabricated at AICRP on Castor &amp; AICRPDA, ARS, Ananthapuramu</p>	<ul style="list-style-type: none"> <li>○ Sowing can be done @ 1:2 ratio for castor + Bajra or castor + Pigeonpea with row to row spacing of 45 cm</li> <li>○ Conservation furrow at the time of sowing</li> <li>○ Can be sown up to 8-10 acre/day</li> <li>○ Fuel consumption -1.7 lph</li> </ul>
<p><b>3. Recommended domain :</b></p>	<p>Suitable for castor and pigeonpea in for rainfed conditions with row to row spacing of 45 cm</p>
<p><b>4. Contact Address :</b></p>	<p>Principal Scientist &amp; Head ,          Agricultural Research Station          Mobile: 9989625222 Email:  <a href="mailto:ars.anantapur@angrau.ac.in">ars.anantapur@angrau.ac.in</a></p>



## Power operated Castor Mini thresher

<b>1. Name of Product / technology:</b>	<b>Power operated Castor Mini thresher</b>
<b>2. Salient Features:</b> Prototype design was fabricated at AICRP on Castor, ARS, Ananthapuramu	<ul style="list-style-type: none"><li>○ Power operated and can be easily operated, transported</li><li>○ Power required : 0.5 HP</li><li>○ RPM-220</li><li>○ Capacity - 50 kg per hour</li></ul>
<b>3. Recommended domain :</b>	<b>Suitable for small and marginal farmers</b>
<b>4. Contact Address :</b>	Principal Scientist & Head , Agricultural Research Station Mobile: 9989625222 Email: <a href="mailto:ars.anantapur@angrau.ac.in">ars.anantapur@angrau.ac.in</a>





## Hand operated Castor small thresher

<b>1.Name of Product / technology:</b>	Hand operated Castor small thresher
<b>2. Salient Features:</b> Prototype design was fabricated at AICRP on Castor & AICRPDA, ARS, Ananthapuramu	<ul style="list-style-type: none"><li>○ Easily operated, transported</li><li>○ Capacity - 10 kg per hour</li></ul>
<b>3. Recommended domain :</b>	Suitable for small and marginal farmers
<b>4. Contact Address :</b>	Principal Scientist & Head , Agricultural Research Station Mobile: 9989625222 Email: <a href="mailto:ars.anantapur@angrau.ac.in">ars.anantapur@angrau.ac.in</a>



# Mobile Apps

## Mobile App on ICAR IIOR CASTOR

**1. Name of the product/technology:** Mobile App on ICAR IIOR CASTOR

**2. Salient Features:**

- a. User friendly app to facilitate castor stake holders viz., researchers, farmers, NGOs, students and industry professionals with handy information on agronomic practices, released cultivars, state-wise preferred varieties and hybrids, intercropping systems recommended for different states, insect pests, diseases, AICRP centres and commodity markets.



**Available at :**

[https://play.google.com/store/apps/details?id=in.org.icar\\_iior.icariiorcastor2&hl=en](https://play.google.com/store/apps/details?id=in.org.icar_iior.icariiorcastor2&hl=en)

**3. Recommended States / Areas:**

- Major Castor growing States

**4. Contact Details:**

Mrs.P.Madhuri  
Scientist(Computer Applications)  
ICAR-IIOR, Hyderabad

## **Mobile App on ICAR IOR SUNFLOWER**

**1. Name of the product/technology:** Mobile App on ICAR IOR SUNFLOWER

### **2. Salient Features:**

- a. The sunflower app was developed to the information on management practices, released varieties and hybrids, state-wise preferred cultivars, cropping systems, insect pests, diseases, AICRP centres and commodity markets.



**Available at :**

[https://play.google.com/store/apps/details?id=in.org.icar\\_iior.icariiorsunflower&hl=en](https://play.google.com/store/apps/details?id=in.org.icar_iior.icariiorsunflower&hl=en)

### **3. Recommended States / Areas:**

- Major sunflower growing States

### **4. Contact Details:**

Mrs.P.Madhuri  
Scientist(Computer Applications)  
ICAR-IIOR, Hyderabad

## **Mobile App on ICAR IIOR SAFFLOWER**

**1. Name of the product/technology:** Mobile App on ICAR IIOR SAFFLOWER

### **2. Salient Features:**

- a. The APP has brief information on management practices, released varieties and hybrids, state-wise preferred cultivars, different cropping systems, insect pests, diseases, AICRP centres and commodity markets. With a simple touch on the arrow button, the detailed information pertaining to each topic is displayed.



**Available at:**

[https://play.google.com/store/apps/details?id=in.org.icar\\_ijor.icaiiorsafflower&hl=en](https://play.google.com/store/apps/details?id=in.org.icar_ijor.icaiiorsafflower&hl=en)

### **3. Recommended States / Areas:**

- Major Safflower growing States

### **4. Contact Details:**

Mrs. P.Madhuri  
Scientist(Computer Applications)  
ICAR-IIOR, Hyderabad