







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



Sunflower hybrid: TilhanTech-SUNH-1



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

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

TilhanTec-SUNH-2 (IIOSH-460)











Technology assessment

Considerations	Projections
Potential of the technology	Increased seed yield beyond 2000 kg/ha from the current 1400-1500 kg/ha
Target areas	Gujarat, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and Telangana State
Potential buyers of technology	Seed companies, Public agencies, Farmer producer organizations, State Seed Corporations (SSC), NGOs, Startups
Competitors of similar technology	KBSH-44, LSFH-171, DRSH-1, RSFH-1887, COH- 3, private company hybrids
Estimated market for technology	TilhanTech-SUNH-1&2: 50,000 ha (2,50,000 kg seed/5 kg seed per ha) Selling price: 550-650/kg
Cost of production	Rs. 250-300/kg
Uniqueness	Higher seed and oil yield, resistant to DM and moderately resistant to LH
Anticipated social impact	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	s 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,	
KBSH-88	2023	1500-2100		Gujarat, Karnataka, Maharashtra, AP, Tamil Nadu and Telangana	
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





IIOR safflower varieties/hybrids with Potential for Commercialization



Safflower variety: ISF-764 (Lakshmipriya)





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

Safflower variety: ISF-1 (Pride)





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

Safflower hybrid: ISH-402





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

Safflower hybrid: ISF- 300



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

Technology assessment

Considerations	Projections
Potential of the technology	Increased seed yield beyond 2000 kg/ha from the current 1400-1500 kg/ha
Target areas	Maharashtra, Karnataka, Telangana, AP, MP, Chhattisgarh, Bihar, Uttar Pradesh, Rajasthan
Potential buyers of technology	Seed companies, Public agencies, FPOs, SSCs, NGOs, Startups
Estimated market for technology	75,000 ha (7,50,000 kg seed@10 kg seed/ha) Selling price: 100 -120/ kg
Cost of production	Rs. 60-65/kg
Uniqueness	Higher seed and oil yield, resistant to Fusarium wilt and drought.
Anticipated social impact	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	Yield	Oil (%)	Days to	Special traits	Recommend
	release	(Kg/ha)		maturity		ed area
ISF.1	2020	1200 (RF)	31	125-130	HIGH OLEIC	All India
151 - 1		1800 (IR)			(76%)	
ISE-764	2019	1500 (RF)	31	125-130	MR to W &	All India
		2200 (IR)			ALS	
ISH-402	2023	2300 (IR)	31	120-125	CGMS based	All India
1511-402					hybrid	
ISE-300	2023	1800	38.2	125-130	High oil, RW	MH, K, AP,
151-500						TS
	2021	1740 (RF)	28.6	120-125	-	МН, К, АР,
A-2020		2160 (IR)		(RF)		TS
				140-145 (IR)		
DSAF-1	2021	1740 (RF)	28.2	125-130	MRW	МН, К, АР,
DSAI-1		2160 (IR)				TS
IGKV-	2021	2710 (IR)	34.3	138-140	HIGH oil, R to	Chattisgarh
Kusum					W	MP
RVSAF-18-	2023	1746	39	127-130	HIGH Oil,	K, MH, TS,
1					MRW	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	Yield (Kg/ha)	0il (%)	Days to	Special traits	Rec. area
	release			maturity		
PBNS-184	2022	1750 (RF)	31.3	120-124	MR to A, W,	MH, K, AP,TS
					ALS	
PHULE-	2020	1480 (RF)	32.9	120-124	MR to A	All India
NIRA		2050 (IR)				
PHULE-	2020	1620 (RF)	29.5	125-130	MR to A, W,	MH, K, AP,
BIVARA		2600 (IR)			ALS	TS
PHULE –	2020	1620 (RF)	34.6	122	MR to W	MH, K, AP,
GOLD		2600 (IR)				TS
PHULE-	2021	1180 (RF)	30.5	132	MR to A	MH, K, AP,
KIRAN		1850(IR)				TS, MP
CG-	2021	1680 (RF)	32-33	122-125	MR to ALS	Chattisgarh
KUSUM1						
CG-	2021	2000	35	135	Red flowers	Chattisgarh
KUSUM 2						

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





Maturity	90 days
Seed yield	950 kg/ha
Oil content	45%
Recommen ded 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

Contact: Dr. K.T. Ramya (ramya.kt@icar.gov.in)

ICAR-IIOR Castor hybrids and female line for commercialization

Castor hybrid: TilhanTech-ICH-5





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

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

Castor hybrid: TilhanTech-ICH-6



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

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

Castor hybrid: TilhanTech-ICH-66



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

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

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

Castor pistillate line: M-574



***PI-Pistillate index**

Pistillate nature	PI* of 0.9 compared to 0.7 for other lines
Seed yield	500 kg/ha
Special features	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
Reg. with PPVFRA	2020

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

Hybrids released during the last 6 years

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

AICRP linseed varieties available for Commercialization

Linseed varieties from AICRP centres

Name	Year of releas e	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	First low ALA (<5%) variety of India	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
BUAT Alsi-4	2021	1261	MR to powdery mildew, Alternaria, budfly	MP, Chhattisgarh, Odisha, MS, Karnataka
Aparna	2021	1342	MR to powdery mildew, Alternaria, budfly	Himachal Pradesh, Punjab
RLC 164	2021	1161	Rest. to rust; MR to wilt, budfly	Himachal Pradesh, Punjab
RLC 167	2021	1131	Rest. to rust; MR to wilt, budfly	Himachal Pradesh, Punjab
Sabour Tisi- 3	2021	547	For <i>Utera</i> cultivation; Rest. to wilt; MR to budfly	UP, Bihar, WB, Assam, MP, Chhattisgarh, Odisha, MS, Karnataka
RLC 171	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) Selling price: 90-120/kg
Cost of production	Rs. 25-30/kg
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





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 ELIS	4	5.0		
Protein content (mg/ml)	49.3		
Presence of beta	-exotoxin	Absent		
Content of bio-co	ontrol organism (%)	33.3		
	Simmons citrate agar for E. coli	Nil		
Human	Salmonella spp.	Nil		
pathogen	Shigella broth for Shigella spp.	Nil		
	Vibrio agar for Vibrio spp.	Nil		
Demonstratior	n in Farmers Fields (87-100% reduct	ion in lepidopteran pests)		
 Soybean (Nizamabad, Telangana; <i>Kharif</i> 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 semileners to be set or piller & conit ulum be rear and recorded birther wield (502)				

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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	Castor (% Reduction)	Bt + Mr	Bt + Bb
H. armigera	76.4-100%	76.4-90.7%	S. litura	94.5-98.7%	90.1-91.8%
T. orichalcea	87.9-100%	70.2-74.8%	A. janata	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 CF	U/ml) of <i>B. bassiana</i>	15.10	-
CFU (log CF	U/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
	Simmons citrate agar for <i>E. coli</i>	Nil	Nil
Human Salmonella differential agar for Salmonella spp.		Nil	Nil
pathogen	Shigella broth for Shigella spp.	Nil	Nil
	<i>Vibrio</i> agar for <i>Vibrio</i> spp.	Nil	Nil



PUBLIC NOTICE

Subject-Guidelines for Registration of biopesticides along with consortium of Bio-pesticidesregarding.

