



ICAR- Indian Institute of Oilseeds Research

# Varieties/Hybrids for Commercialization





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# **TilhanTec-SUNH-1 and SUNH-2 Sunflower Hybrids with Potential for Commercialization**



# Sunflower hybrid: **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, J&amp;K</b>
<b>Special features</b>	<b>Resistant to Downy mildew; moderately resistant to leafhopper</b>
<b>Year of release</b>	<b>2021</b>

**Contact:** Dr. H.P. Meena ([meena.hp@icar.gov.in](mailto:meena.hp@icar.gov.in))

# TilhanTec-SUNH-2 (IIOSH-460)



<b>Maturity</b>	<b>Early Duration (84-87 days)</b>
<b>Average seed yield (kg/ha)</b>	<b>1600 kg/ha (RF) 2500 kg/ha (IR)</b>
<b>Oil content</b>	<b>38-40%</b>
<b>Recommended areas (States)</b>	<b>Gujarat, Maharashtra and Northern Karnataka, Andhra Pradesh, Southern Karnataka, Tamil Nadu and Telangana State</b>
<b>Special features</b>	<b>Downy mildew and moderately resistant to leafhopper</b>
<b>Year of release</b>	<b>2023</b>

**Contact:** Dr. H.P. Meena (meena.hp@icar.gov.in)

# Technology assessment

Considerations	Projections
<b>Potential of the technology</b>	Increased seed yield <b>beyond 2000 kg/ha</b> from the <b>current 1400-1500 kg/ha</b>
<b>Target areas</b>	Gujarat, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and Telangana State
<b>Potential buyers of technology</b>	Seed companies, Public agencies, Farmer producer organizations, State Seed Corporations (SSC), NGOs, Startups
<b>Competitors of similar technology</b>	KBSH-44, LSFH-171, DRSH-1, RSFH-1887, COH-3, private company hybrids
<b>Estimated market for technology</b>	TilhanTech-SUNH-1&2: 50,000 ha (2,50,000 kg seed/5 kg seed per ha) <b>Selling price: 550-650/kg</b>
<b>Cost of production</b>	<b>Rs. 250-300/kg</b>
<b>Uniqueness</b>	Higher seed and oil yield, resistant to DM and moderately resistant to LH
<b>Anticipated social impact</b>	Additional income of Rs 6400 to 9200/ha with an yield advantage of 1 to 1.5 q/ha

# Other hybrids released during the last 6 years

Name	Year of release	Potential yield (kg/ha)	Specific features	Recommended area/states
KBSH-78	2018	1700-2000	Early (82-85)	Karnataka
CoH-3	2018	2200-2400	High oil (42%)	Tamil Nadu
PSH-2080	2019	2441	High oil (43.7%)	Punjab
RSFH-700	2021	1800-2200	Tolerant to SND & ALB	Karnataka
KBSH-85	2021	1800-2200	Resistant to DM & LH	Uttarakhand, J&K, Gujarat, Karnataka, Maharashtra, AP, Tamil Nadu and Telangana
KBSH-88	2023	1500-2100		
CoH-4	2023	2182	Moderately resistant to PM & ALB	Tamil Nadu
KBSH-90	Pipeline	1600-2000	Early (80-82) Resistant to DM & LH	Karnataka

**DM**=Downy mildew; **LH**=Leafhopper; **SND**=Sunflower Necrosis Disease; **ALB**=Alternaria Leaf Blight

# Photos of recently released Sunflower hybrids





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# **IIOR safflower varieties/hybrids with Potential for Commercialization**





# Safflower variety: ISF-764 (LakshmiPriya)



<b>Maturity</b>	<b>125-130 days</b>
<b>Seed yield</b>	<b>1583 kg/ha (RF) 2274 kg/ha (IR)</b>
<b>Oil content</b>	<b>30.6%</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Telangana, AP, MP, Chhattisgarh, Bihar, Uttar Pradesh, Rajasthan</b>
<b>Special features</b>	<b>Moderately resistant to wilt &amp; Alternaria</b>
<b>Year of release</b>	<b>2020</b>

**Contact:** Dr. H.D. Pushpa (Pushpa.HD@icar.gov.in)

# Safflower variety: ISF-1 (Pride)



<b>Maturity</b>	<b>125-130 days</b>
<b>Seed yield</b>	<b>1236 kg/ha (RF) 1864 kg/ha (IR)</b>
<b>Oil content</b>	<b>30.5%</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Telangana, AP, MP, Chhattisgarh, Bihar, Uttar Pradesh, Rajasthan</b>
<b>Special features</b>	<b>First high oleic (76%) variety</b>
<b>Year of release</b>	<b>2020</b>

**Contact:** Dr. H.D. Pushpa (Pushpa.HD@icar.gov.in)

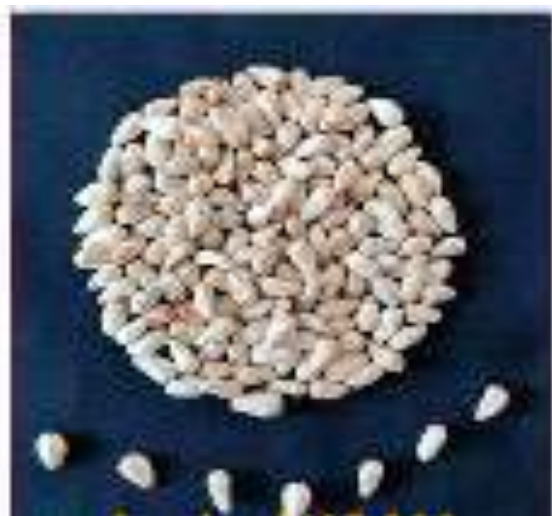
# Safflower hybrid: **ISH-402**



<b>Maturity</b>	<b>120-125</b>
<b>Seed yield (kg/ha)</b>	<b>2003 (Rainfed) 3008 (Irrigated)</b>
<b>Oil content</b>	<b>30.8%</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, Telangana, Andhra Pradesh, Madhya Pradesh and Chhattisgarh</b>
<b>Special features</b>	<b>CGMS based hybrid with high seed and oil yield</b>
<b>Year of release</b>	<b>2023</b>

**Contact:** Dr. H.D. Pushpa (Pushpa.HD@icar.gov.in)

# Safflower hybrid: ISF- 300



<b>Maturity</b>	<b>125-129 DAYS</b>
<b>Seed yield</b>	<b>1796 kg/ha</b>
<b>Oil content</b>	<b>38.2%, 694 kg/ha oil yield</b>
<b>Special features</b>	<b>Resistant to wilt, High oil content with moderately thin hull and seed weight</b>
<b>Recommended areas</b>	<b>Maharashtra, Karnataka, AP, Telangana, MP and Chhattisgarh</b>
<b>Year of release</b>	<b>2023</b>

**Contact:** Dr. H.D. Pushpa (Pushpa.HD@icar.gov.in)

# Technology assessment

Considerations	Projections
<b>Potential of the technology</b>	Increased seed yield <b>beyond 2000 kg/ha</b> from the <b>current 1400-1500 kg/ha</b>
<b>Target areas</b>	Maharashtra, Karnataka, Telangana, AP, MP, Chhattisgarh, Bihar, Uttar Pradesh, Rajasthan
<b>Potential buyers of technology</b>	Seed companies, Public agencies, FPOs, SSCs, NGOs, Startups
<b>Estimated market for technology</b>	75,000 ha ( <b>7,50,000 kg seed@10 kg seed/ha</b> ) <b>Selling price: 100 -120/ kg</b>
<b>Cost of production</b>	Rs. 60-65/kg
<b>Uniqueness</b>	Higher seed and oil yield, resistant to Fusarium wilt and drought.
<b>Anticipated social impact</b>	Additional income of Rs. 10000 to 15000/ha with an yield advantage of 2 to 3 q/ha

# Varieties released during the last 5 years

Name	Year or release	Yield (Kg/ha)	Oil (%)	Days to maturity	Special traits	Recommended area
<b>ISF-1</b>	2020	1200 (RF) 1800 (IR)	31	125-130	HIGH OLEIC (76%)	All India
<b>ISF-764</b>	2019	1500 (RF) 2200 (IR)	31	125-130	MR to W & ALS	All India
<b>ISH-402</b>	2023	2300 (IR)	31	120-125	CGMS based hybrid	All India
<b>ISF-300</b>	2023	1800	38.2	125-130	High oil, RW	MH, K, AP, TS
<b>A-2020</b>	2021	1740 (RF) 2160 (IR)	28.6	120-125 (RF) 140-145 (IR)	-	MH, K, AP, TS
<b>DSAF-1</b>	2021	1740 (RF) 2160 (IR)	28.2	125-130	MRW	MH, K, AP, TS
<b>IGKV-Kusum</b>	2021	2710 (IR)	34.3	138-140	HIGH oil, R to W	Chattisgarh MP
<b>RVSAF-18-1</b>	2023	1746	39	127-130	HIGH Oil, MRW	K, MH, TS, AP, J, Ch

R- Resistant, MR- mod. Resistant  
W-Wilt, A- aphid, ALS-Alternaria leaf spot

IR-Irrigated, RF-Rainfed

# Varieties released during the last 5 years

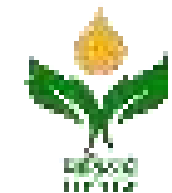
Name	Year or release	Yield (Kg/ha)	Oil (%)	Days to maturity	Special traits	Rec. area
<b>PBNS-184</b>	2022	1750 (RF)	31.3	120-124	MR to A, W, ALS	MH, K, AP,TS
<b>PHULE-NIRA</b>	2020	1480 (RF) 2050 (IR)	32.9	120-124	MR to A	All India
<b>PHULE-BIVARA</b>	2020	1620 (RF) 2600 (IR)	29.5	125-130	MR to A, W, ALS	MH, K, AP, TS
<b>PHULE – GOLD</b>	2020	1620 (RF) 2600 (IR)	34.6	122	MR to W	MH, K, AP, TS
<b>PHULE-KIRAN</b>	2021	1180 (RF) 1850(IR)	30.5	132	MR to A	MH, K, AP, TS, MP
<b>CG-KUSUM1</b>	2021	1680 (RF)	32-33	122-125	MR to ALS	Chattisgarh
<b>CG-KUSUM 2</b>	2021	2000	35	135	Red flowers	Chattisgarh

R- Resistant, MR- mod. Resistant  
W-Wilt, A- aphid, ALS-Alternaria leaf spot

IR-Irrigated, RF-Rainfed



# **IIOR sesame variety with Potential for Commercialization**





# Sesame variety: **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>

**Contact:** Dr. K.T. Ramya ([ramya.kt@icar.gov.in](mailto:ramya.kt@icar.gov.in))

**ICAR-IIOR Castor hybrids  
and female line  
for commercialization**

# Castor hybrid: **TilhanTech-ICH-5**



<b>Maturity</b>	<b>97-108 days for primary spike</b>
<b>Seed yield</b>	<b>1670 kg/ha</b>
<b>Oil content</b>	<b>46-48%</b>
<b>Recommended areas</b>	<b>AP, Telangana, Karnataka, Tamil Nadu, Odisha Maharashtra</b>
<b>Special features</b>	<b>Resistant to wilt and moderately resistant to root rot and leafhopper</b>
<b>Year of release</b>	<b>2021</b>

**Contact:** Dr. T. Manjunatha [t.manjunatha@icar.gov.in](mailto:t.manjunatha@icar.gov.in)

# Castor hybrid: **TilhanTech-ICH-6**



<b>Maturity</b>	<b>90-100 days for primary spike</b>
<b>Seed yield</b>	<b>1100 kg/ha (RF) (120 days duration) 1900 kg/ha (IR) (150 days duration)</b>
<b>Oil content</b>	<b>46-47%</b>
<b>Recommended areas</b>	<b>All castor growing areas of India</b>
<b>Special features</b>	<b>Resistant to wilt, tolerant to sucking pests due to double bloom</b>
<b>Year of release</b>	<b>2023</b>

**Contact:** Dr. C. Lavanya (c.lavanya@icar.gov.in)

# Castor hybrid: **TilhanTech-ICH-66**



<b>Maturity</b>	<b>94-97 days for primary spike</b>
<b>Seed yield</b>	<b>1550 kg/ha (RF)</b>
<b>Oil content</b>	<b>48-49%</b>
<b>Recommended areas</b>	<b>Rainfed areas - peninsular India</b>
<b>Special features</b>	<b>Resistant to wilt, root rot and leafhopper</b>
<b>Year of release</b>	<b>2019</b>

**Contact:** Dr. T. Manjunatha (t.manjunatha@icar.gov.in)

Considerations	Projections
<b>Potential of technology</b>	Increase in seed yield beyond <b>1550-1670 kg/ha</b> from the <b>current 700 -1400 kg/ha</b>
<b>Target areas</b>	ICH-5 and ICH-66 for rainfed conditions (peninsular India) ICH-6 All over India
<b>Potential buyers of technology</b>	Seed companies, FPOs, NSC, SSC, NGOs, Startups
<b>Competitors of Similar technology</b>	Public sector-IR-GCH-4*, GCH-7, GCH-8 (Mostly NW-region) RF-PCH-111*, YRCH-1*, YRCH-2 Private sector: NBCH-22, Mahyco hybrids Sold at Rs. 250-600 /kg
<b>Estimated market for technology</b>	ICH-5 and ICH-66 - 70,000 ha (350 tonnes seed/@ 5 kg seed/ha); ICH-6 >2 lakh ha (1000 tonnes seed /@ 5 kg seed/ha) Selling price Rs 300-500/kg
<b>Cost of production</b>	Rs 220-250/kg
<b>Uniqueness</b>	ICH-5, ICH-6 for RF, higher yield, W & LH Resistant; ICH-6 both RF & IR, W Resistant, Tolerant to all sucking pests
<b>Anticipated social impact</b>	Additional income of Rs 6000 to 9000/ha with an yield advantage & stability even under severe drought conditions

RF-Rainfed, IR-Irrigated

W-Fusarium wilt, LH-Leafhopper

(\*wilt susceptible)

# Castor pistillate line: M-574



**\*PI-Pistillate index**

<b>Pistillate nature</b>	<b>PI* of 0.9 compared to 0.7 for other lines</b>
<b>Seed yield</b>	<b>500 kg/ha</b>
<b>Special features</b>	<b>Resistant to wilt and leafhopper, Good combiner for seed yield and long primary spike M-74 based hybrids very stable performance across locations 2 to 2.5t/ha</b>
<b>Reg. with PPVFRA</b>	<b>2020</b>

**Contact: Dr. C. Lavanya (c.lavanya@icar.gov.in)**

# Hybrids released during the last 6 years

Name	Year of release	Yield (kg/ha)	Oil (%)	Days to first picking	Major traits /Res./Tol.	Recommended states
<b>GCH-8</b>	2018	3590 (IR)	48	100-130	W, RR, LH	All over India
<b>YRCH-2</b>	2018	2090 (RF)	48	110-115	W	Tamil Nadu
<b>GCH-9</b>	2018	3820 (IR)	48-50	110-120	W, RR	Gujarat
<b>GNCH-1</b>	2018	2545 (IR)	47-48	100-115	W, LH	Gujarat
<b>ICH-66</b>	2019	1550 (RF) 3375 (IR)	48-49	94-97	W, LH	RF zone -AP, TG, TN, KN, Odisha, MH
<b>GCH-10</b>	2020	3900 (IR)	50	90-110	W, LH	Gujarat
<b>ICH-5</b>	2021	1670	46-48	97-108	W, RR, LH	RF zone
<b>Tilhan Tec ICH-6</b>	2024	1100 (RF) 1900 (IR)	46-47	90-110	W, tol. to sucking pests	All over India