The Registration Committee in its 439th meeting held on 25.04.2022 has approved the guidelines of Biopesticides along with consortium of Bio-pesticides under the Insecticides Act, 1968 proposed by the sub-committee constituted by the RC in its 427th meeting under the chairmanship of Dr. S.C.Dubey, ADG(PP &B), ICAR and Member RC for humanization of data requirement for grant of registration of Bio-pesticides under the provision of IA, 1968 after extensive consultation with the stakeholders.

 Vibrio agar for Vibrio 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



Patent No. 315134 dt. 28.6.2019

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 x 10⁶ cfu/ml even at 18th 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 x 10⁶ cfu/gm even at 18th 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 x 10⁶ cfu/gm even at 18th 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*)

Trichoderma-biopolymer formulation

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



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

Contents lists available at ScienceDirect

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

K.S.V. Poorna Chandrika^{2,*}, R.D. Prasad^b, Varsha Godbole^b 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. <u>A novel chitosan biopolymer based *Trichoderma* delivery system: Storage stability, persistence and bio efficacy against seed and soil borne diseases of oilseed crops</u>. *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 <u>5 locations</u> (Solapur, Tandur, Hyderabad, Parbhani, Annigeri) over 2-3 years



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



Bioflims Cellulose-Trichoderma)

(0.2% w/w

NE + \$1 m





SEM image of Polymer film SEM image of Polymer film with *richoderma*

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 10⁹ to 10¹²
- Seed load: 1000 to 2000 CFUs/ g seed
- Shelf life: 10.3 log CFU (24 months)
- Entrapment efficiency: 94%
- Persistence: 10⁶ CFUs/g soil 90
 DAA



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



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



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

io-name composition

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

Seed treatment

- 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







TEM image



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

- 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.





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 nanomicronutrients.

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 Fe content an	d 7n content in citrates

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

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

<u>K.S.V. Poorna Chandrika</u>, 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)

<u>K.S.V. Poorna Chandrika</u>, 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)





Lignin from agricultural waste and its applications in agriculture and industry





Chopped castor stalk Castor stalk lignin
Application of Lignin derivative-Seed pelleting in sesame



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







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

Germination testing of pelleted seeds

	Speed of germination		
Treatment	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	

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



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
	Suitable for Rabi summer cultivation.
	Days to maturity: 86-90
	Yield: 9.51 q/ha
Salient features	Oil content: 46.35%
	Mod. resistant to Macrophomina stem and root rot and Alternatia leaf spot, Cercospora leaf spot, mod. resistant to leaf Webber, Capsule borer, leaf hopper and mirid bug
	Zone I :Maharashtra, Telangana, Karnataka,
States proposed for	Zone II : Andhra Pradesh, Bihar, Madhya Pradesh and
	Zone III: Odisha, Andhra Pradesh, West Bengal and Tamil Nadu
Contact Detail	Dr. Rajani Bisen, Principal Scientist, Project Coordinating Uni (Sesame & Niger), JNKVV Jabalpur 482004. Email: rajanitomar20@gmail.com, 9425483648



TilhanTec Til-1

Maturity	90 days
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

Dr. R.K. Mathur, Director, ICAR-Indian Institute of Oilseeds Research

Tel: +91-40-24598444, 24016141 Mobile : +91- 944044196,

director.iior@icar.gov.in

Contact





		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	- ASA
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	:	 High yielding 8.51 q/ha (8.20-9.80 q/ha) late maturity, white seeded Maturity : 92 days (91-95 days) late maturity Plant height : 96.43 cm (89-106 cm) Oil content : 44.2 % (44-49%) Oil Yield : 355.2 kg/ha Quality traits: (medium size seed) Moderately resistant to Macrophomina stem and root rot, Alternaria leaf spot, Cercospora leaf spot and phyllody) 	<image/>
Cantast Dataila		Dr. D. Padmaia, Scientist (Plant Breeding), AICRP on sesame	and the second sec
Contact Details		RARS Polasa lagtial Email subanight@gmail.com	
		indite in a second contraction of the second	

MT-2013-3(BUAT Til-1)

Recommend ed 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 Mocrophomina, Cercospora leaf spot, Leafcurl and Bacterial leaf spot Diseases and resistant to Pod borer insect pest
Contact	Dr. Vijay Sharma, Breeder, BUAT, Banda UP

Details





VRI-4

Year of Notification	2022. No.SO. 4065 (E) dated 31.08.2022
Parentage	VRI Sv 2 / GT 10
Duration	85-90 days
Season	Suitable for Rabi / Summer cultivation in all sesame
	growing zones of India
Yield	957 kg/ha
Reaction to	Moderately resistant to phyllody and dry root rot
major pests	diseases and sucking pests
and disease	
Special	 Brown seed
features	• Oil content: 50%
	 Oil yield: 380 kg/ha
Contact	Dr. A. Mahalingam, Asst. Prof. (PBG), AICRP on
Details	Sesame Regional Research Station, Vriddhachalam
	Tamil Nadu Agricultural University, Coimbatore (Tami
	Nadu)



Gujarat Til 7 (Banas 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
ength of capsule (cm)	2.5-2.8
Seeds/capsule	64-76
LOOO-seed weight (g)	3.19-3.50
Dil content %	48.55-49.82
Special Features	High yielding, profuse branching, white bold seeded and hig 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	 Average seed yield: 795 kg/ha Maturity: 75-80 days White seed 	
	 Monostem / shy branching sesame type Suitable for high density sowing 52% Oil and 23.8% protein content Moderately resistant to stem and dry root rot, phyllody and powdery mildew diseases 	
	 Moderately resistant to sucking pests and capsule borer 	
Contact person	Dr. A. Mahalingam, Asst. Prof. (PBG), AICRP on Sesame Regional Research Station, Vriddhachalam Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu)	



Jagtial Til 2 (JCS 2454)