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

IR-Irrigated, RF-Rainfed



# **AICRP linseed varieties available for Commercialization**

# Linseed varieties from AICRP centres

Name	Year of release	Potential yield (kg/ha)	Special features	Recommended area/states
Utera Alsi 2	2019	520	Oil:35.0%; MR to wilt and budfly	UP, Bihar, WB, Assam, MP, Chhattisgarh, Odisha, MS, Karnataka
Surya	2019	1431	Oil: 36.0%; MR to wilt, resistant to rust	Himachal Pradesh, Punjab
LSL-93	2019	960	Oil: 38.0%; ALA: 55%; early maturity (90 d)	Maharashtra
TL 99	2020	1274	<b>First low ALA (&lt;5%) variety of India</b>	UP, Bihar, WB, Assam
Suvee	2020	1262	MR to wilt and budfly	Himachal Pradesh, Punjab
Kota Alsi-6	2021	1259	Oil: 36.0%; MR to wilt, Alternaria, budfly	UP, Bihar, WB, Assam
Kota Barani Alsi-6	2021	1224	MR to wilt, powdery mildew, Alternaria, budfly	Himachal Pradesh, Punjab

# Linseed varieties from AICRP centres

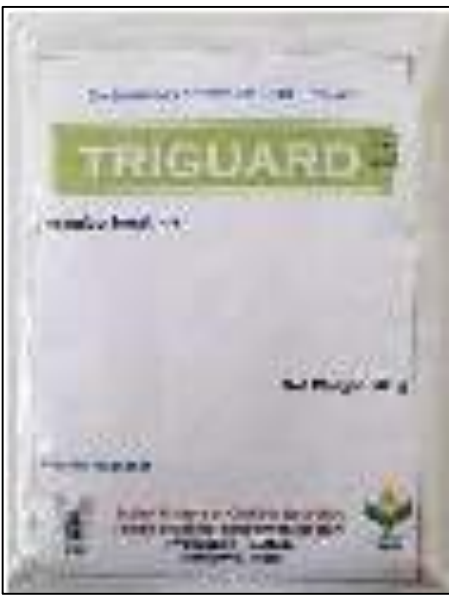
Name	Year of release	Potential yield (kg/ha)	Special features	Recommended area/states
<b>BUAT Alsi-4</b>	2021	1261	MR to powdery mildew, Alternaria, budfly	MP, Chhattisgarh, Odisha, MS, Karnataka
<b>Aparna</b>	2021	1342	MR to powdery mildew, Alternaria, budfly	Himachal Pradesh, Punjab
<b>RLC 164</b>	2021	1161	Rest. to rust; MR to wilt, budfly	Himachal Pradesh, Punjab
<b>RLC 167</b>	2021	1131	Rest. to rust; MR to wilt, budfly	Himachal Pradesh, Punjab
<b>Sabour Tisi-3</b>	2021	547	<b>For <i>Utera</i> cultivation;</b> Rest. to wilt; MR to budfly	UP, Bihar, WB, Assam, MP, Chhattisgarh, Odisha, MS, Karnataka
<b>RLC 171</b>	2023	1175	MR to wilt	UP, Bihar, WB, Assam, MP, Chhattisgarh, Odisha, MS, Karnataka

# Technology assessment

Considerations	Projections
Potential of the technology	Increase in seed yield: >1200 kg/ha from 500-700 kg/ha (Rainfed); 1700-2000 kg/ha from 1000-1200 kg/ha (Irrigated)
Target areas	Madhya Pradesh, Chhattisgarh, Uttar Pradesh, Bihar, Jharkhand, Maharashtra
Potential buyers of technology	Seed companies, Public agencies, Farmer producer organizations, SSC, NGOs, Startups
Competitors of similar technology	SAUs, Public seed agencies
Estimated market for technology	Newly released varieties 1,00,000 ha (25,00,000 kg seed/25 kg seed per ha) <b>Selling price: 90-120/kg</b>
Cost of production	<b>Rs. 25-30/kg</b>
Uniqueness	Higher seed and oil yield, high ALA, Lignans, tocopherol, dietary fibre
Anticipated social impact	Additional income of Rs 7000 to 9000/ha with an yield advantage of 5 to 7q/ha

*Thank you all for your  
kind attention*





# Microbial Biopesticide Technologies



# *Bacillus thuringiensis* var. *kurstaki* DOR Bt-1 WP

**Technology:** Wettable Powder (W.P.) formulation of *B. thuringiensis* var. *kurstaki* Strain - DOR Bt-1, Serotype 3a3b3c (NAIMCC-B-01118)

**Target pests:** Pod borer, *Helicoverpa armigera* on pigeon pea (polyphagous pest) and semilooper (*Achaea janata*) on castor

**Target agroecological zones:** All pigeon pea growing areas of India

**Validation & 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)

**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

**License fee:** Rs. 6,00,000/- + 18% GST

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



Bt sprayed



Unsprayed

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

**Technology:** Suspension Concentrate (SC) formulation of *Bacillus thuringiensis* var. *kurstaki* strain DOR Bt 127 (MTCC 5976/NAIMCC-B-01463); SC formulation with mineral oil as carrier

**Target pests:** *Spodoptera litura*, *Helicoverpa armigera*, *Thysanoplusia orichalcea*, *Achaea janata* (Polyphagous pests). Can be extended to lepidopteran pests viz., *H. armigera* on pigeon pea, *Cnaphalocrocis medinalis* on rice, *Plutella xylostella* on cauliflower & cabbage

## Status of evaluation:

- ❖ Studies for determination of potency completed
- ❖ Analytical test report for physicochemical & biological parameters generated including endotoxin quantification
- ❖ Completed 3 years of multi-location evaluation (29 locations) in AICRP (Soybean, Sunflower, Groundnut, Castor, Cotton) against *Spodoptera litura* & other lepidopteran defoliators
- ❖ Safety to natural enemies & phytotoxicity studies completed
- ❖ Shelf-life studies for formulation stored at 2 locations (Hyderabad & Akola) completed for 24 months
- ❖ **Eco-toxicity data generated (mother culture & formulation) as per CIBRC 9(3) registration**



Bt-127 SC

Control



**Benefits:** DOR Bt-127 strain effective at high temperatures (till 40°C). Broad host range with potencies of 34833 IU/mg, 50200 IU/mg, 46205 SU/mg and 71,722 SU/mg against *H. armigera*, *A. janata*, *Spodoptera exigua* and *S. litura*, respectively

Parameter		Bt-127 SC
Heat viable spore count of Bt (log CFU/ml)		17.56
Toxin % by ELISA		5.0
Protein content (mg/ml)		49.3
Presence of beta-exotoxin		Absent
Content of bio-control organism (%)		33.3
Human pathogen	Simmons citrate agar for <i>E. coli</i>	Nil
	<i>Salmonella</i> spp.	Nil
	<i>Shigella</i> broth for <i>Shigella</i> spp.	Nil
	<i>Vibrio</i> agar for <i>Vibrio</i> spp.	Nil



**Bt-127 SC**

**Control**

**Demonstration in Farmers Fields (87-100% reduction in lepidopteran pests)**

- ❖ Soybean (Nizamabad, Telangana; *Kharif* 2017): Bt-127SC effectively reduced semiloopers & tobacco caterpillar & resulted higher yield (700 kg/acre) & BC ratio (2.36) compared to farmer's practice (450 kg/acre & 1.61)
- ❖ Castor (Mahabubnagar, Telangana; *Kharif* 2018): Bt-127SC effective against semilooper, tobacco caterpillar & hairy caterpillars & resulted higher yield (1053 kg/acre) & BC ratio (2.61) over farmer's practice (633 kg/acre & 1.84)
- ❖ Sunflower (Osmanabad, Maharashtra; *Kharif* 2019): Bt-127SC effective against semilooper, tobacco caterpillar & capitulum borer and recorded higher yield (502 kg/acre) & BC ratio (2.30) over farmer's practice (yield 362 kg/acre & BC ratio 1.94)

**Technology ready for transfer**

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

**Technology:** 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)**

**Target pests:** Effective against polyphagous lepidopteran pests viz., *Spodoptera litura*, *Helicoverpa armigera*, *Thysanoplusia orichalcea*, *Achaea janata*. Can be used against lepidopteran pests in several agricultural and horticultural crops

**Validation & commercialization:** Formulations effective against lepidopteran pests on sunflower (RARS-Nandyal & ORS-Latur) & on castor (RARS, Palem & TCRS, Yethapur)



Sunflower (% Reduction)	Bt + Mr SC	Bt + Bb SC
<i>H. armigera</i>	76.4-100%	76.4-90.7%
<i>T. orichalcea</i>	87.9-100%	70.2-74.8%

Castor (% Reduction)	Bt + Mr	Bt + Bb
<i>S. litura</i>	94.5-98.7%	90.1-91.8%
<i>A. janata</i>	86.1-98.5%	90.6-94.4%

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

Parameter		Bt+Bb-SC	Bt+Mr-SC
Heat viable spore count of Bt (log CFU/ml)		17.47	17.3
CFU (log CFU/ml) of <i>B. bassiana</i>		15.10	-
CFU (log CFU/ml) of <i>M. rileyi</i>		-	12.2
Toxin % by ELISA		4.67	4.67
Protein content (mg/ml)		46.3	43.3
Presence of beta-exotoxin		Absent	Absent
Content of bio-control organism (%)		38.6	37.4
Human pathogen	Simmons citrate agar for <i>E. coli</i>	Nil	Nil
	<i>Salmonella</i> differential agar for <i>Salmonella</i> spp.	Nil	Nil
	<i>Shigella</i> broth for <i>Shigella</i> spp.	Nil	Nil
	<i>Vibrio</i> agar for <i>Vibrio</i> spp.	Nil	Nil



❖ **Benefits:** Diverse modes of action; increased speed of kill; Shelf life of 24 months; combination microbial formulations promising for mitigating resistance development to Bt and green technology for management of wide range of pests in agricultural and horticultural crops

❖ **Data generation for CIB registration is under way (CIBRC guidelines 23.5.2022 for Registration of Consortium of Bio-pesticides)**

❖ **Patent can be licensed to interested firms**

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

**Technology:** Suspension Concentrate (SC) formulation of entomopathogenic fungi (EPF), *Beauveria bassiana*; Suspension Concentrate formulation with mineral oil as carrier

**Target pest:** Pod borer, *Helicoverpa armigera* on pigeon pea (polyphagous pest)

**Target agroecological zones:** All pigeon pea growing areas of India

**Validation & commercialization:** Evaluated for efficacy against *H. armigera* & 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**

**Benefits:** The formulation is not phytotoxic, eco-friendly and safe to non-target organisms & beneficial insects.

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



# Trichoderma harzianum Th4d SC (Triguard Th-L)

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

- ❑ **Shelf-life:** 24 months at 25-35°C. 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
- ❑ **Patented production process:** Indian patent no. 316651.
- ❑ **Target diseases and crops:** 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.
- ❑ **Method of application:** The formulations can be used for seed treatment @ 1ml/kg seed or 500 ml in 500 litre of water/ha and foliar spray
- ❑ **Target agroecological zones/states:** Telangana, Tamilnadu, Maharashtra
- ❑ **Validation:** Technology validated over 5 years in multi-location field trials conducted under AICRP on castor, sunflower and safflower.
- ❑ **Benefits:** Endophytic root colonizer, Defense inducer, Plant growth promotion and high seed yield, Good shelf-life, Broad host range, Low dosage.



*T. harzianum*, Th4d 20% SC (Triguard Th-L)



Triguard Th-L treated



Control

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

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

- ❑ The technology offered is the biocontrol agent *Trichoderma harzianum* Th4d 1.5% WP formulation
- ❑ **Shelf-life:** 18 months at 25-35°C. 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.
- ❑ **Patented production process:** Indian patent no. 316651
- ❑ **Target diseases and crops:** Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt of safflower and castor, Aspergillus root rot in groundnut.
- ❑ **Method of application:** The formulation can be used for seed treatment @10g/kg.
- ❑ **Target agroecological zones/states:** Telangana, Tamilnadu, Maharashtra
- ❑ **Validation:** Technology validated over 8 years in multi-location field trials conducted under AICRP on castor and safflower.
- ❑ **Technology dossier for 9.3 (b) registration with CIB & RC.**
- ❑ **Benefits:** Endophytic root colonizer, Defence inducer, Plant growth promotion and high seed yield, Good shelf-life, Broad host range, Low dosage.



*T. harzianum*, Th4d 1.5%  
WP (Triguard Th-P)



Left-Control; Right-  
Treated



Triguard Th-P



Control

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

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

- ❑ The technology offered is wettable powder formulation of thermotolerant strain of *Trichoderma asperellum* Tv 7316 5% WP .  
*Trichoderma asperellum* TaDOR7316 (MTCC 5623)
- ❑ **Shelf-life:** 18 months at 25-35°C. 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.
- ❑ **Patented production process:** Indian patent no. 359123
- ❑ **Target diseases and crops:** Phytophthora seedling blight, Macrophomina root rot and Fusarium wilt of safflower.
- ❑ **Method of application:** The formulation can be used for seed treatment @ 10g/kg
- ❑ **Target agroecological zones/states:** Telangana, Tamilnadu, Maharashtra
- ❑ **Validation:** Technology validated over 5 years in multi-location field trials conducted under AICRP on safflower.
- ❑ **Technology dossier for 9.3 (b) registration with CIB & RC.**
- ❑ **Benefits:** Endophytic root colonizer, Defence inducer, Plant growth promotion and high seed yield, Good shelf-life, Broad host range, works well under high temperature and moisture stress.



Triguard Ta-P



Control

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

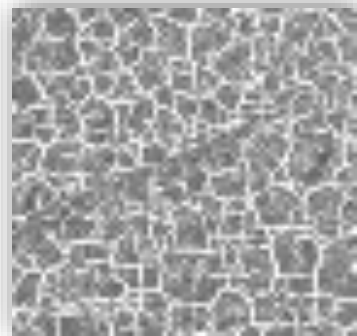
**Biopolymers (Chitosan and cellulose) developed as a stable crosslinked film coating polymers with *Trichoderma* for seed coating and evaluated against soil borne diseases in oilseeds crops**



**Biopolymer (Chitosan) Film**



**Chitosan+ *Trichoderma* film**



**Biopolymer Film Matrix -SEM**

**Physical, structural and chemical characterization showed suitability of the film for uniform seed coating**



**Biocoat  
Biopolymer Chitosan (Cts)- Th4d**



**Groundnut, Sunflower Seed coated with biopolymer + *Trichoderma***



**Groundnut, Sunflower Seeds coated with *Trichoderma* powder**



**Biofilm Cellulose-Th4d**

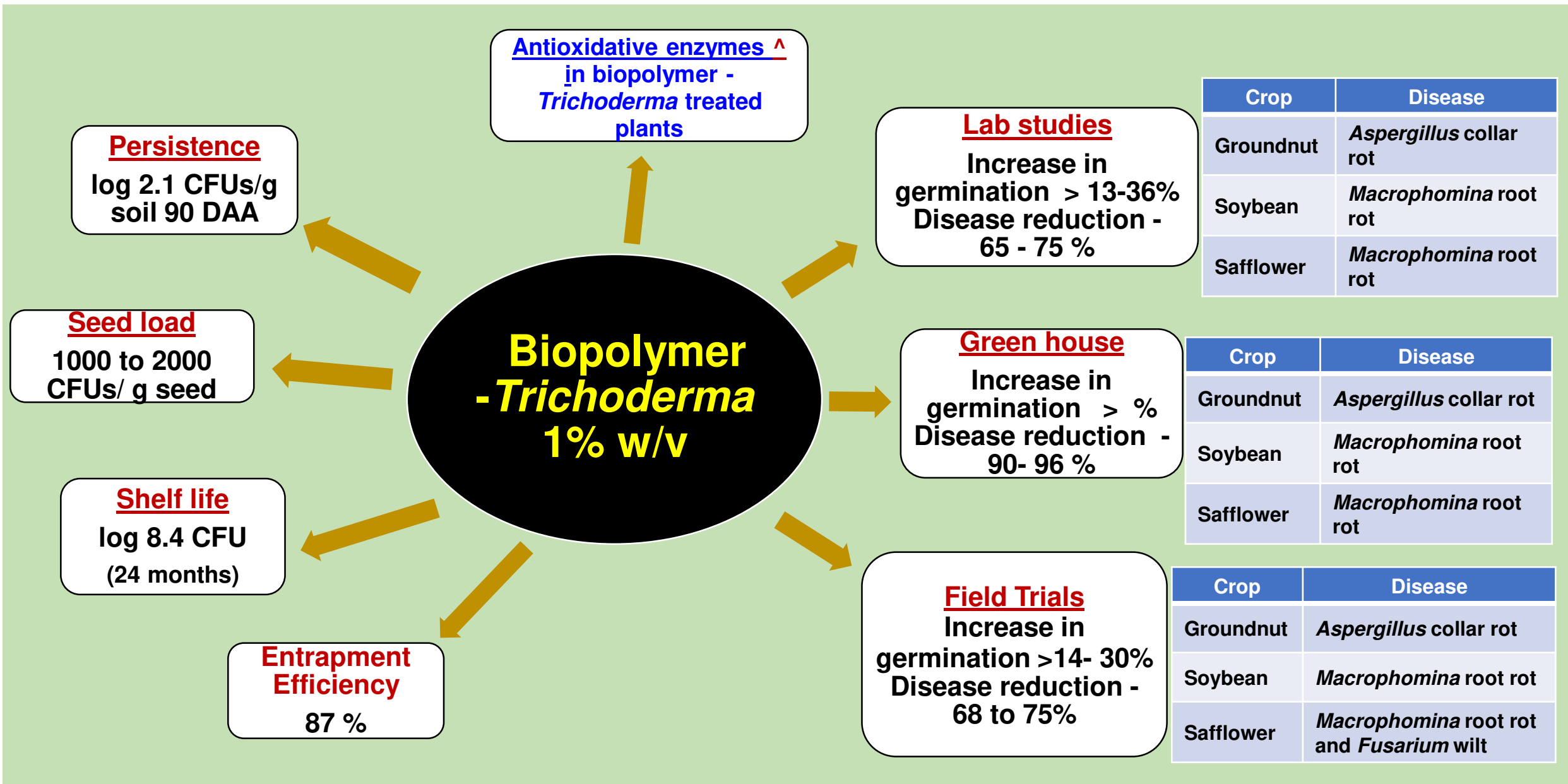


Development of chitosan-PEG blended films using *Trichoderma*: Enhancement of antimicrobial activity and seed quality

K.S.V. Poojita Chandrika<sup>1\*</sup>, K.D. Sheetal<sup>2</sup>, Vansha Gadbole<sup>3</sup> **NAAS rating 12.95**

**Patent granted: A polymer composition and a process for its preparation [Patent No. 202141015658A]**





Prasad, R.D., Poorna Chandrika, K. S. V., Varsha G., 2020. [A novel chitosan biopolymer based \*Trichoderma\* delivery system: Storage stability, persistence and bio efficacy against seed and soil borne diseases of oilseed crops. \*Microbiol. Res.\* 237:126487. \(NAAS rating - 9.9\)](#)

# Biopolymer-*Trichoderma* based Seed Coating Technology and Disease Management

## Soybean

In multilocation field evaluation under AICRP -Soybean, seed treatment with combination of chitosan+ *T. harzianum*, Th4d and thiamethoxam performed on par with fungicide (penflufen + trifloxystrobin) + thiamethoxam in management of root rot, stem fly and girdle beetle at 4 locations

(Jabalpur, Amaravathi, Dharwad and Adilabad)

## Groundnut

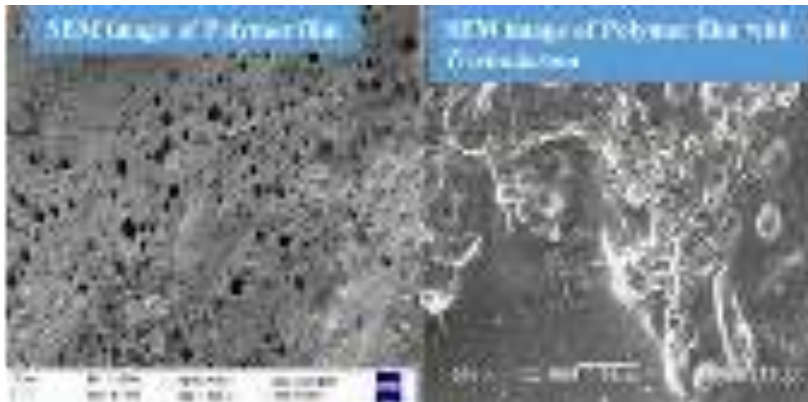
In field evaluation at two locations, Ch-Th4d and Cellulose-Th4d treatments have shown low root rot incidence (5.7 and 4.6%), pod yield (2887 and 2900kg/ha) compared to a very low germination of 61%, high root rot incidence of 17.5% root rot incidence and low pod yield (1662kg/ha)

## Safflower

In multilocation field evaluation under AICRP -Safflower, seed treatment with chitosan+ *T. harzianum*, Th4d seed treatment (Ch-Th4d) found to be effective against *Fusarium* wilt and root rot and comparable to fungicide penflufen + trifloxystrobin at 5 locations (Solapur, Tandur, Hyderabad, Parbhani, Annigeri) over 2-3 years

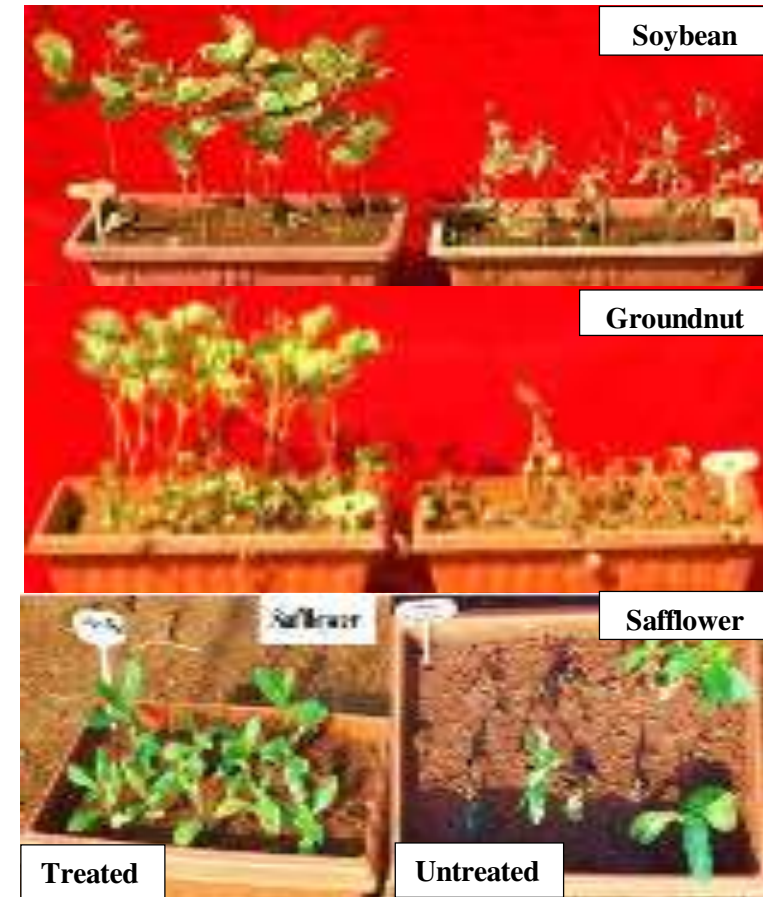


# Biopolymer Cellulose – *Trichoderma harzianum* Th4d 0.2% w/w



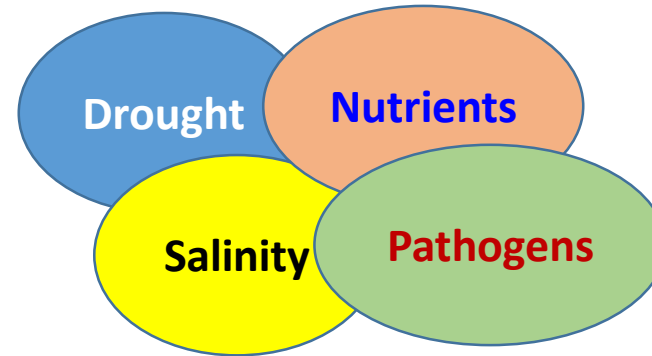
## Salient features:

- Synthesis by physico-chemical crosslinking polymerization technique and followed by solvent casting method.
- Entrapped fungal spores range of 1.0 wt. % having cfu of  $10^9$  to  $10^{12}$
- Seed load: 1000 to 2000 CFUs/ g seed
- Shelf life: 10.3 log CFU (24 months)
- Entrapment efficiency: 94%
- Persistence:  $10^6$  CFUs/g soil 90 DAA

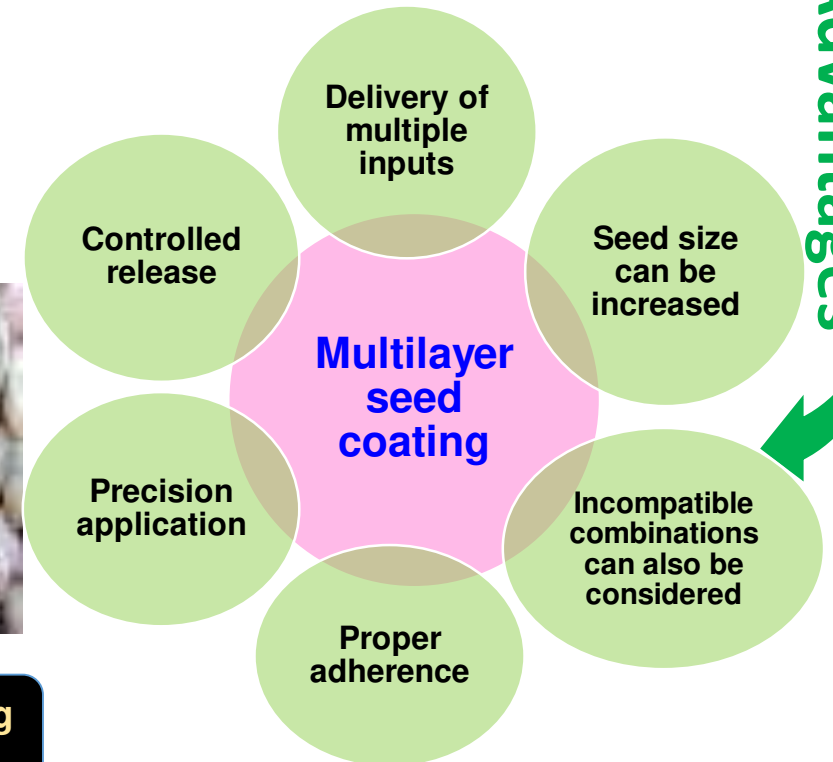


# Standardization of multilayer seed coating using layer-by-layer strategy with biopolymeric films and crop inputs (microbes, insecticides, fungicides )

## Biotic and abiotic stresses



## Multilayer seed coating with different inputs



## Direct seed treatment with multiple inputs

- Physical incompatibility
- Environmental pollution
- Change in chemical characteristics
- Antagonistic interactions
- Wastage
- Improper adherence
- Toxicity and adverse effects

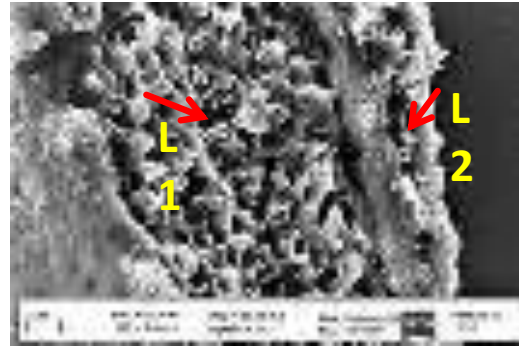
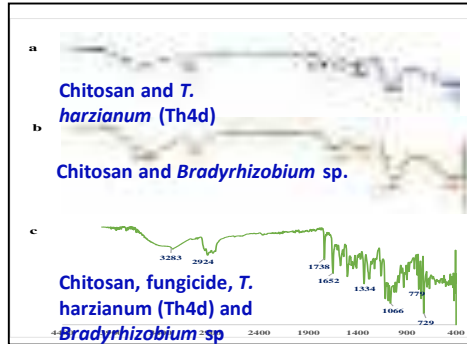


Seed quality and germination issues resulting in less plant stand and establishment

Constraints

Advantages

# Physicochemical characterization (FT-IR, SEM) of double layer biopolymeric films and bioefficacy testing



L1: Chitosan+ Fungicide+ Th4d  
L2: Chitosan+ *Bradyrhizobium* sp.

The double layer film FT-IR spectra and SEM image shows the physical and chemical integrity of the film is intact. The film forms the fine layer around the seed with separation between the two layers as depicted in the SEM imaging.



Double-layer seed coating (Layer 1: Chitosan 5ml + Penflufen + Trifloxystrobin 7.5ml + Th4d 0.1g and Layer 2: Chitosan + Thiamethoxam) has improved seed germination and reduced root rot incidence in groundnut, soybean and sesame crops

Persistence, root colonization and shelf life of *T. harzianum* (Th4d) and *Bradyrhizobium* in double layer biopolymer films/on coated seed in red and black soils has been studied

- An increase in CFUs of *Trichoderma* and *Bradyrhizobium* up to 90 days in double layer film added red and black soils.
- Population of *Trichoderma* and *Bradyrhizobium* remained unaffected on double layer coated groundnut seed during 4 months of storage

## Trichoderma Biocomposites

Chitosan- Cu Nano composites  
(40 nm)-*Trichoderma* formulation  
for  
Seed treatment

Chitosan- Lignosulfonate Nano  
Coacervate (50 nm) based  
*Trichoderma* for  
Foliar Applications



- Entrapping the biocontrol agent (*Trichoderma*) will improve the bio efficacy, and gives wider applicability of the biocontrol agents.
- Seed treatment with nano composite showed around 90% root & collar rot disease reduction in groundnut

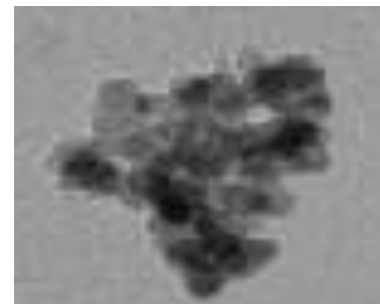
- To protect *Trichoderma* from the direct sunlight and adverse temperature variations for foliar applications, encapsulation of *Trichoderma* spores is necessary
- Disease development was delayed on the coacervate treated castor capsules and showed 66% reduction in gray mold disease.