Seed coat colour	White
Salient features	Suitable for Rabi summer cultivation Yield - 947-1030 kg/ha during summer Quality traits viz., Iron -130.07 mg/kg, Zinc - 69.8 mg/kg and Calcium - 12630 mg/kg Duration: 90-95 days Oil Content: 46.0 - 48.7 % Moderate Resistance to Powdery mildew and tolerance to Alternaria leaf spot.
States proposed for	Zone I :Maharashtra, Telangana, Karnataka, Zone II :Andhra Pradesh, Bihar, Madhya Pradesh and Zone III: Odisha, Andhra Pradesh, West Bengal and Tamil Nadu
Contact Detail	Dr. D. Padmaja, Scientist (Plant Breeding), AICRP on sesame RARS, Polasa, Jagtial Email:suhanigpb@gmail.com





Jagtial Til 2 (JCS 2454)

Seed coat colour	White
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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	 Medium plant height (100cm) 		
	Duration: 87-93days		
	 Moderately resistance to Alternaria leaf spot, Phyllody, Powdery mildew, Macrophomina stem and root rot, Cercospora leaf spot. 		
	 Moderately resistant to leaf roller and capsule borer, leaf hopper and mirid bug. 		
	Synchronous maturity, Late shattering type		
	• Oil content- 45 to 48 %		
	Reddish brown colour seed		
	• No. of Locules -Six		
Contact Details	Dr. DibyaRanjan Mishra, Jr. Breeder, Deptt. of Plant Breeding		



OSC-79(Kalinga Sesame 3-1)

Recommended area	Zone-III (For Odisha)		
Suitability	Kharif		
Salient features	 Average seed yield of 569 Kg/ha (Potential-740Kg/ha) Medium maturity duration (80-83 days) Medium plant height (85.5 to 112.9 cm) Resistant to Alternaria leaf spot, moderately resistant to Macrophomina stem and root rot, Phytopthora 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)

Maturity84-90 daysSeed yield992 kg/ha (950-1050 kg/ha)Oil yield42-44%States proposedCone II: Bihar, West Bengal, Mada PradesProposed byBihar Agricultural University, Sabour, BiharFeaturesMod. resistant of Soburgal, S	Seed Coat	Black seeded
Seed yield992 kg/ha (950-1050 kg/ha)Oil yield42-44%States proposedCone II: Bihar, West Bengal, Madhya Prades Andhra PradeshProposed byBihar Agricultural University, Sabour, BiharFeaturesMod. resistant to Macrophomina stem and oot rot, Alternaria leaf spot, Cercosporal e spot and phyllody	Maturity	84-90 days
Oil yield42-44%States proposedCone II: Bihar, West Bengal, Madhya Prades Andhra PradeshProposed byBihar Agricultural University, Sabour, BiharFeaturesMod. resistant to Macrophomina stem and root rot, Alternaria leaf spot, Cercospora le spot and phyllody	Seed yield	992 kg/ha (950-1050 kg/ha)
States proposedZone II: Bihar, West Bengal, Madhya Prades Andhra PradeshProposed byBihar Agricultural University, Sabour, BiharFeaturesMod. resistant to Macrophomina stem and spot and phyllody	Oil yield	42-44%
Proposed byBihar Agricultural University, Sabour, BiharFeaturesMod. resistant to Macrophomina stem and root rot, Alternaria leaf spot, Cercospora le spot and phyllody	States proposed	Zone II: Bihar, West Bengal, Madhya Pradesh Andhra Pradesh
Mod. resistant to Macrophomina stem and root rot, Alternaria leaf spot, Cercospora le spot and phyllody	Proposed by	Bihar Agricultural University, Sabour, Bihar
	Features	Mod. resistant to Macrophomina stem and root rot, Alternaria leaf spot, Cercospora lea spot and phyllody

Contact person Dr Sima Sinha, Scientist, BAU, Sabour





<u>RT 372</u>

Recommended area	Zone I (Rajasthan, Haryana, Punjab, Gujarat, Himachal Pradesh, U.P, Maharastra, Nagaland and parts of Karnataka and Telangana states)	
Suitability	Rainfed, Kharif, both high and low fertility conditions.	No.
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:srkumhar@gmail.com2	影響を





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

Recommended area	Zone I (Rajasthan, Haryana, Punjab, Gujarat, Himachal Pradesh, U.P, Maharastra, Nagaland and parts of Karnataka and Telangana states)
Suitability	As kharif til in upland situation
Salient features	Tolerant to lodging, responsive to fertilizer, suitable for upland situation Seed yield of 875 kg/ha, Days to maturity 65-75 days.
Contact Details	Dr. Ashutosh Roy, Chief Scientist Regional Agricultural Research Station Diphu
	Mob: +91 94 358 23 601
	Email:ashutosh_rars@yahoo.com



JLT-408-2 (Phule Purna)

Recommended	Summer in Khandesh and adjoining areas of
area	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	Telangana State
area	
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









- 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 cercospo 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







GNIG-4

Suitability	:	Late Kharif season
Salient features	:	 The genotype belongs to mid late group (109-133 days)
		• The seeds are black and bold with test weight of 4.08 g
		 It gave an average seed yield of 543 kg/ha.
		 Contains 37.77% oil with oil yield of 205 kg/ha
		Resistant against Alternaria and Cercospora leaf spot diseases and
		Semilooper and Caterpillar
Recommended area	:	GUJARAT
Contact Details	:	Dr. Prashant K. Jagtap, Jr. Breeder, Niger Research Station, NAU, Vanarasi-396 580 Tal. Vansda, Dist. Navsari, Cell 09428688744, email pacific7@rediffmail.com PC Unit. ICAR. JNKVV. Jabalpur



JNS -2016-1413

Suitability	:	Suitable for rainfed as well as irrigated hills and plain condition. Kharif Season	ture
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	4
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	JNS 521
		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.	
		Average yield 550-600 kg/ha.	JNS 2015-9
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	JNS 2016-1115
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: <u>mahaveer620@gmail.com</u>; <u>Mahaveer.Sharma@icar.gov.in</u>



M P Sharma, ICAR-IISR, Indore



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.









Ampany



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

S.	Name of firm	Name of specialty soybean	Year
No.		line/ variety	
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 (RHSPL) 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)
 Broad bed furrow (BBF) Seed drill Furrow irrigated raised bed system (FIRBS) Subsoiler Sweep seed drill Ridge fertilizer drill cum seed planter Broad bed furrow (BBF) planter Soybean Seed planter Single ridge seed planter Soybean seed drill cum planter two in one 	 SKB Agrotech Private Limited, Indore New Patidar iron works, Indore R.B Agro Industries, Indore Rohit steel works, Chinchwad, Pune Mahashakti Agro Energy& Innovation private Ltd, Wardha, Maharashtra S.R. Engineering,Wardha, Maharashtra Prabhat Krishi Yantra Pvt.Ltd, Sehore (MP)







Mass production of Arbuscular Mycorrhizal Fungi

Technology

Mycorrhiza production technology (Microbial technology)

Commercialized to

Biome technologies Pvt Ltd, Ahmednagar, Maharashtra







SOY PRODUCTS TECHNOLOGIES available at ICAR-IISR, Indore for commercialization



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%





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 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%



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 discloser 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 Raghuwanshi	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	Production of Microbial
	Veeley endleen Circely	Leisure Deiesthere	052241	Bioinoculants
15	Yashvardhan Singh Bathoro	Jaipur, Kajastnan	-	Production of Microbial
	Nathole			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, Maharastra



Visibility in Media

the pioneer

BHOPAL | TUESDAY | MARCH 16, 2021

In order to promote, meta-

ATMANIRBHAR BHARAT ABHIYAN -

ICAR to launch Agri-Business Incubation Centre today

PNE . INDORE

South and the second states of the second se Omega-3 & Omega-6 enriched oil. Iron, Calcium and other the honourable Prime Ministerbeneficial metrition factors provides several health benefits. That's why it is referred as will be inaugurated on Geldon bean and the any-Tuesday. based food products as Functional foods. However, to nurture and strongthm startthe utilization of archegt for any business econviten in the most and reamotion of pro-

anty-food derivatives in India in very low. Among the several nu-

one lack of awareness and Manufacturing and Marketing availability of soy-based prodof Soy-based Processed Food, ucts are prime one, Indore Biofertilizer production, and based ICAR-Indian Institute of Quality Seed Production of Soybean Research, an institu-Seybean etc. tion popular for the research &

topment, standardization tor and incubate the start ups, and popularization of package a Sensitization Workshop on

of practices among different statubolders has established Research-Estreprineurs/Startups-Industry Interface in used during March Hi and Agri-Basiness Incubation Centre (ABCI) in alignment 7, 2023 along with the launchwith the scheme Atmanirbhar ing of Agribusiness Incubation Rharat Abbient launched by Cantre of ICAB-IISR on March 14, 2021 at 10 am on virtual to give stimulos to the skilling mode using neers app. econverters of the nation which

About 130 participants CEO, Nutrihob TRISC, ICAI including budding entrepre-Nationia Academy e Agricultural Research neurs, technical experts finani The prime aim of ABIC is various agricultural research Management, Hyderaba institutes involved in develop-Directors desk that the ICAI agriculture and allied sectors duction, protection and pro-

which include Promotion of crusing technologies on soy-115R is primarily focussing o Processing Technologies of heav would be attending this the development and promwithohop. tion of antroproseambip an The workshop will provide start-up programmes.

platform to get guidance from It is especially designed top nesked scientific gold from based on years of experiment Indian Council of Agricultural tation and R&D work carrie Research, New Delhi via. out by the group of scientism-Deputy Director General (Crop-ICAB-Indian Institute a Science) Dr. T. H. Sharma, Soobran Research.

तीय सोयाबीन अनसंघान संस्थान इंदीर में दो

इंक्यूबेशन सेंटर करेगा किसानों, युवाओं को लघु उद्योग लगाने में मदद

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catat to the needs of formers, farm innevators, unemployed youths thes.old shit would filled shifter a destrous to take up the activities on restitutions are seen and interior word sector, soy-food, farm capatp-ments and his-fertilizers in conser-उसी प्रथमनी 142 सोस अन उन्हान दिवेद sinds side a seather h as al its form focusing on new methods anyor i pie followe for and its faster of man annot state of assbeats cultivation. The chief gaes of the pro-prantice T.B. Sharma, Deputy Director General (Crop Science) of की 10 की है कि बता में 24 किसी में संख्यान के are pool of each of the area works with it infantie stim bi it. His sit, farfier, and SCAR, New Della repressed satis-

faction over the recent initiatives conducted by the ICAR institutions with response to the call given by the Prime Minister's Office to make the country self sufficient (Atmanieblue) through conduct-ing startup activities for design and of notions products

and indigenous tech-



the pioneer

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Workshop on launch of Agribusiness

BHOPAL | THURSDAY | MARCH 18, 2021

He also called for developing and strengthering linkages with different stakeholder s to make this ABIC a grand success. The workshop was inaugurated on virtual made in the august presence of Sanjory Sasana, Assistant Director General Cintellectual Property and Technology Management, ICAR) who appreciated the efforts of ICAB-IDSR to suitate AIUC and commethod that centre has a potential for creating multiple vermans, On this success, Dr. Serjoy Gapts, Assistant Director General (Ollow) & Pulsey), Indian Council of Agricultural Besearch enophastood to actual the test mainteen and utilization of

ing a cough meration of nearly 150 cipano from different sectors as well as the dignituries from the ICAB locadquarters highlighted the importance of othered method vis-a-was sore necessitate fulfilling the role of sop bean in meeting the sestainable development goals (SDGs) of United Nations Agenda 2016. Use further, highlighted the most for increasing the productivity of seybean which has already contributed for the secto-sconomic transformation of millions of small and marginal farmers of Central India also has tremendous priential for contributing the netritional security of the poor countrymen though supply of common health benefits an chargest source of quality posters in

a concentry adsounces due / Agribusiness incubation Centre ICAR-Indian Institute of Soybean Research, Indore ICAR-Indian Institute of Soybean Research, Indore March 11 - 63 March 18 - 3 inauguration of Agribusiness incubation centre and sensitization Please watch the live program on launch of agributiness incubation virtual meet on opportunities for Agri entrepreneurs start-ups on centre using the link : https://youtu.be/-521UuORwzA apybean (16-17 March 2021 link https://youtube.com/channel/UCNdY5AuPZqsCCBlokAu5yQ which is a start with the start of Virtual Meet, 36-17 March, 2021 INADIGINAL SEDEROM TAN - OLDI AN COLUMN Soybean technologies and incubation facilities for agri startups and entrepreneurs hree days training on any food product develops 4 mil 22 - 24 Sign up et cartified hands on training coperturble for

VOLITUBE COM Opportunities for Agri-start-ups



अस्तन्त्र के उ क्लाफ उत्पादक संरथाओं के 25 तोख-कृषकों में सोख खारा 103740791 0 305402 प्राथ्वीमा पर प्राप्ता विकास OPINION IN COLUMN

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Indore Edition Mar 16, 2023 Page No. 3 Powered by : eReleGo.com