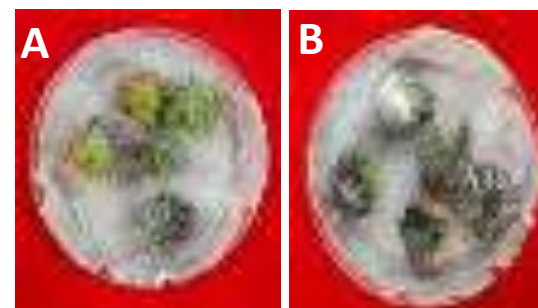
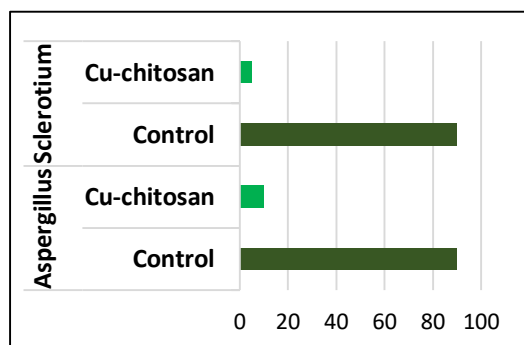
Cu-Chitosan  
nano polymer -Th4d



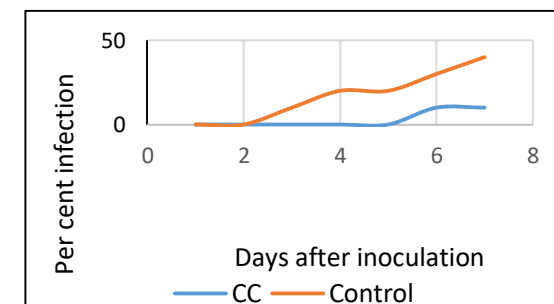
TEM image



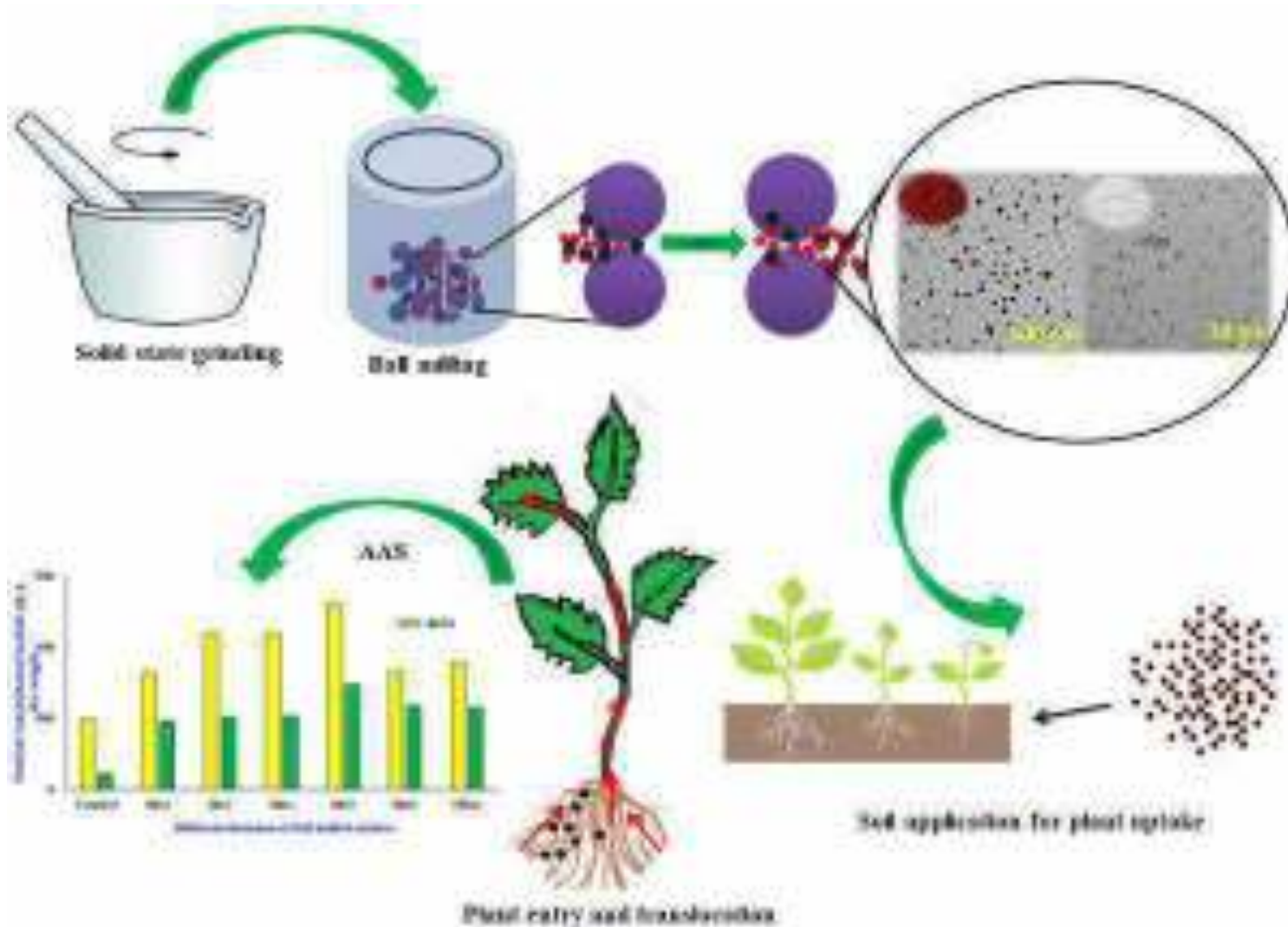
TEM images of nano coacervate



A . Coacervate Treated B. Untreated capsules



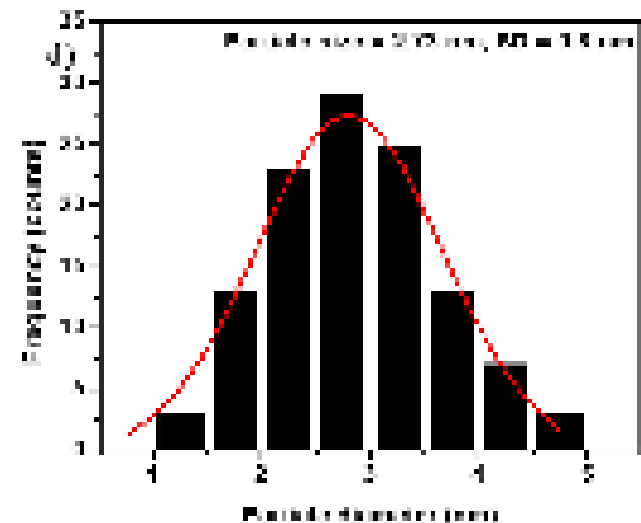
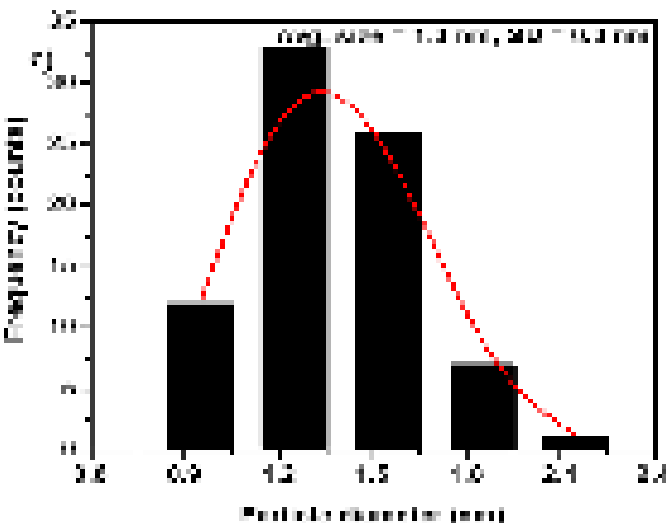
# Synthesis of Fe and Zn nanosystems for soil application



- Nano nutrients of Fe and Zn were synthesized using greener techniques like **solid state grinding followed by ball milling**.
- Fe and Zn nanosystems are synthesized in the form of **nanochelators based of citrates**.
- Evaluation of nanochelators of Fe and Zn micronutrients (developed at IIOR) on soybean and groundnut showed **higher nutrient uptake compared to commercially available nano-micronutrients**.

# Confirmation of Particle size of the synthesized citrates

*Fe and Zn Nanonutrients*



Size of FC (1:1) is 195.2 nm

ZC (1:3) is 74.5 nm

Fe-citrate nano particles (1:1) - 6 hrs- 2.73 nm

Zn-citrate nano particles (1:3)- 6 hrs - 1.3 nm

## Fe and Zn content in citrates

Treatment	Fe/ Zn content (%)
FC (1:1)	20.7
FeSO4	19.5
Chelated- Fe	12.0
Nano- Fe	12.0
ZC (1:3)	29.8
ZnSO4	21.0
Chelated- Zn	12.0
Nano- Zn	12.0

The nano particle size has been confirmed and was found in the range of 1.3-2.73 nm

**K.S.V. Poorna Chandrika, Dinabandhu Patra, Praduman Yadav, A. Aziz Qureshi, and Balaji Gopalan, Metal citrate nanoparticles: a robust water-soluble plant micronutrient source. RSC Advances, 2021,11, 20370-20379. (NAAS ratings- 9.12)**

**K.S.V. Poorna Chandrika, A. Aziz Qureshi, Anupama Singh, Chunduri Sarada, and Balaji Gopalan. Fe and Zn Metal Nanocitrates as Plant Nutrients through Soil Application. ACS Omega, 2022, 7 (49), 45481-45492. (NAAS rating- 10.13)**



The Fe content and Zn content in citrates were evaluated and compared with market available Fe and Zn.



# Lignin from agricultural waste and its applications in agriculture and industry



Chopped castor stalk

Azeotropic mixture



Castor stalk lignin

## Application of Lignin derivative-Seed pelleting in sesame

### Process of pelleting



- Lignin content varied from 12 to 28%.
- Lignin extraction confirmation was done through FTIR at two different peaks 3347 and 2920



Unpelleted



Pelleted



## Physical properties of pelleted seeds

Treatment	Test weight (1000 seeds) in g.	Distilled Water (in min)
Sesame seeds	2.85-4.06	-
Pelleted with lignosulphonate	10.3-11.5	1.15
Pelleted with lignosulphonate + Sesame cake	10.5-13.4	3.54

- ❖ 100% lignosulphonate has potential as filler material for seed pelleting process



## Germination testing of pelleted seeds

Treatment	Speed of germination	
	In sand	By roll paper towel method
Lignosulphonate + 30% cellulose	6.81	10.2
Lignosulphonate + 30% cellulose + Sesame cake (1:1)	2.79	5.7
Unpelleted (control)	7.02	10.8

A-Lignosulphonate

B-Lignosulphonate + SCake

C- Control

This is under field evaluation for different sowing methods

Pelleting of 100% Lignosulfonate resulted in on par speed of germination compared to unpelleted

# TECHNOLOGIES FOR SESAME AND NIGER



**A.K.Vishwakarma**  
**Project Coordinator (Sesame & Niger)**  
**INDIAN COUNCIL OF AGRICULTURAL RESEARCH**



# PCUS-18-1(Unnat Rama)

Seed coat colour	Dark Brown
Maturity	85-90 days
Salient features	<p>Suitable for Rabi summer cultivation.</p> <p>Days to maturity: 86-90</p> <p>Yield: 9.51 q/ha</p> <p>Oil content: 46.35%</p> <p>Mod. resistant to Macrophomina stem and root rot and Alternaria leaf spot, Cercospora leaf spot, mod. resistant to leaf Webber, Capsule borer, leaf hopper and mirid bug</p>
States proposed for	<p>Zone I :Maharashtra, Telangana, Karnataka,</p> <p>Zone II :Andhra Pradesh, Bihar, Madhya Pradesh and</p> <p>Zone III: Odisha, Andhra Pradesh, West Bengal and Tamil Nadu</p>
Contact Detail	<p>Dr. Rajani Bisen, Principal Scientist, Project Coordinating Unit (Sesame &amp; Niger), JNKVV Jabalpur 482004. Email: <a href="mailto:rajanitomar20@gmail.com">rajanitomar20@gmail.com</a>, 9425483648</p>



# TilhanTec Til-1

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

<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: vanrajgohil11@gmail.com



## JCS 3202 (Telangana Til-I)

Recommended area	:	Zone I (Maharashtra, Karnataka and Telangana)
Suitability	:	Rabi/Summer- Irrigated
Salient features	:	<ul style="list-style-type: none"><li>➤ High yielding 8.51 q/ha (8.20-9.80 q/ha) late maturity, white seeded Maturity : 92 days (91-95 days) late maturity</li><li>➤ Plant height : 96.43 cm (89-106 cm)</li><li>➤ Oil content : 44.2 % (44-49%)</li><li>➤ Oil Yield : 355.2 kg/ha</li><li>➤ Quality traits: (medium size seed)</li><li>➤ Moderately resistant to Macrophomina stem and root rot, Alternaria leaf spot, Cercospora leaf spot and phyllody)</li></ul>
Contact Details		Dr. D. Padmaja, Scientist (Plant Breeding), AICRP on sesame RARS, Polasa, Jagtial Email:suhanigpb@gmail.com



# 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

<b>Year of Notification</b>	2022. No.SO. 4065 (E) dated 31.08.2022
<b>Parentage</b>	VRI Sv 2 / GT 10
<b>Duration</b>	85-90 days
<b>Season</b>	Suitable for Rabi / Summer cultivation in all sesame growing zones of India
<b>Yield</b>	957 kg/ha
<b>Reaction to major pests and disease</b>	Moderately resistant to phyllody and dry root rot diseases and sucking pests
<b>Special features</b>	<ul style="list-style-type: none"><li>• Brown seed</li><li>• Oil content: 50%</li><li>• Oil yield: 380 kg/ha</li></ul>
<b>Contact Details</b>	Dr. A. Mahalingam, Asst. Prof. (PBG), AICRP on Sesame Regional Research Station, Vriddhachalam Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu)



# Gujarat Til 7 (Banaras Gaurav)

Productivity (kg/ha.)	957
Days to maturity	88-94
Plant height (cm)	125-149 cm
No. of branches/plant	3.84-6.00
No. of capsules/plant	74-85
Length of capsule (cm)	2.5-2.8
Seeds/capsule	64-76
1000-seed weight (g)	3.19-3.50
Oil content %	48.55-49.82
Special Features	High yielding, profuse branching, white bold seeded and high oil content Suitable for kharif season
Contact Details	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	<ul style="list-style-type: none"><li>➤ Average seed yield: 795 kg/ha</li><li>➤ Maturity: 75-80 days</li><li>➤ White seed</li><li>▪ Monostem / shy branching sesame type</li><li>▪ Suitable for high density sowing</li><li>▪ 52% Oil and 23.8% protein content</li><li>▪ Moderately resistant to stem and dry root rot, phyllody and powdery mildew diseases</li><li>▪ Moderately resistant to sucking pests and capsule borer</li></ul>
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