Praned filts



महाराष्ट्र से जालना जिले के पांच कृषक जालन के 25 सोया-कषकों ने किया प्रशिसण प्राप्त उत्पादक संस्थाओं के 25 सोया-कृषकों ने reditor targenerarie ad more de serie concenses avenuedes







इतेरः मध्य प्रदेश, आतीत्र मोणसेन अन्यतेशन संस्थान, इतेर के offic measure presidents with the president response offic गोण्डर प्रमोर- तमार पर सेन दिसमीत प्रतिश्वम बरादेवम बर आयेजर फिय गय जिसमें महारह के जातना जिले की 5 क्षमक अवस्था संस्थाओं के कुल 25 प्रतिषिध कुमकों में चाप लिखा

अभि विभाग, मातरह राजमन हारा मनेतरीतर मधर्ट परिवेहनना के andet à rente mais à en reger aine néférie atom र्ज से एक जिंह तथा मांगवन के कीने निष्याचे के अन्यक जी अनीम गनी, ही मार्थांग हम्रे रंग ही थी.य. हाले तथा स्मर्ट प्रेजेपट, धनि विध्यम, जननम के की तेतरर लिरे दुव केल्वल राजीपीर उपनिवन थे. इस आवार पा ही सिंह ने संस्थाप के इप्रदुवेशन केंद्र इस बिये पर से इतिहरू कार्यक्रमों की सतहन की है। ही सिंह ने इस प्रॉल्डन कार्यक्रम से मरोगा साथ पटनी पर लग्ह उद्योग कर्यापर सेने में मारापर जिनने भी आख जगह को. इस आपस पा इज्युबेगम बेंद्र के प्रथती ही महाथी। पानी ने जानवारी देते हुए बात कि इन्द्रवेशन केंद्र को समागत ये से बई राजी सोकवेद क्षेत्रेप्पटर, जिसेत केयर में उपयेथे संस्थान द्वरा विकसित उसा कृति पन्त्र, तथा मुझ्मजीव आधारित द्वय जीवान खर ल्येन सीच अध्यति खाड पटची स प्रतिश्वन के serbre by fefer store i i unjin fers in th farten के देशन संपत्नीन से बने विभिन्न रक्षय प्रदार्थ जैसे सोच हुए, सोच-क्षंद्र तीय डीक्षेट्र सेथ-पनि, तीय मनीटे सेथ हल्ला, क्षेत्र उत्पत के साथ स्वय स्वेचा आता अवतीत वेकरी पटनां कायने की प्रसामकाण संप्रतिको बाबस प्रदर्शन सहित जनवारी दी थई, इस बाबत संस्थान के मेलांग्रेज को मेल कारीय की विश्वेत करवर, की भी, य, हरते, की कांग्रेज भूमार सीमालग, जो मुम्पाल कुप्रायन ने सम्बन्धित विषयों पर तसनिकों व्यक्षत्रन के मध्यम में जनकरी है। इसमें सोम साथ पार्थ्व सीम बीलोस्ट्राइन, गरेलु स्वर पर क्षुद्र उत्पन का प्रस्तवेश किया गया है. सोगा आधारित हम साथ पदार्थी के प्रदर्शन हेतु सांस्थान के इन्द्रवेतान केंद्र के वेरेत संहरी, अधिक पाले, मुन्हे मीम पोलन तथा ही रीयक की वृत्रिकां स्वाप्तपूर्ण की है।

मससार के आलगा जिले की 5 कुषक उत्पादक संस्थाओं के 25 सोया-कृषकों ने सोया खाद्य प्रसंस्करण एवं उपोत्पाद उपयोग पर भारतीय सोयाबीन

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



Dr M.P. Sharma, ICAR-IISR, Indore



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Indore Edition

Mar 30, 2023 Page No. 3

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डंदौर

ICAR-IISR holds training for farmers

STAFF REPORTER

Indore ICAH-IISH ors Wodrsenday held a training programma for acriman farmers under 'ASCHP NSP Seed and was attended by 45 sety growers of Malwa and Nomar region

fixed production programma

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पंजीगत लाभ

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in-charge Mrinal Kochlan possible efforts for quality seed formedied formers about the prewailing seed production status. of popular varieties and emphontoed on inclusion of medium/late duration saryaties considering slimate aduppelling.

Director KH Birgh said the

production, including recently released accherges wartedlass through various seed production programmes. The traditute also busined a

training programme cet privcessing and utilisation of actbean for food uses" for 20 FPOs institute had been making all of Osmanabad district of Ma-

भारतीय सोयाबीन अनुसन्धान संस्थान द्वारा सोयाबीन

माराग्ट के उस्मानाबाट जिले के 20 क्रथक उत्पादक संस्थाओं के लिए प्रतिश्चण का समापन

बीजोत्पादन कृषकों के लिए कार्यक्रम का आयोजन

harashtra through its agribusiness incubation centre. Incubation in-charge Ma-Instruct Presid Shorma said the institute had standardised processing techniques of uppheashased fixed prediccts and the Alli centre was montoring and incidenting agri-startups and PPCH.

इतेर, मुरुवार 20 मार्च 2022 8

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राम नवमी को बन रहे हैं कई शभ संयोग डसमें आराधना करने से होगी सभी की मनोकानाएं पूर्णःडॉ. अशोक शास्त्री

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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









M P Sharma, ICAR-IISR, Indore



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 rapeseedmustard 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 notificatio n	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 growi	ng 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 condition Haryana, Jammu & Kashmir, Rajasthan)	is of Zone II (Delhi, , Punjab and Parts Of
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	RADHIKA gener 211-10 TRET
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%
Special Attributes, if any	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



For further information visit us at www.drmr.res.in





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Variety : Groundnut Co 7

Name of the Variety	Groundnut Co 7		Station .
Background	TNAU, Coimbate	ore (2015)	
Salient Features (in	Spanish Bunch	ı	
Bullets)	• Resistant to ru	st	
Benefits/Utility	Pod yield (Kg/ha)	:	
	2300 (kharif);		
	2806 (rabi-summe	er)	1000
Scalability/ Target	Tamil Nadu		
market / Market			-1-0
intelligence			1000
Business and	Oil content (%)	50.5-51	
commercial potential	Shelling (%)	71	

Variety: Phule Bharti (JL 776)

Name of the Variety	Phule Bharti (JL 776)	
Background	MPKV, Jalgaon (2015)	
Salient Features (in Bullets)	Spanish Bunch	
	• Resistant to <i>S. litura</i> a	nd rust in field
	condition	
Benefits/Utility	Pod yield (Kg/ha): 2110	(kharif)
Scalability/ Target market /	Maharashtra and Madhy	a Pradesh
Market intelligence		
Business and commercial	Oil content (%)	50
potential	Shelling (%)	69