# 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



# 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	<ul style="list-style-type: none"><li>• Medium plant height (100cm)</li><li>• Duration: 87-93days</li><li>• Moderately resistance to Alternaria leaf spot, Phyllody, Powdery mildew, Macrophomina stem and root rot, Cercospora leaf spot .</li><li>• Moderately resistant to leaf roller and capsule borer, leaf hopper and mirid bug.</li><li>• Synchronous maturity, Late shattering type</li><li>• Oil content- 45 to 48 %</li><li>• Reddish brown colour seed</li><li>• No. of Locules -Six</li></ul>
Contact Details	Dr. DibyaRanjan Mishra, Jr. Breeder, Deptt. of Plant Breeding



# OSC-79(Kalinga Sesame 3-1)

OSC 79



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

# Sabour Til-1 (BRT-04)

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





# RT 372

Recommended area	Zone I (Rajasthan, Haryana, Punjab, Gujarat, Himachal Pradesh, U.P, Maharashtra, 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, Agricultural Research Station, Mandor, Jodhpur - Rajasthan Mob. 9413251053, 9784821500 Email: <a href="mailto:srkumhar@gmail.com">srkumhar@gmail.com</a>



Field view of RT 372

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

Recommended area	Zone I (Rajasthan, Haryana, Punjab, Gujarat, Himachal Pradesh, U.P, Maharashtra, 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 -



# 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



## **SVT-222**

- **Potential yield: 1115 kg/ha**
- **Seed yield : 560-650 kg/ha Responded favourably 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**



**NIGER**

# GNIG-4

<b>Suitability</b>	:	<b>Late Kharif season</b>
<b>Salient features</b>	:	<ul style="list-style-type: none"> <li>• The genotype belongs to mid late group (109-133 days)</li> <li>• The seeds are black and bold with test weight of 4.08 g</li> <li>• It gave an average seed yield of 543 kg/ha.</li> <li>• Contains 37.77% oil with oil yield of 205 kg/ha</li> <li>• Resistant against Alternaria and Cercospora leaf spot diseases and</li> <li>• Semilooper and Caterpillar</li> </ul>
<b>Recommended area</b>	:	<b>GUJARAT</b>
<b>Contact Details</b>	:	<p>Dr. Prashant K. Jagtap, Jr. Breeder, Niger Research Station, NAU, Vanarasi-396 580            Tal. Vansda, Dist. Navsari, Cell 09428688744, email <a href="mailto:pacific7@rediffmail.com">pacific7@rediffmail.com</a>            PC Unit, ICAR, JNKVV, Jabalpur</p>



# JNS -2016-1413

<b>Suitability</b>	<b>: Suitable for rainfed as well as irrigated hills and plain condition. Kharif Season</b>
Salient features	: Yield: 650 -750 kg/ha Maturity: 90-100 days 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/PC Unit 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/ PC Unit, 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/ PC Unit,  
AICRP on Niger, Zonal Agricultural Research Station, JNKVV, Chhindwara (Madhya Pradesh)



## 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/ PC Unit

AICRP on Niger, Zonal Agricultural Research Station, JNKVV, Chhindwara (Madhya Pradesh)





# Business Opportunities and Technologies Available for Commercialization at ICAR-IISR, Indore

**Dr. Mahaveer P. Sharma**  
**Principal Scientist (Agri. Microbiology)**  
**& PI, Agri-business Incubation Centre &ITMU**  
**ICAR- Indian Institute of Soybean Research Indore**  
Email: [mahaveer620@gmail.com](mailto:mahaveer620@gmail.com);  
[Mahaveer.Sharma@icar.gov.in](mailto:Mahaveer.Sharma@icar.gov.in)





# Soybean and Food Products

- India is now the fifth largest producer of soybean at a global level with more than 12.9 million tonnes production during 2022-23.
- Soy foods are nutritious, economical and provide many health benefits.
- Use of 10-20% of soybean along with cereals gives maximum nutritional advantages.
- Soy based technologies include soy milk, full fat soy flour, soy fortified biscuits, soy cheese, soy yoghurt, soy paneer (tofu), soy meat alternatives and soy chunks
- Presence of some antinutritional factors in soybeans requires careful processing/or use food specialty soybeans to make it fit for human and animal consumption.





## Prospects of Entrepreneurship in Soy Food Processing

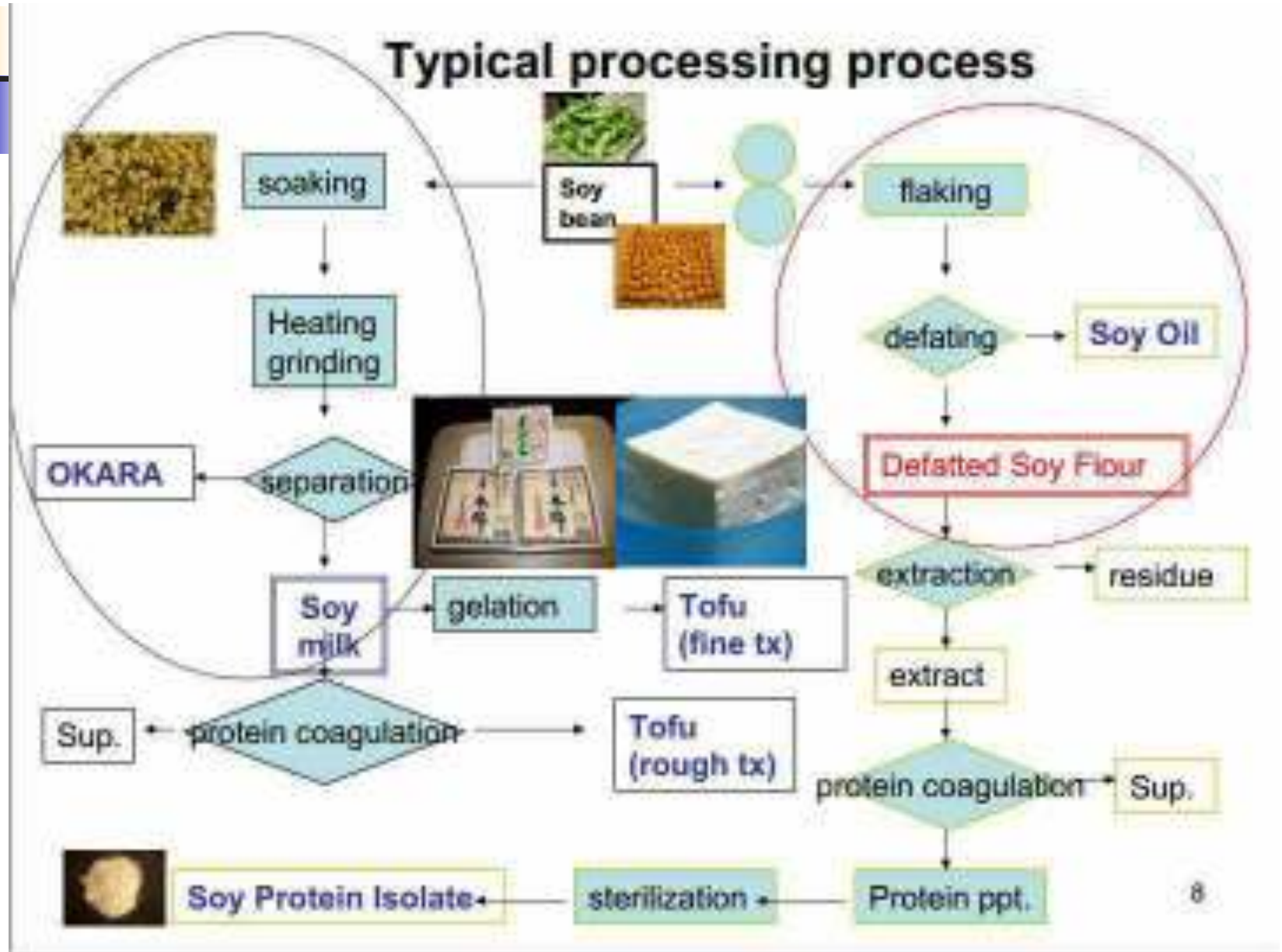
- Soy is a major ingredient in the food industry.
- **Meat alternatives:** tofu, tempeh, vegetarian burgers and frankfurters, meatless luncheon slices, canned meat analogs, ground soy burger, and soy bacon. Soy is used for textured vegetable protein in meal replacements and protein powders.
- **Dairy alternatives:** soy milk, soy creamers, soy yogurts, soy cheese etc.,
- **Vegetable alternatives:** soy may be is sold as fresh, frozen, and dried soybeans.



## Prospects of Entrepreneurship in Soy Food Processing..

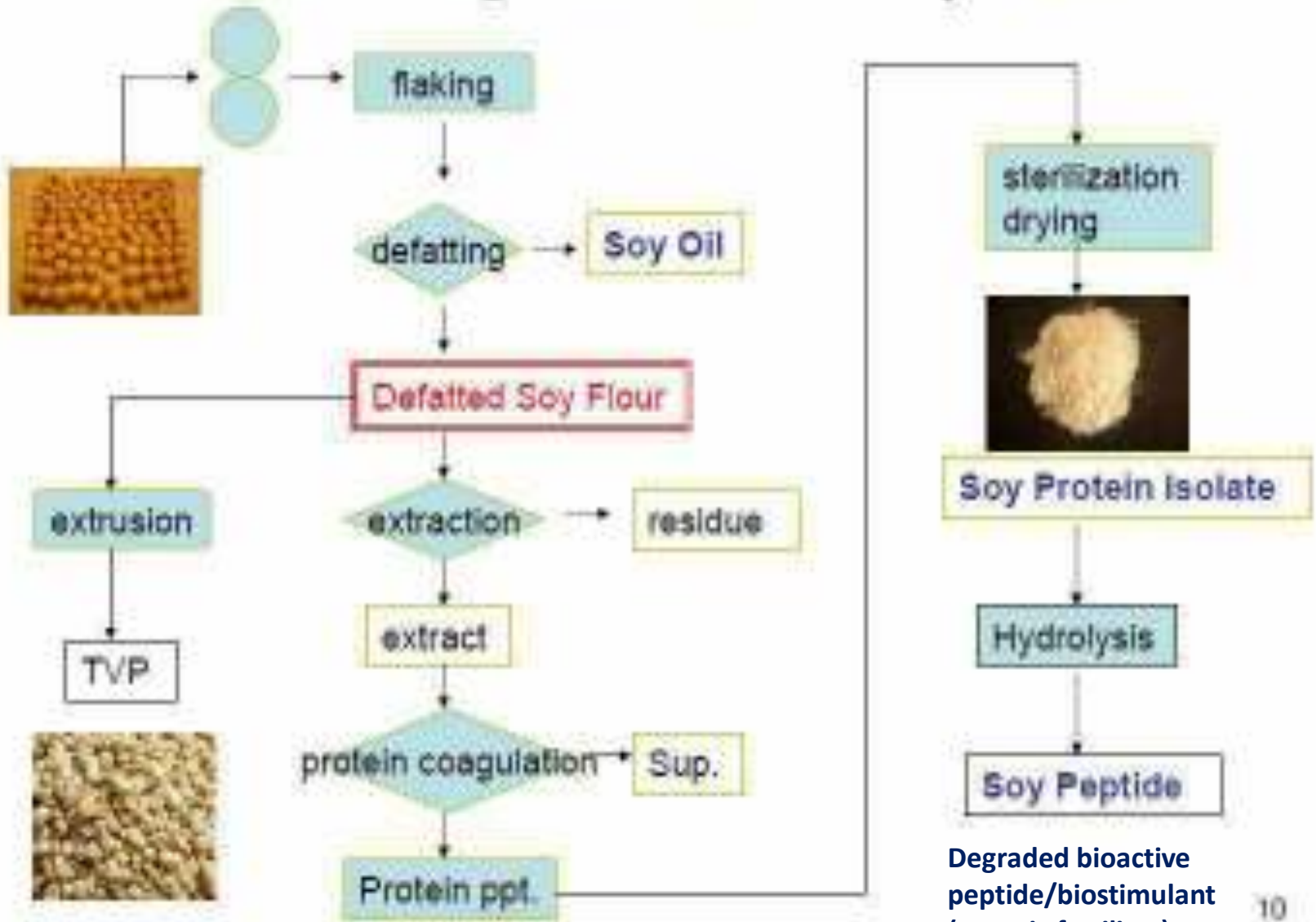
- Protein isolates (90% protein), soy protein concentrates (70% protein), and soy flour (50% protein content).
- Extruded, extracted, baked, fried, canned, frozen etc (**Technology based**).
- **Applications:** bakery and confectionary, meat products, functional foods, dairy products, and infant foods (**Zero lactose high calcium**).
- Vegan market trend, soy lecithin is another important byproduct, typically the brownish yellow complex mixture used as natural emulsifier.
- Cost effective production, abundant availability at affordable prices makes the major driver for the growth of the soy lecithin market.

# Typical processing process





# Processing for Defatted soy flour



Degraded bioactive peptide/bio stimulant (organic fertilizer)





## Technologies commercialized (specialty soybean line/ variety) by ITMU-IISR, Indore

S. No.	Name of firm	Name of specialty soybean line/ variety	Year
1.	Suminter India Organics Pvt. Ltd., Andheri (w), Mumbai- 400053	NRC 181(Kunitz trypsin inhibitor free), high protein	2022
2.	Nature Bio Foods Limited, New Delhi	NRC 109 (Lipoxygenase -2 free soybean line)	2017
3.	Sonic Biochem Extraction Limited, Indore	NRC 109 (Lipoxygenase-2 free soybean line)	2016
4.	Ruchi Hi-Rich Seeds Private Limited (RHSP) Mumbai	NRC 101 (Kunitz trypsin inhibitor free)-NRC-127	2014
5.	ITC Limited, Secunderabad	NRC 102 (KTI-free) & IC 210 (high oleic acid)- NRC 147	2014



## Technologies developed and commercialized (farm machineries) at IISR Indore

Farm machineries	Commercialized to (Non-exclusive license)
<ol style="list-style-type: none"><li>1. Broad bed furrow (BBF) Seed drill</li><li>2. Furrow irrigated raised bed system (FIRBS)</li><li>3. Subsoiler</li><li>4. Sweep seed drill</li><li>5. Ridge fertilizer drill cum seed planter</li><li>6. Broad bed furrow (BBF) planter</li><li>7. Soybean Seed planter</li><li>8. Single ridge seed planter</li><li>9. Soybean seed drill cum planter two in one</li></ol>	<ul style="list-style-type: none"><li>•SKB Agrotech Private Limited, Indore</li><li>•New Patidar iron works, Indore</li><li>•R.B Agro Industries, Indore</li><li>•Rohit steel works, Chinchwad, Pune</li><li>•Mahashakti Agro Energy&amp; Innovation private Ltd, Wardha, Maharashtra</li><li>•S.R. Engineering, Wardha, Maharashtra</li><li>•Prabhat Krishi Yantra Pvt.Ltd, Sehore (MP)</li></ul>



## Mass production of Arbuscular Mycorrhizal Fungi

Technology	Commercialized to
Mycorrhiza production technology (Microbial technology)	Biome technologies Pvt Ltd, Ahmednagar, Maharashtra



# SOY PRODUCTS TECHNOLOGIES

*available at ICAR-IISR, Indore for commercialization*

## TOFU



**Nutritive value per 100 g:**

1. **Calories: 147.29**
2. **protein: 9.25%**
3. **fat: 3.81%**
4. **minerals: 1.5%**

## SOY MILK



**Nutritive values per 100 g:**

1. **Calories: 120.27**
2. **Protein: 9.65 %**
3. **Fat : 3.63%**
4. **Minerals: 0.24%**

## SOY NUTS



**Nutritive value per 100 g:**

1. **Calories: 438.5**
2. **Protein: 47.8%**
3. **Fat : 12.5%**
4. **Minerals : 6.1%**

## SOY DAHI



**Nutritive values per 100 g:**

1. **Calories: 51.84**
2. **Protein: 3.42%**
3. **Fat: 4.24%**
4. **Minerals: 0.25%**





## SOY HALWA MIX



**Nutritive values per 100 g:**

1. **Calories: 300.5**
2. **Protein: 28.5%**
3. **Fat: 15.5%**
4. **Minerals: 5%**

## SOY MATHRI



**Nutritive values per 100 g:**

1. **Calories: 231.5**
2. **Protein: 21.2%**
3. **Fat: 16.3%**
4. **Minerals: 5%**

## SOY SEV



**Nutritive value Per 100 g:**

1. **Calories: 565**
2. **Protein: 30%**
3. **Fat: 45%**
4. **Minerals: 3.6%**

## SOY COOKIES



**Nutritive values per 100 g:**

1. **Calories: 293.9**
2. **Protein: 13.4%**
3. **Fat :26.7%**
4. **Minerals: 3.8 %**





**Soy flour**



**Soy lassi**



**Soy nuts**





## SOY UPMA MIX



Nutritive values per 100 g:

1. Calories: 177.93
2. Protein: 12.6%
3. Fat: 14.17%
4. Minerals: 3.2%

## SOY LADDOO



Nutritive values per 100 g:

1. Calories: 278.52
2. Protein: 28.5%
3. Fat: 18.3%
4. Minerals: 4.2%

## DRIED OKARA



Nutritive values per 100 g:

1. Calories: 89.89
2. Protein: 4%
3. Fat: 8.21%
4. Minerals: 3.5%

## PROCESSED SOY FLOUR



Nutritive values per 100 g:

1. Calories: 336.1
2. Protein: 37.6%
3. Fat: 18.3%
4. Minerals: 3.5%







## Hand-holding services provided at IISR-ABI

- Full disclosure of technologies chosen by incubatees
- Help in prototype development, trials, improvement, label design, shelf-life estimation
- Knowledge dissemination about financial aid e.g. Government schemes and subsidy, bank loan schemes.
- Rules and regulations involving plant design and fssai implementation



## Handholding agri start-ups for production of biofertilizers, Soyfood processing and seed business sectors





**Mass production of *B. daqingense* culture/consortia in ABI Centre, IISR Indore  
(liquid formulation)**



Microbial bioreactor/fermenter (100L Capacity-Liquid formulation)

- Easy to apply, socially highly acceptable; Higher self life up to 12 months
- Highly economic (one acre cost is Rs 50/- for 80 ml) (\*semiautomatic)
- During 2023 produced about 8000 packets and supplied to farmers and KVKs

# Our Current Incubates

S. No.	Name of incubate	Name of Firm/Startup	Registration No.	Registration for services
1	Akash Phulari	Akash agro processing, Betul	-	Soy food processing
2	Harsh Bhajipale	Naked earth Indore 452009 (M.P.)	C/1626815	Soy food processing
3	Lalit Raghuvanshi	M/s Gudlak, Guna 473001 (M.P.)	-	Soy food processing
4	Sagar Manglani	Vegano cafe and kitchen, Indore (M.P.)	2623135	Soy food processing
5	Ayush Giri Goswami	Health mystic Pvt. Ltd. Betul 460001 (M.P.)	R55441810	Soy food processing
6	Anjali Bharti	Iraeco agro products and marketing Pvt. Ltd. Indore	-	Soy food processing
7	Vikram Shandilya Udaygiri	Earthistic produce, Bengaluru	KR03A0039304	Soy food processing
8	Sumit Patidar	Indore	-	Soy food processing
9	Kishan Raghuvanshi	Guna	-	Quality Seed Processing
10	Punit chourasiya	Jgdamba Bij Utpadak	Dr/kwa/1995	Quality Seed Processing
11	Dr Prafull Prabhakar Gadge	Biome Technologies Pvt. Ltd.	-	Production of microbial bioinoculants
12	Sunny Patel	Nextnode Bioscience Pvt. Ltd. Kadi, Gujarat	DIPP69037	Production of microbial bioinoculants
13	Niranjana Prabhu K J	Ecophytocare india private limited, Mysuru, Karnataka	DIPP97555	Production of Microbial Bioinoculants
14	Megha Gupta	Morph Industries Pvt. Ltd.	U24290MP2020PTC 052241	Production of Microbial Bioinoculants
15	Yashvardhan Singh Rathore	Jaipur, Rajasthan	-	Production of Microbial Bioinoculants



Agriculture secretary visited ABIC IISR Indore



NABARD officials visited ABIC IISR Indore





Conducting orientation training on “Soy Products Processing and Byproduct Utilization for FPO of Sangali, Maharashtra



# Visibility in Media



BHOPAL | TUESDAY | MARCH 10, 2020

## ATMAKISHAN BHOPAL AGRI-BUSINESS

### RBI's funds Agri-Business Incubation Centre today

**By Anshu Singh**  
 The RBI has approved the funding of the Agri-Business Incubation Centre (ABIC) in Bhopal. The centre is a joint venture of the Government of Madhya Pradesh and the National Bank for Agriculture and Rural Development (NABARD). The centre will provide a platform for agri-business entrepreneurs to showcase their products and services to investors and buyers. The centre will also provide training and mentorship to entrepreneurs. The centre is expected to be operational by the end of the year.

सर्वोच्च न्यायालय ने न्यायाधीशों के पदों पर विचार करने का फैसला किया

## इंक््यूबेशन सेंटर करेगा किसानों, युवाओं को लघु उद्योग लगाने में मदद

विशेष प्रतिवेदन

राज्य सरकार और न्यायाधीशों के पदों पर विचार करने का फैसला किया।



इंक््यूबेशन सेंटर के माध्यम से किसानों और युवाओं को लघु उद्योगों में मदद मिलेगी।

अभिलेखित उद्योगों को प्रोत्साहित करने के लिए सरकार ने इस कदम को उठाया है।



BHOPAL | THE BUREAU | MARCH 10, 2020

## Workshop on launch of Agribusiness Incubation Centre ends in Indore

A workshop on the launch of the Agri-Business Incubation Centre (ABIC) in Bhopal ended in Indore. The workshop was held at the Indore office of the National Bank for Agriculture and Rural Development (NABARD). The workshop was attended by officials from the Government of Madhya Pradesh and NABARD. The workshop discussed the various aspects of the ABIC and the role of NABARD in its development. The workshop was a success and it is expected that the ABIC will be operational soon.



ICAR Incubator Incubator of Bhopal, Madhya Pradesh



Opportunities for Agri-preneurs




Workshop on launch of Agri-Business Incubation Centre



**सोयबीन में हे औषधीय गुण व अन्य लाभकारी तत्व**

सोयबीन एक अत्यंत पोषक और स्वास्थ्यदायक खाद्य पदार्थ है। इसमें प्रोटीन, फाइबर, और विभिन्न प्रकार के विटामिन और खनिजों का समृद्ध स्रोत है। सोयबीन को अनेक प्रकार के व्यंजनों में इस्तेमाल किया जा सकता है, जिससे इसका पोषण और स्वाद बढ़ता है।

**ICAR-ISSR training held on soybean processing**

ICAR-ISSR Indore में सोयबीन प्रसंस्करण पर एक प्रशिक्षण कार्यक्रम आयोजित किया गया। इस कार्यक्रम में किसानों को सोयबीन को बेहतर ढंग से प्रसंस्कार करने के तरीके और नए तकनीकी उपकरणों के उपयोग के बारे में जानकारी दी गई।

**महाराष्ट्र की अन्नदातियों के पास मुख्यक**

महाराष्ट्र की अन्नदातियों के पास मुख्यक (Soybean) की जानकारी बढ़ाने के लिए ICAR-ISSR Indore ने एक प्रशिक्षण कार्यक्रम आयोजित किया। इस कार्यक्रम में किसानों को सोयबीन की खेती और प्रसंस्करण के बारे में जानकारी दी गई।

**कृषि व्यवसाय इनक्यूबेशन**

कृषि व्यवसाय इनक्यूबेशन के माध्यम से किसानों को नए तकनीकी उपकरणों और प्रशिक्षण के माध्यम से अपनी कृषि व्यवसाय को बेहतर ढंग से चलाने में मदद मिलेगी।

**अछिल्या नगरी**

**गांधी व जन्माटना**

अछिल्या नगरी में गांधी व जन्माटना का आयोजन किया गया। इस कार्यक्रम में किसानों को गांधी जी के जीवन और उनके योगदान के बारे में जानकारी दी गई।

**कृषि व्यवसाय इनक्यूबेशन केंद्र से कृषि प्रशिक्षण प्राप्त**

कृषि व्यवसाय इनक्यूबेशन केंद्र से कृषि प्रशिक्षण प्राप्त करने वाले किसानों को नए तकनीकी उपकरणों और प्रशिक्षण के माध्यम से अपनी कृषि व्यवसाय को बेहतर ढंग से चलाने में मदद मिलेगी।

**Jalna district Maharashtra's 25 farmers (5 FPOs trained during March 2023)**







# ଭଲଭେଦା ବାଘାଠାଠା

## ICAR-IISR holds training for farmers

**Indore Edition**  
 Mar 30, 2023 Page No. 3  
 Powered by : eRelief.com

**Osmanbad district Maharashtra's 90 farmers from 20 FPOs trained during March 2023**





## Acknowledgements

- IP&TM Division, ICAR HQ, New Delhi for funding ITMU and ABI Centre
- Director, ICAR-IISR Indore for the support and necessary permission
- Dr Neha Pandey, Scientist (Food Technology), IISR, Indore for providing information on soy food processing
- Organizers of this meet for the opportunity



**Thank You**





# Hybrids/ varieties of ICAR-DRMR



**P.K.RAI, Director**

ICAR-Directorate of Rapeseed-Mustard Research  
(Indian Council of Agricultural Research)  
Sewar, Bharatpur-321303, Rajasthan






## **Vision**

Brassica science for oil and nutritional security

## **Mission**

Harnessing science and resources for sustainable increase in productivity of Rapeseed-Mustard

## **Mandate**

- Basic, strategic and adaptive research on rapeseed-mustard to improve productivity and quality
  - Provide equitable access to information, knowledge and genetic material to develop improved varieties and technologies
  - Coordination of applied research to develop location specific varieties and technologies
  - Technology dissemination and capacity building
- 

# DRMR Hybrid/ Varieties

Name of the Variety	Year of notification	Maturity (days)	Yield (kg/ha)	Oil Content (%)	Salient features	Area of Adaptability
NRCDR-2	2007	131-156	1951-2626	36.5-42.5	Suitable for Irrigated conditions	Zone-II (Delhi, Haryana, Punjab, J&K and RJ)
NRC HB 101	2009/2017	105-135	1382-1491	35- 42	Suitable for late sown irrigated conditions	Zone-III (Eastern Rajasthan, MP, UP, UK), Zone-V (JHK, Bihar, Odisha, Assom, WB)
NRCHB 506 (Hybrid)	2009	127-148	1550-2542	39- 43	High adaptation	Zone-III (Eastern Rajasthan, MP, UP, UK),
NRCDR 601	2010	137-151	1939-2626	38.7-41.6	Timely sown irrigated	Zone-II (Delhi, Haryana, Punjab, J&K and RJ)
DRMR 1165-40	2020	142	2200-2600	41.2	Rainfed, timely sown	Zone-II (Delhi, Haryana, Punjab, J&K and RJ)
Giriraj (DRMRIJ 31)	2013	137-153	2246-2767	38.7-42.5	Timely sown irrigated	Zone-II (Delhi, Haryana, Punjab, J&K and RJ)
DRMR 150-35	2020	114	1200-1800	36.7-42.8	Rainfed condition	Zone-V (Orissa, WB, Bihar, Jharkhand, Chhattisgarh and Assam)
DRMR 2017-15 (Radhika)	2020	131	1686-1847	40.7	Late sown irrigated conditions	Zone-II (Delhi, Haryana, Punjab, J&K and RJ)
DRMRIC 16-38 (Brijraj)	2020	120-149	1733	37.6-40.9	Late sown irrigated conditions	Zone-II (Delhi, Haryana, Punjab, J&K and RJ)
DRMR 2018-19 (BPM-11)	2023	120-125	1649-2058	40-41	Late sown irrigated conditions	Zone III (MP,UP,UK and RJ)
NRCYS 05-02	2009	94-118	1056-1251	38.2-46.5	Yellow sarson growing areas of the country	



# Indian Mustard: NRCDR 2

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	NRCDR 2
Year of Identification	2006, NRCDR-2
Year of notification and S.O. No.	122 (E), Dated 06-02-2007
Recommended Region / Areas	Zone II (Delhi, Haryana, Jammu & Kashmir, Punjab and Parts Of Rajasthan)
Cultivar descriptor	Plant height : 165-212 cm Maturity : 131-156 days Oil content : 36.5-42.5% 1000 Seed wt.: 3.5-5.6 g
Special Attributes, If any	Tolerant to Salinity and high temperature at the time of sowing.
Yield	1951-2626 kg/ha



# Indian Mustard: NRCHB 101

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	NRCHB 101
Year of Identification	2008, NRCHB 101
Year of notification and S.O. No.	454 (E), Dated 11-02-2009
Recommended Region / Areas	Zone-III (Eastern Rajasthan, MP, UP, UK), Zone-V (Jharkhand, Bihar, Odisha, Assom, WB)
Cultivar descriptor	Plant height : 170-200 cm Maturity : 105-135 days Oil content : 34.6- 42.1% 1000 Seed wt.: 3.6- 6.2 g
Special Attributes, If any	Suitable for late sown irrigated conditions
Yield	1382-1491 kg/ha





# Indian Mustard hybrid NRCHB 506

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	NRCHB 506
Nature of the Cultivar (Variety/ Hybrid)	Hybrid
Pedigree (Plant-wise for Hybrids)	MJA 5 × MJR 1(mori CMS based)
Method of Breeding/Selection	Heterosis Breeding
Year of Identification	2008, NRCHB 506
Year of notification and S.O. No.	454 (E), Dated 11-02-2009
Recommended Region / Areas	Rajasthan and Uttar Pradesh
Cultivar descriptor	Plant height : 180-205 cm Maturity : 127-148 days Oil content : 38.6- 42.5% 1000 Seed wt.: 2.9- 6.5 g
Special Attributes, If any	High oil content
Yield	1550-2542 kg/ha



# Indian Mustard: NRCDR 601

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	NRCDR 601 (DRMR 601)
Year of Identification	2009, NRCDR 601
Year of notification and S.O. No.	733 (E), Dated 01-04-2010
Recommended Region / Areas	Zone II (Delhi, Haryana, Jammu & Kashmir, Punjab and parts of Rajasthan)
Cultivar descriptor	Plant height : 161-210 cm Maturity : 137-151 days Oil content : 38.7- 41.6% 1000 Seed wt. : 4.2- 4.9 g
Special Attributes, If any	Suitable for timely sown irrigated condition
Yield	1939-2626 kg/ha



# Indian Mustard: DRMR IJ-31 (Giriraj)

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	DRMR IJ-31 (Giriraj)
Year of Identification	2013, DRMR IJ-31
Year of notification and S.O. No.	2816 (E) Dated 19-09-2013
Recommended Region / Areas	Zone II (Delhi, Haryana, Jammu & Kashmir, Punjab and parts of Rajasthan)
Cultivar descriptor	Plant height : 180-210 cm Maturity : 137-153 days Oil content : 38.7-42.5% 1000 Seed wt. : 3.1-6.1 g
Special Attributes, If any	Suitable for timely sown irrigated condition
Yield	2246-2767 kg/ha