Variety : G 2-52

Name of the Variety	G 2-52		alle Antonio
Background	UAS, Dharwad (2	015)	the second has a l
Salient Features (in	Spanish Bunch	1	Con Salas (D)
Bullets)	• Foliar disease	resistant	
Benefits/Utility	Pod yield (Kg/ha)	: 2000-2500	NA SECON
	(kharif)		G2-52
Scalability/ Target	Karnataka		
market / Market			
intelligence			
Business and	Oil content (%)	48	
commercial potential	Shelling (%)	71	

Variety : GKVK 5

Name of the Variety	GKVK 5	
Background	UAS, GKVK, Bangaluru (2016)	
Salient Features (in Bullets)	Spanish Bunch	
	• Drought tolerant; moderately re	sistance to rust and
	LLS	
Benefits/Utility	Pod yield (Kg/ha): 2500-2800 (Kha	rif and Summer)
Scalability/ Target market /	Southern Karnataka	
Market intelligence		
Business and commercial	Oil content (%)	50
potential	Shelling (%)	74
	GKVK-5	
	X Marthand Parts	5
	Carl Contract Contract Contract Contract	
		y

Variety: ALG -06-320

Name of the Variety	ALG -06-320	
Background	TNAU, Tindivana	um (2017)
Salient Features (in	• Spanish Bunch	l
Bullets)	• Tolerant to rus	t, LLS and
	Peanut Bud No	ecrosis
	disease (PBNI)), <i>S. litura</i> ,
	leaf miner and	thrips
Benefits/Utility	Pod yield (Kg/ha)	: 2741 (Rabi-
	summer)	
Scalability/ Target	Tamil Nadu and A	Indhra
market / Market	Pradesh	
intelligence		
Business and	Oil content (%)	50.3
commercial potential	Shelling (%)	70.7



Variety : Kadiri Amaravathi (K 1535)

Name of the Variety	Kadiri Amaravathi (K 1535)
Background	ANGRAU, Kadiri (2017)
Salient Features (in	Spanish Bunch
Bullets)	• Tolerant to early and late
	season drought; tolerant to
	leaf spot, sucking pests
	(thrips and jassids)
Benefits/Utility	Pod yield (Kg/ha): 1600-1800
	(Kharif)
Scalability/ Target	Andhra Pradesh
market / Market	
intelligence	
Business and	Oil content (%) 50
commercial potential	Shelling (%)65



Variety : VRI 8 (VG 09220)

Name of the Variety	VRI 8 (VG 09220)		2 TANKA
Background	TNAU, Vridhachalan	n (2017)	
Salient Features (in	Spanish Bunch		00000
Bullets)	Moderately resista	nt to sucking	
	pest (jassids and th	rips),	
	moderately resista	nt to LLS and	
	rust		am
Benefits/Utility	Pod yield (Kg/ha): 2130 (Kharif);		1 mart
	2700 (Rabi-summer)		
Scalability/ Target market	Tamil Nadu		
/ Market intelligence			10 ALAR
			13588
Business and commercial	Oil content (%)	49-50	LOCAS .
potential	Shelling (%)	70	ACC A

Variety : GJG 32 (ICGV 03043)

Name of the Variety	GJG 32 (ICGV 030	43)	
Background	JAU, Junagadh (201	.8)	ALC BATTA
Salient Features (in	Spanish Bunch		AN AL
Bullets)	• Tolerant to stem	rot, color rot	
	and rust		* 学长家 新
			ICGV 03043
			202000000000000000000000000000000000000
Benefits/Utility	Pod yield (Kg/ha): 1947 (Kharif)		
Scalability/ Target	Tamil Nadu, Andhra Pradesh,		
market / Market	Karnataka, southern Maharashtra		44376434
intelligence	and Telangana, Gujarat (Area		PADRADO-CC
	extention)		
Business and	Oil content (%)	50	
commercial potential	Shelling (%)	66	

Variety : GJG 33 (ICGV 07222)

Name of the Variety	GJG 33 (ICGV 072	22)			(Same
Background	JAU, Junagadh (201	.8)	10	Contra	(Party
Salient Features (in	Spanish Bunch				
Bullets)	• Tolerant to colla	r rot and rust			念常
Benefits/Utility	Pod yield (Kg/ha): 3064 (Rabi- summer)		節發		
Scalability/ Target	Tamil Nadu, Andhra Pradesh		多加	認知	Life .
market / Market	and Telangana		4965	E HH	
intelligence			上的	四十六	1111
Business and	Oil content (%)	51	20284	BB 111	mitte
commercial potential	Shelling (%)	67			

Variety: DH-232

Name of the Variety	DH-232	
Background	UAS, Dharwad (20)	(8)
Salient Features (in	Spanish Bunch	
Bullets)	• Resistance to Fo	liar diseases
Benefits/Utility	Pod yield (Kg/ha): 2	2500-3000
	(Kharif)	
Scalability/ Target	Karnataka	
market / Market		
intelligence		
Business and	Oil content (%)	46.9
commercial potential	Shelling (%)	77.4



Variety: DH-245

Name of the Variety	DH-24 5		
Background	UAS, Dharwad (2018)		
Salient Features (in	Spanish Bunch		
Bullets)	• Resistance to Fo	liar diseases	
Benefits/Utility	Pod yield (Kg/ha): 2	2500-2900	
	(Kharif)		
Scalability/ Target	Karnataka		
market / Market			
intelligence			
Business and	Oil content (%)	45.9	
commercial potential	Shelling (%)	73	
Social impact of the	High oleic acid (>70)%)	
technology			



Variety : Nitya Haritha (TCGS 1157)

Name of the Variety	Nitya Haritha (TCGS 1157)
Background	ANGRAU, Tirupati (2018)
Salient Features (in Bullets)	 Spanish Bunch Tolerance against late leaf spot, rust and PSND
Benefits/Utility	Pod yield (Kg/ha): 2657 (Kharif)
Scalability/ Target	Maharashtra and Madhya
market / Market	Pradesh
intelligence	
Business and	Oil content (%) 49
commercial potential	Shelling (%) 69



Variety : Avtar (ICGV 93468)

Name of the Variety	Avtar (ICGV 93468)		
Background	CSAUA&T, Kanpu	ur (2018)	-
Salient Features (in	• Spanish Bunch		2
Bullets)	• Early maturity;	tolerant to	-5
	PBND, Fungal	diseases,	1
	Jassid and pod	borer	A
Benefits/Utility	Pod yield (Kg/ha): 2400 (Rabi-		
	summer)		-
Scalability/ Target	Uttar Pradesh		
market / Market			
intelligence			
Business and	Oil content (%)	51.1	10
commercial potential	Shelling (%)	70.6	