# Indian Mustard: DRMR 150-35

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	DRMR 150-35 (Bharat Sarson 7)
Year of Identification	2015, DRMR 150-35
Year of notification and S.O. No.	SO 3482 (E) Dated 07-10-2020
Recommended Region / Areas	Zone-V (Orissa, WB, Bihar, Jharkhand, Chhattisgarh and Assam)
Cultivar descriptor	Plant height : 164-186 cm Maturity : 114 days Oil content : 36.7-42.8 % 1000 Seed wt.: 3.0-6.2 g
Special Attributes, If any	Suitable for rainfed situation
Yield	1200-1800 kg/ha



# Indian Mustard: DRMR 1165-40

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	DRMR 1165-40 (Rukmini)
Year of Identification	2017, DRMR 1165-40
Year of notification and S.O. No.	SO 3482 (E) Dated 07-10-2020
Recommended Region / Areas	Zone II (Delhi, Haryana, Jammu & Kashmir, Punjab and Parts Of Rajasthan)
Cultivar descriptor	Plant height : 177-196 cm Maturity : 133-151 days Oil content : 40.1-42.5% 1000 Seed wt.: 3.2-6.6 g
Special Attributes, If any	Suitable for timely sown rainfed conditions
Yield	2200-2600 kg/ha



# Indian Mustard: DRMR 2017-15 (Radhika)

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	DRMR 2017-15 (Radhika)
Year of Identification	2020, DRMR 2017-15
Year of notification and S.O. No.	2986 (E), Dated 20-07-2021
Recommended Region / Areas	Late sown irrigated conditions of Zone II (Delhi, Haryana, Jammu & Kashmir, Punjab and Parts Of Rajasthan)
Cultivar descriptor	Plant height : 191-204 cm Maturity : 120-150 days Oil content : 40.0-41.8 % 1000 Seed wt.: 2.8-5.1 g
Special Attributes, If any	Suitable for late sowing under irrigated Conditions, tolerant to high temperature at terminal stage
Yield	1686-1847 kg/ha



# Indian Mustard: DRMRIC 16-38 (Brijraj)

Name of the Crop	Indian Mustard ( <i>B. juncea</i> )
Name of the Cultivar	DRMRIC 16-38 (Brijraj)
Year of Identification	2020, DRMRIC 16-38
Year of notification and S.O. No.	2986 (E), Dated 20-07-2021
Recommended Region / Areas	Zone II (Delhi, Haryana, Jammu & Kashmir, Punjab and Parts Of Rajasthan)
Cultivar descriptor	Plant height : 188-197 cm Maturity : 120-149 days Oil content : 37.6-40.9% 1000 Seed wt.: 2.9-5.0 g
Special Attributes, If any	Suitable for late sowing under irrigated conditions
Yield	1733 kg/ha



# Indian Mustard: BPM-11

1	Name of crop	India Mustard ( <i>B. juncea</i> )
2	Variety	DRMR 2018-19 (BPM-11)
3	Suitable Zone	Zone III (MP,UP,UK and RJ)
4	Notification year	2023
5	Maturity period (Days)	120-125
6	Yield /hectare (kg)	1649-2058
7	Special Characteristics	Late sown irrigated condition, White rust resistant
8	Oil percentages	40-41





# Yellow Sarson: NRCYS 05-02

Name of the Crop	Yellow Sarson ( <i>B. campestris</i> var. <i>yellow sarson</i> )
Name of the Cultivar	NRCYS 05-02
Year of Identification	2008, NRCYS 05-02
Year of notification and S.O. No.	454 (E), Dated 11-02-2009
Recommended Region / Areas	Yellow sarson growing areas of the country
Cultivar descriptor	Plant height : 110-120 cm Maturity : 94-181 days Oil content : 38.2-46.5% 1000 Seed wt.: 2.2-6.6 g
Special Attributes, If any	Early maturity, medium height and high oil content
Yield	1239-1715 kg/ha

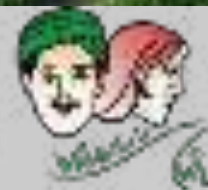


## Commercialization of DRMR hybrid/ varieties (2023-24)

Variety	Name of Private Partners	Date
NRCHB- 506	Trikuta Agri Seeds Pvt. Ltd.	20/09/2023
NRCHB- 101	Trikuta Agri Seeds Pvt. Ltd.	20/09/2023
NRCHB- 506	Ajeet Seeds Pvt. Ltd.	21/09/2023
GIRIRAJ (DRMRIJ-31)	Ajeet Seeds Pvt. Ltd.	21/09/2023
NRCHB- 506	Ganga Kaveri Seeds Pvt. Ltd. New Delhi	04/10/20223
NRCHB- 101	Navrattan Seeds Pvt. Ltd. Sirsa, Haryana	12/10/2023
NRCHB- 506	Delta Agrigenetics Pvt. Ltd.	12/01/2024
DRMRIJ-31 (GIRIRAJ)	Delta Agrigenetics Pvt. Ltd.	12/01/2024

THANK YOU...

For further information visit us at  
[www.drmmr.res.in](http://www.drmmr.res.in)



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# Variety : Groundnut Co 7

<b>Name of the Variety</b>	<b>Groundnut Co 7</b>	
<b>Background</b>	<b>TNAU, Coimbatore (2015)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Resistant to rust</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha):</b> <b>2300 (kharif);</b> <b>2806 (rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50.5-51</b>
	<b>Shelling (%)</b>	<b>71</b>



# Variety : Phule Bharti (JL 776)

Name of the Variety	Phule Bharti (JL 776)	
Background	MPKV, Jalgaon (2015)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Resistant to <i>S. litura</i> and rust in field condition</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 2110 (kharif)	
Scalability/ Target market / Market intelligence	Maharashtra and Madhya Pradesh	
Business and commercial potential	Oil content (%)	50
	Shelling (%)	69



# Variety : G 2-52

<b>Name of the Variety</b>	<b>G 2-52</b>	
<b>Background</b>	<b>UAS, Dharwad (2015)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Foliar disease resistant</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2000-2500 (kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Karnataka</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48</b>
	<b>Shelling (%)</b>	<b>71</b>



# Variety : GKVK 5

<b>Name of the Variety</b>	<b>GKVK 5</b>	
<b>Background</b>	<b>UAS, GKVK, Bangaluru (2016)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Drought tolerant; moderately resistance to rust and LLS</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2500-2800 (Kharif and Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Southern Karnataka</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50</b>
	<b>Shelling (%)</b>	<b>74</b>



# Variety : ALG -06-320

<b>Name of the Variety</b>	<b>ALG -06-320</b>	
<b>Background</b>	<b>TNAU, Tindivanam (2017)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Tolerant to rust, LLS and Peanut Bud Necrosis disease (PBND), <i>S. litura</i>, leaf miner and thrips</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2741 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu and Andhra Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50.3</b>
	<b>Shelling (%)</b>	<b>70.7</b>





# Variety : Kadiri Amaravathi (K 1535)

<b>Name of the Variety</b>	<b>Kadiri Amaravathi (K 1535)</b>	
<b>Background</b>	<b>ANGRAU, Kadiri (2017)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Tolerant to early and late season drought; tolerant to leaf spot, sucking pests (thrips and jassids)</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 1600-1800 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Andhra Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50</b>
	<b>Shelling (%)</b>	<b>65</b>



# Variety : VRI 8 (VG 09220)

<b>Name of the Variety</b>	<b>VRI 8 (VG 09220)</b>	
<b>Background</b>	<b>TNAU, Vridhachalam (2017)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Moderately resistant to sucking pest (jassids and thrips), moderately resistant to LLS and rust</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2130 (Kharif); 2700 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>49-50</b>
	<b>Shelling (%)</b>	<b>70</b>



# Variety : GJG 32 (ICGV 03043)

<b>Name of the Variety</b>	<b>GJG 32 (ICGV 03043)</b>	
<b>Background</b>	<b>JAU, Junagadh (2018)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Tolerant to stem rot, color rot and rust</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 1947 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu, Andhra Pradesh, Karnataka, southern Maharashtra and Telangana, Gujarat (Area extention)</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50</b>
	<b>Shelling (%)</b>	<b>66</b>



# Variety : GJG 33 (ICGV 07222)

<b>Name of the Variety</b>	<b>GJG 33 (ICGV 07222)</b>	
<b>Background</b>	<b>JAU, Junagadh (2018)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Tolerant to collar rot and rust</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3064 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu, Andhra Pradesh and Telangana</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51</b>
	<b>Shelling (%)</b>	<b>67</b>



# Variety : DH-232

<b>Name of the Variety</b>	<b>DH-232</b>	
<b>Background</b>	<b>UAS, Dharwad (2018)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Resistance to Foliar diseases</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2500-3000 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Karnataka</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>46.9</b>
	<b>Shelling (%)</b>	<b>77.4</b>



# Variety : DH-245

<b>Name of the Variety</b>	<b>DH-245</b>	
<b>Background</b>	<b>UAS, Dharwad (2018)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Resistance to Foliar diseases</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2500-2900 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Karnataka</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>45.9</b>
	<b>Shelling (%)</b>	<b>73</b>
<b>Social impact of the technology</b>	<b>High oleic acid (&gt;70%)</b>	



# Variety : Nitya Haritha (TCGS 1157)

<b>Name of the Variety</b>	<b>Nitya Haritha (TCGS 1157)</b>	
<b>Background</b>	<b>ANGRAU, Tirupati (2018)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Tolerance against late leaf spot, rust and PSND</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2657 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Maharashtra and Madhya Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>49</b>
	<b>Shelling (%)</b>	<b>69</b>



# Variety : Avtar (ICGV 93468)

<b>Name of the Variety</b>	<b>Avtar (ICGV 93468)</b>	
<b>Background</b>	<b>CSAUA&amp;T, Kanpur (2018)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Early maturity; tolerant to PBND, Fungal diseases, Jassid and pod borer</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2400 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Uttar Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51.1</b>
	<b>Shelling (%)</b>	<b>70.6</b>





# Variety : TMV 14

<b>Name of the Variety</b>	<b>TMV 14</b>	
<b>Background</b>	<b>TNAU, Tindivanam (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Early maturity; tolerant to S. litura, thrips, leaf minor; moderately resistance to LLS and rust</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2124 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48</b>
	<b>Shelling (%)</b>	<b>70.6</b>



# Variety : Phule Chaitanya (Central- KDG 160)

<b>Name of the Variety</b>	<b>Phule Chaitanya (Central- KDG 160)</b>	
<b>Background</b>	<b>MPKV, Digraj (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2184 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu, Telangana and Andhra Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51.6</b>
	<b>Shelling (%)</b>	<b>66.6</b>



# Variety : AK 335 (PDKVG-335)

<b>Name of the Variety</b>	<b>AK 335 (PDKVG-335)</b>	
<b>Background</b>	<b>PDKV, Akola (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Moderately resistance to tikka, color rot, stem rot, jassid, thrips and aphids</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2200-2400 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Maharashtra</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48-49</b>
	<b>Shelling (%)</b>	<b>68.7</b>



# Variety : Phule Unnati (RHRG 6083)

Name of the Variety	Phule Unnati (RHRG 6083)	
Background	MPKV, Rahuri (2019)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Resistance to LLS, stem rot, rust, <i>S. litura</i>, and thrips</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 2854 (Kharif); 3990 (Rabi-Summer)	
Scalability/ Target market / Market intelligence	Maharashtra	
Business and commercial potential	Oil content (%)	52
	Shelling (%)	68



# Variety : Phule Dhani (JL 1085)

Name of the Variety	Phule Dhani (JL 1085)	
Background	MPKV, Rahuri (2019)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Resistance to LLS and rust</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 3333 (Kharif)	
Scalability/ Target market / Market intelligence	Tamil Nadu, Andhra Pradesh and Karnataka	
Business and commercial potential	Oil content (%)	50
	Shelling (%)	68



# Variety : Gujarat Groundnut-34 (GG 34)

<b>Name of the Variety</b>	<b>Gujarat Groundnut-34 (GG 34) (AG-2012-06)</b>	
<b>Background</b>	<b>AAU, Anand (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3715 (Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Gujarat</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>52.8</b>
	<b>Shelling (%)</b>	<b>67.9</b>



# Variety : Dheeraj (TCGS 1073)

<b>Name of the Variety</b>	<b>Dheeraj (TCGS 1073)</b>	
<b>Background</b>	<b>ANGRAU, Tirupati (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Possesses heat tolerance and high water use efficiency</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2547 (Kharif); 3690 (Rabi)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Andhra Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48-49</b>
	<b>Shelling (%)</b>	<b>77</b>



# Variety : BSR 2 (BSG 0912)

<b>Name of the Variety</b>	<b>BSR 2 (BSG 0912)</b>	
<b>Background</b>	<b>TNAU, Bhavanisagar (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Moderately resistance to rust, LLS, jassid, thrips and aphids</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2222 (Kharif); 2360 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>45</b>
	<b>Shelling (%)</b>	<b>70.2</b>





# Variety : Central-Pragati (TCGS 894)

<b>Name of the Variety</b>	<b>Central-Pragati (TCGS 894)</b>	
<b>Background</b>	<b>ANGRAU, Tirupati (2019)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2816 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu, Telangana and Andhra Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48</b>
	<b>Shelling (%)</b>	<b>70</b>



# Variety : Dh 256

Name of the Variety	Dh 256	
Background	UAS, Dharwad (2019)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Tolerant to mid season drought, <i>S. litura</i>, thrips and leaf miner and leaf hopper</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 3258 (Kharif)	
Scalability/ Target market / Market intelligence	Tamil Nadu, Andhra Pradesh, Karnataka and Telangana	
Business and commercial potential	Oil content (%)	50
	Shelling (%)	68



# Variety : Pratap Mungphli 3 (UG 116)

Name of the Variety	Pratap Mungphli 3 (UG 116)	
Background	MPAUT, Udaipur (2020)	
Salient Features (in Bullets)	<ul style="list-style-type: none"> <li>• Spanish Bunch</li> <li>• Moderately tolerant to Early Leaf Spot (ELS), Late Leaf Spot (LLS), rust, collar rot and dry root rot; moderately resistant to <i>Spodoptera litura</i>, leaf miner, defoliators, jassids, thrips and leafhopper</li> </ul>	
Benefits/Utility	Pod yield (Kg/ha): 3388 (Kharif and Summer)	
Scalability/ Target market / Market intelligence	Rajasthan	
Business and commercial potential	Oil content (%)	47
	Shelling (%)	70



# Variety : Jagtial Palli 1 (JGC 2141)

<b>Name of the Variety</b>	<b>Jagtial Palli 1 (JGC 2141)</b>	
<b>Background</b>	<b>PJTSAT, Jagtial (2020)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Tolerant to early season drought; resistant to Leaf spots and rust diseases; tolerant to Sucking pests such as Thrips and Jassids</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3330-3500 (Kharif and Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Telangana</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51.5</b>
	<b>Shelling (%)</b>	<b>64</b>



# Variety : K 1719 (Kadiri Chithravathi)

<b>Name of the Variety</b>	<b>K 1719 (Kadiri Chithravathi)</b>	
<b>Background</b>	<b>ANGRAU, Kadiri (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Tolerant to collar rot, PBND and thrips</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3092 (Rabi-Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Andhra Pradesh, Telangana, and Tamil Nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>49</b>
	<b>Shelling (%)</b>	<b>70</b>



# Variety : DH 257

<b>Name of the Variety</b>	<b>DH 257</b>	
<b>Background</b>	<b>UAS, Dharwad (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Drought tolerant</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3397 (Rabi-Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Karnataka and Maharashtra</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48</b>
	<b>Shelling (%)</b>	<b>72</b>



# Variety : K 1812 (Kadiri Lepakshi)

<b>Name of the Variety</b>	<b>K 1812 (Kadiri Lepakshi)</b>	
<b>Background</b>	<b>ANGRAU, Kadiri (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Drought tolerant; multiple Disease &amp; Pests Resistant</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3514 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>AP, Telangana, Karnataka and Tamilnadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51</b>
	<b>Shelling (%)</b>	<b>70</b>



# Variety : J 87 (Gujarat Groundnut 36)

<b>Name of the Variety</b>	<b>J 87 (Gujarat Groundnut 36)</b>	
<b>Background</b>	<b>JAU, Junagadh (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Bold kernel (HKW 63g)</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 4165 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Punjab and Uttar Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50</b>
	<b>Shelling (%)</b>	<b>70</b>





# Variety : Gujarat Groundnut 35 (Sorath Gold)

<b>Name of the Variety</b>	<b>Gujarat Groundnut 35 (Sorath Gold)</b>	
<b>Background</b>	<b>JAU, Junagadh (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3177 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Gujarat</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>49.8</b>
	<b>Shelling (%)</b>	<b>71.4</b>



# Variety : Kalinga Groundnut 101

<b>Name of the Variety</b>	<b>Kalinga Groundnut 101</b>	
<b>Background</b>	<b>OUAT, Bhubaneswar (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Tolerant to late leaf spot and rust</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3179 (Rabi-Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Odisha</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50</b>
	<b>Shelling (%)</b>	<b>72</b>



# Variety : TAG-73 (TAG 14-73)

<b>Name of the Variety</b>	<b>TAG-73 (TAG 14-73)</b>	
<b>Background</b>	<b>PDKV, Akola &amp; BARC, Mumbai (2021)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Moderate resistance to major diseases (Tikka, Collar rot and Stem rot) and pests (Jassid, Thrips &amp; Aphids).</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2500-2800 (Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Vidarbha region of Maharashtra</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>49</b>
	<b>Shelling (%)</b>	<b>72.6</b>



# Variety : VRI 9 (VG 13163)

<b>Name of the Variety</b>	<b>VRI 9 (VG 13163)</b>	
<b>Background</b>	<b>TNAU, Vridhhachalam (2022)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Exhibited moderate resistance reaction to LLS and Rust</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2526 (Kharif); 2921 (Rabi-summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>47-49</b>
	<b>Shelling (%)</b>	<b>70-72</b>



# Variety : GG 40 (ICGV 16668)

<b>Name of the Variety</b>	<b>GG 40 (ICGV 16668)</b>	
<b>Background</b>	<b>JAU, Junagadh (2022)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3321 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Rajasthan, Gujarat, Karnataka, Tamil Nadu, Andhra Pradesh and Telagana</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51</b>
	<b>Shelling (%)</b>	<b>63</b>
<b>Social impact of the technology</b>	<b>Recorded 78.4% oleic acid and 3.56% linoleic acid</b>	



# Variety : Visishta (TCGS 1694)

<b>Name of the Variety</b>	<b>Visishta (TCGS 1694)</b>	
<b>Background</b>	<b>ANGRAU, Tirupati (2022)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Tolerant to foliar diseases viz., early leaf spot, late leaf spot and rust diseases;</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2489 (kharif); 2495 (rabi)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Andhra Pradesh</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50</b>
	<b>Shelling (%)</b>	<b>72-75</b>



# Variety : Improved JL 24 (DBG 3)

Name of the Variety	Improved JL 24 (DBG 3)	
Background	UAS, Dharwad (2022)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Spanish Bunch</li><li>• Resistant to late leaf spot; Susceptible to late leaf spot</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 2736 (Kharif)	
Scalability/ Target market / Market intelligence	Karnataka	
Business and commercial potential	Oil content (%)	53.8
	Shelling (%)	75-76



# Variety : GG 37 (Sorath Gaurav)

Name of the Variety	GG 37 (Sorath Gaurav)	
Background	JAU, Junagadh (2022)	
Salient Features (in Bullets)	• Spanish Bunch	
Benefits/Utility	Pod yield (Kg/ha): 3218 (Summer)	
Scalability/ Target market / Market intelligence	Gujarat	
Business and commercial potential	Oil content (%)	48.9
	Shelling (%)	73





# Variety : GG 38 (Sorath Navin)

<b>Name of the Variety</b>	<b>GG 38 (Sorath Navin)</b>	
<b>Background</b>	<b>JAU, Junagadh (2022)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2966 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Gujarat</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48.9</b>
	<b>Shelling (%)</b>	<b>72.4</b>



# Variety : Super TMV 2 (DBG 4)

<b>Name of the Variety</b>	<b>Super TMV 2 (DBG 4)</b>	
<b>Background</b>	<b>UAS, Dharwad (2022)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Resistant to late leaf spot</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2440 (Summer)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Karnataka</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>-</b>
	<b>Shelling (%)</b>	<b>78</b>



# Variety : VRI 10 (VG 17008)

<b>Name of the Variety</b>	<b>VRI 10 (VG 17008)</b>	
<b>Background</b>	<b>TNAU, Vridhhachalam (2023)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Spanish Bunch</b></li><li>• <b>Moderate resistance to late leaf spot, rust diseases and moderately resistant to sucking pests and defoliators</b></li><li>• <b>Early maturity</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2535 (kharif); 2448 (rabi)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil nadu</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>46-48</b>
	<b>Shelling (%)</b>	<b>70-72</b>



# Variety : Raj Mungfali-2 (RG 578)

<b>Name of the Variety</b>	<b>Raj Mungfali-2 (RG 578)</b>	
<b>Background</b>	<b>SKRAU, Durgapura (2015)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Virginia Bunch</b></li><li>• <b>Resistant to LLS, dry root rot, ELS and rust ; tolerant to S. litura, thrips, jassids and leaf miner</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 1480 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Odisha, WB and Manipur</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>46</b>
	<b>Shelling (%)</b>	<b>72</b>



# Variety : Birsa Groundnut 4 (BAU 25)

<b>Name of the Variety</b>	<b>Birsa Groundnut 4 (BAU 25)</b>	
<b>Background</b>	<b>BAU, Kanke (2015)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Virginia Bunch</li><li>• Large seeded; resistant to LLS</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2000-2200 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Jharkhand</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50.8</b>
	<b>Shelling (%)</b>	<b>72</b>



# Variety : Raj Mungfali 3 (RG 559-3)

Name of the Variety	Raj Mungfali 3 (RG 559-3)	
Background	SKNAU, Durgapura (2016)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Virginia Bunch</li><li>• Large seeded; tolerant to <i>S.litura</i>, leafminer and thrips</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 3173 (Kharif)	
Scalability/ Target market / Market intelligence	Rajasthan, UP and Punjab	
Business and commercial potential	Oil content (%)	49
	Shelling (%)	69



# Variety : Phule Warna (KDG 128)

<b>Name of the Variety</b>	<b>Phule Warna (KDG 128)</b>	
<b>Background</b>	<b>MPKV, Digraj (2016)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Virginia Bunch</b></li><li>• <b>Moderately resistance to rust and leaf spot</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2425 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Tamil Nadu, Andhra Pradesh, Karnataka, southern Maharashtra Gujarat and Rajasthan</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>50.9</b>
	<b>Shelling (%)</b>	<b>65</b>



# Variety : Phule Morna (KDG 123)

<b>Name of the Variety</b>	<b>Phule Morna (KDG 123)</b>	
<b>Background</b>	<b>MPKV, Digraj (2016)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"> <li>• <b>Virginia Bunch</b></li> <li>• <b>Moderately resistance to rust and leaf spot</b></li> </ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2212 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Gujarat, Rajasthan Odisha, WB, Jharkhand, Manipur, Tamil Nadu, AP, Karnataka and Southern Maharashtra</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>44</b>
	<b>Shelling (%)</b>	<b>70</b>





# Variety : Konkan Bhuratna (RTNG-29)

Name of the Variety	Konkan Bhuratna (RTNG-29)	
Background	DBSKKV, Dapoli (2019)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Virginia Bunch</li><li>• Resistance to ELS, LLS, rust, PBND, thrips, jassids and leaf miner</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 2500-3000 (Kharif)	
Scalability/ Target market / Market intelligence	Maharashtra	
Business and commercial potential	Oil content (%)	50
	Shelling (%)	74



# Variety : Gujarat Groundnut HPS 2 (GG HPS 2)

Name of the Variety	Gujarat Groundnut HPS 2 (GG HPS 2)	
Background	JAU, Junagadh (2019)	
Salient Features (in Bullets)	<ul style="list-style-type: none"><li>• Virginia Bunch</li><li>• Large seeded</li></ul>	
Benefits/Utility	Pod yield (Kg/ha): 2835 (Kharif)	
Scalability/ Target market / Market intelligence	Gujarat	
Business and commercial potential	Oil content (%)	48.8
	Shelling (%)	68.6



# Variety : Girnar 4 (ICGV 15083)

Name of the Variety	Girnar 4 (ICGV 15083)	
Background	ICAR-DGR, Junagadh (2020)	
Salient Features (in Bullets)	<ul style="list-style-type: none"> <li>• Virginia Bunch</li> <li>• Tolerant to Late Leaf spot, Rust, Stem rot and Peanut Bud Necrosis Disease, Leaf hopper, Leaf miner, thrips and <i>Spodoptera litura</i></li> </ul>	
Benefits/Utility	Pod yield (Kg/ha): 3218 (Kharif)	
Scalability/ Target market / Market intelligence	Rajasthan, Gujarat, Karnataka, Tamil Nadu and Andhra Pradesh	
Business and commercial potential	Oil content (%)	53
	Shelling (%)	67
Social impact of the technology	Recorded 78.5% oleic acid and 4.8% linoleic acid	



# Variety : Girnar 5 (ICGV 15090)

Name of the Variety	Girnar 5 (ICGV 15090)	
Background	ICAR-DGR, Junagadh (2020)	
Salient Features (in Bullets)	<ul style="list-style-type: none"> <li>• Virginia Bunch</li> <li>• Tolerant to Late Leaf spot, Rust, Stem rot and Collar rot, Leaf hopper, Leaf miner, thrips and <i>Spodoptera litura</i></li> </ul>	
Benefits/Utility	Pod yield (Kg/ha): 3124 (Kharif)	
Scalability/ Target market / Market intelligence	Rajasthan, Gujarat, Karnataka, Tamil Nadu and Andhra Pradesh	
Business and commercial potential	Oil content (%)	53
	Shelling (%)	67
Social impact of the technology	Recorded 78.4% oleic acid and 4.6% linoleic acid	



# Variety : Groundnut 23 (Sorath Kiran)

Name of the Variety	Gujarat Groundnut 23 (Sorath Kiran)	
Background	JAU, Junagadh (2021)	
Salient Features (in Bullets)	• Virginia Bunch	
Benefits/Utility	Pod yield (Kg/ha): 2722 (Kharif)	
Scalability/ Target market / Market intelligence	Gujarat	
Business and commercial potential	Oil content (%)	49.7
	Shelling (%)	69.4



# Variety : Raj Mungfali 4 (RG 638)

<b>Name of the Variety</b>	<b>Raj Mungfali 4 (RG 638)</b>	
<b>Background</b>	<b>SKNAU, Durgapura (2022)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Virginia Bunch</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 3698 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Rajasthan, UP and Punjab</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>49</b>
	<b>Shelling (%)</b>	<b>74</b>



# Variety : GJG 18 (JSP 49)

<b>Name of the Variety</b>	<b>GJG 18 (JSP 49)</b>	
<b>Background</b>	<b>JAU, Junagadh (2015)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Virginia Runner</b></li><li>• <b>Moderately resistant to PBND and PSND</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 1450 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Odisha, WB, Jharkhand and Manipur</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>48</b>
	<b>Shelling (%)</b>	<b>69</b>



# Variety : GJG 19 (JSP 51)

<b>Name of the Variety</b>	<b>GJG 19 (JSP 51)</b>	
<b>Background</b>	<b>JAU, Junagadh (2016)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• Virginia Runner</li><li>• Tolerant to stem rot, dry root rot and rust as compared to check (KDG 123)</li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 1876 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Odisha, West Bengal, Jharkhand and Manipur</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>47</b>
	<b>Shelling (%)</b>	<b>69</b>





# Variety : Gujarat Groundnut 41 (Padma)

<b>Name of the Variety</b>	<b>Gujarat Groundnut 41 (Padma)</b>	
<b>Background</b>	<b>JAU, Junagadh (2020)</b>	
<b>Salient Features (in Bullets)</b>	<ul style="list-style-type: none"><li>• <b>Virginia Runner</b></li></ul>	
<b>Benefits/Utility</b>	<b>Pod yield (Kg/ha): 2722 (Kharif)</b>	
<b>Scalability/ Target market / Market intelligence</b>	<b>Gujarat</b>	
<b>Business and commercial potential</b>	<b>Oil content (%)</b>	<b>51.4</b>
	<b>Shelling (%)</b>	<b>74</b>



## **Linseed Value added products**

**BVDU, Pune, AICRP-Linseed**

# Roasted and Salted Flaxseed

## Salient Features:

- Natural source of important micronutrients such as calcium, magnesium and potassium etc. and lignan (phytoestrogen).
- 2 spoons-full of FLAXSEEDS provides 3-5 g of Omega 3 fatty acid (Alpha Linolenic Acid)

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## 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)



## Product cost:

- Rs. 40.00/100 gm
- Bulk price: 350.00/kg
- Packing, forwarding and taxes at actual

# Fibre and Lignan Rich Hull Powder

## Salient Features:

- Defatted (mechanically pressed) hull fraction of flaxseed mainly containing linnan 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**

## 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)



## Product cost:

- Rs. 50.00/100 grams pack
- Minimum order quantity: 25 packs
- Packing, forwarding and taxes at actual

# Flaxseed oil

## Salient Features:

- Flaxseed oil is a virgin, cold press oil extracted and sealed under nitrogen to ensure purity and avoid rancidity
- 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%



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## 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

# Velmega Softgel Capsules

## Salient Features:

- VELMEGA Softgel is easy to consume, easy to carry linseed oil in soft gel form, and 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: 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:

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# Flaxseed Oil Emulsion

## Salient Features:

- Water soluble form of omega-3 fatty acid enriched with multivitamins to fulfill the needs of growing children
- 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 %

## 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@bharativersity.edu](mailto:anand.zanwar@bharativersity.edu)



**FSSAI Lic. No. 1151603500506**

## Product cost:

- Rs. 155.00/100 ml bottle
- Minimum order quantity: 25 packs
- Packing, forwarding and taxes at actual

# Omega-3 Chocolates

## Salient Features:

- Omega-3 chocolate is enriched with omega-3 fatty acid, tasty and delicious
- 5-10 Chocolates/pack and customized pack sizes

## Nutritive value:

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

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## 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)



## Product cost:

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



# Omega-3-rich 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 rich eggs

## 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)



FSSAI Lic. No. 11517035001012



## Product cost:

- Rs. 120.00/kg (for feed)
- Minimum order quantity: 1 tone
- Packing, forwarding and taxes at actual



Thank you