Variety: TMV 14

Name of the Variety	TMV 14			MAN 192
Background	TNAU, Tindivanar	m (2019)	M ST HE	10
Salient Features (in	• Spanish Bunch		22.00	
Bullets)	• Early maturity; t	colerent to S.		
	litura, thrips, lea	of minor;	TAK	100
	moderately resi	istance to LLS	A	2 M
	and rust	and rust		
Benefits/Utility	Pod yield (Kg/ha): 2124 (Kharif)		1000	222
			2028	258
Scalability/ Target	Tamil Nadu		14.040	
market / Market				
intelligence				
Business and	Oil content (%)	48		
commercial potential	Shelling (%)	70.6		

Variety : Phule Chaitanya (Central- KDG 160)

Name of the Variety	Phule Chaitanya (Central- KDG		
	160)		3
Background	MPKV, Digraj (2019))	
Salient Features (in	Spanish Bunch		5
Bullets)			
Benefits/Utility	Pod yield (Kg/ha): 2184 (Rabi-		32
	summer)		
Scalability/ Target	Tamil Nadu, Telangana and		
market / Market	Andhra Pradesh		
intelligence			
Business and	Oil content (%)	51.6	
commercial potential	Shelling (%)	66.6	39



Variety : AK 335 (PDKVG-335)

Name of the Variety	AK 335 (PDKVG-335)			
Background	PDKV, Akola (2019	PDKV, Akola (2019)		
Salient Features (in	Spanish Bunch		- J 22	
Bullets)	• Moderately resis	tance to tikka,	· 4	
	color rot, stem ro	ot, jassid, thrips	5	
	and aphids		风雨	
Benefits/Utility	Pod yield (Kg/ha): 2200-2400			
	(Kharif)			
Scalability/ Target	Maharashtra			
market / Market				
intelligence				
Business and	Oil content (%)	48-49	3.3	
commercial potential	Shelling (%)	68.7		



Variety: Phule Unnati (RHRG 6083)

Name of the Variety	Phule Unnati (RHRG 6083)		
Background	MPKV, Rahuri (201	.9)	4
Salient Features (in	• Spanish Bunch		3.0
Bullets)	• Resistance to LL	S, stem rot,	
	rust, <i>S. litura</i> , and	d thrips	1/6
			VA
Benefits/Utility	Pod yield (Kg/ha): 2854 (Kharif);		
	3990 (Rabi-Summer)		
Scalability/ Target	Maharashtra		
market / Market			
intelligence			900
Business and	Oil content (%)	52	24
commercial potential	Shelling (%)	68	A ROOM



Variety: Phule Dhani (JL 1085)

Name of the Variety	Phule Dhani (JL 1085)		A State Carter and
Background	MPKV, Rahuri (2019)		and the second second
Salient Features (in	Spanish Bunch		Contraction of the second
Bullets)	• Resistance to LL	S and rust	Praise Str. 9.
			ANT A STAN
			Field view of JL -1085
Benefits/Utility	Pod yield (Kg/ha): 3333 (Kharif)		
Scalability/ Target	Tamil Nadu, Andhra Pradesh		
market / Market	and Karnataka		
intelligence			
Business and	Oil content (%)	50	Pod
commercial potential	Shelling (%)	68	

Variety : Gujarat Groundnut-34 (GG 34)

Name of the Variety	Gujarat Groundnut-34 (GG 34)	
	(AG-2012-06)	
Background	AAU, Anand (2019)	
Salient Features (in	Spanish Bunch	
Bullets)		
Benefits/Utility	Pod yield (Kg/ha): 3715	
	(Summer)	
Scalability/ Target	Gujarat	
market / Market		
intelligence		
Business and	Oil content (%)	52.8
commercial potential	Shelling (%)	67.9



Variety : Dheeraj (TCGS 1073)

Name of the Variety	Dheeraj (TCGS 1073)		
Background	ANGRAU, Tirupati (2019)		
Salient Features (in	Spanish Bunch		
Bullets)	Possesses heat tolerance and		
	high water use efficiency		
Benefits/Utility	Pod yield (Kg/ha): 2547 (Kharif);		
	3690 (Rabi)		
Scalability/ Target	Andhra Pradesh		
market / Market	PSP		
intelligence	a contraction of the second se		
Business and	Oil content (%) 48-49		
commercial potential	Shelling (%) 77		



Variety : BSR 2 (BSG 0912)

Name of the Variety	BSR 2 (BSG 0912)	
Background	TNAU, Bhavanisag	ar (2019)
Salient Features (in	Spanish Bunch	
Bullets)	• Moderately resistance to rust,	
	LLS, jassid, thrips and aphids	
Benefits/Utility	Pod yield (Kg/ha): 2222 (Kharif);	
	2360 (Rabi-summer	r)
Scalability/ Target	Tamil Nadu	
market / Market		
intelligence		
Business and	Oil content (%)	45
commercial potential	Shelling (%)	70.2

Variety : Central-Pragati (TCGS 894)

Name of the Variety	Central-Pragati (TC)	GS 894)
Background	ANGRAU, Tirupati	(2019)
Salient Features (in	Spanish Bunch	
Bullets)		
Benefits/Utility	Pod yield (Kg/ha): 2816 (Rabi-	
	summer)	
Scalability/ Target	Tamil Nadu, Telang	gana and
market / Market	Andhra Pradesh	
intelligence		
Business and	Oil content (%)	48
commercial potential	Shelling (%)	70



Variety: Dh 256

Name of the Variety	Dh 256	
Background	UAS, Dharwad (2019)	
Salient Features (in	Spanish Bunch	
Bullets)	• Tolerant to mid season	
	drought, <i>S. litura</i> , thrips and	
	leaf miner and leaf hopper	
Benefits/Utility	Pod yield (Kg/ha): 3258 (Kharif)	
Scalability/ Target	Tamil Nadu, Andhra Pradesh,	
market / Market	Karnataka and Telangana	
intelligence		
Business and	Oil content (%) 50	
commercial potential	Shelling (%)68	





Variety: Pratap Mungphli 3 (UG 116)

Name of the Variety	Pratap Mungphli 3 (UG 116)		SED DOLLE
Background	MPAUT, Udaipur	(2020)	TANK TA
Salient Features (in	Spanish Bunch		NONECH JER
Bullets)	Moderately tole	erant to Early	
	Leaf Spot (ELS), Late Leaf	INS. NO.
	Spot (LLS), rus	t, collar rot	A .
	and dry root ro	t; moderately	No. And No.
	resistant to Spo	resistant to <i>Spodoptera litura</i> ,	
	leaf miner, defo	oliators, jassids,	AAAA
	thrips and leafh	opper	The second second
Benefits/Utility	Pod yield (Kg/ha):	3388 (Kharif	
	and Summer)		Red Control
Scalability/ Target	Rajasthan		100 C 200
market / Market			Barris and the
intelligence			· UG-116
Business and	Oil content (%)	47	
commercial potential	Shelling (%)	70	

Variety : Jagtial Palli 1 (JGC 2141)

Name of the Variety	Jagtial Palli 1 (JGC 2		
Background	PJTSAT, Jagtial (20	20)	
Salient Features (in	Spanish Bunch		
Bullets)	• Tolerant to early	v season	
	drought; resistan	t to Leaf	
	spots and rust di	seases;	
	tolerant to Sucking pests such		
	as Thrips and Jassids		
Benefits/Utility	Pod yield (Kg/ha): 3330-3500		
	(Kharif and Summer)		
Scalability/ Target	Telangana		
market / Market			194114
intelligence			SAR V
Business and	Oil content (%)	51.5	Carles .
commercial potential	Shelling (%)	64	T. Martin F.

Variety: K 1719 (Kadiri Chithravathi)

Name of the Variety	K 1719 (Kadiri Chit	hravathi)
Background	ANGRAU, Kadiri (2	2021)
Salient Features (in	Spanish Bunch	
Bullets)	• Tolerant to collar rot, PBND	
	and thrips	
Benefits/Utility	Pod yield (Kg/ha): 8	8092 (Rabi-
	Summer)	
Scalability/ Target	Andhra Pradesh, Te	langana, and
market / Market	Tamil Nadu	
intelligence		
Business and	Oil content (%)	4 9
commercial potential	Shelling (%)	70



Variety: DH 257

Name of the Variety	DH 257	
Background	UAS, Dharwad (202	21)
Salient Features (in	Spanish Bunch	
Bullets)	Drought tolerant	
Benefits/Utility	Pod yield (Kg/ha): 3397 (Rabi-	
	Summer)	
Scalability/ Target	Karnataka and Maha	arashtra
market / Market		
intelligence		
Business and	Oil content (%)	48
commercial potential	Shelling (%)	72





Variety: K 1812 (Kadiri Lepakshi)

Name of the Variety	K 1812 (Kadiri Lepakshi)	
Background	ANGRAU, Kadiri (2021)	
Salient Features (in	Spanish Bunch	
Bullets)	• Drought tolerant; multiple	
	Disease & Pests Resistant	
Benefits/Utility	Pod yield (Kg/ha): 3514 (Kharif)	
Scalability/ Target	AP, Telangana, Karnataka and	
market / Market	Tamilnadu	
intelligence		
Business and	Oil content (%) 51	
commercial potential	Shelling (%) 70	



Variety : J 87 (Gujarat Groundnut 36)

Name of the Variety	J 87 (Gujarat Groundnut 36)	
Background	JAU, Junagadh (202	1)
Salient Features (in	Spanish Bunch	
Bullets)	• Bold kernel (HKW 63g)	
Benefits/Utility	Pod yield (Kg/ha): 4165 (Rabi-	
	summer)	
Scalability/ Target	Punjab and Uttar Pra	adesh
market / Market		
intelligence		
Business and	Oil content (%)	50
commercial potential	Shelling (%)	70


Variety : Gujarat Groundnut 35 (Sorath Gold)

Name of the Variety	Gujarat Groundnut 35 (Sorath Gold)		
Background	JAU, Junagadh (2021)		
Salient Features (in	Spanish Bunch		
Bullets)			
Benefits/Utility	Pod yield (Kg/ha): 3177 (Kharif)		
Scalability/ Target	Gujarat		
market / Market			
intelligence			
Business and	Oil content (%)	49.8	
commercial potential	Shelling (%) 71.4		





Variety: Kalinga Groundnut 101

Name of the Varietyc	Kalinga Groundnut 101		
Background	OUAT, Bhubaneshwar	(2021)	
Salient Features (in	Spanish Bunch		
Bullets)	• Tolerant to late leaf	spot and rust	
Benefits/Utility	Pod yield (Kg/ha): 3179 (Rabi-		
	Summer)		
Scalability/ Target	Odisha		
market / Market			
intelligence			
Business and	Oil content (%)	50	
commercial potential	Shelling (%)	72	





KALINGA GROUNDNUT-101

Variety : TAG-73 (TAG 14-73)

Name of the Variety	TAG-73 (TAG 14-73)			
Background	PDKV, Akola & BARC, Mumbai			
	(2021)			
Salient Features (in	Spanish Bunch			
Bullets)	• Moderate resistance	to major		
	diseases (Tikka, Col	lar rot and		
	Stem rot) and pests (Jassid, Thrips			
	& Aphids).			
Benefits/Utility	Pod yield (Kg/ha): 2500-2800			
	(Summer)			
Scalability/ Target	Vidarbha region of Mah	arashtra		
market / Market				
intelligence				
Business and	Oil content (%)	49		
commercial potential	Shelling (%)	72.6		





Variety : VRI 9 (VG 13163)

Name of the Variety	VRI 9 (VG 13163)		
Background	TNAU, Vridhhachalam (2022)		
Salient Features (in	Spanish Bunch		
Bullets)	Exhibited moderate resistance		
	reaction to LLS and Rust		
Benefits/Utility	Pod yield (Kg/ha): 2526 (Kharif);		
	2921 (Rabi-summer)		
Scalability/ Target	Tamil Nadu		
market / Market			
intelligence			
Business and	Oil content (%)	47-49	
commercial potential	Shelling (%)	70-72	



Variety : GG 40 (ICGV 16668)

Name of the Variety	GG 40 (ICGV 16668)		
Background	JAU, Junagadh (2022)		
Salient Features (in	Spanish Bunch		
Bullets)			
Benefits/Utility	Pod yield (Kg/ha): 3321 (Kharif)		
Scalability/ Target	Rajasthan, Gujarat, Karnataka, Tami		
market / Market	Nadu, Andhra Pradesh and Telagana		
intelligence			
Business and	Oil content (%)	51	
commercial potential	Shelling (%)	63	
Social impact of the	Recorded 78.4% oleic acid and 3.56%		
technology	linoleic acid		



Variety : Visishta (TCGS 1694)

Name of the Variety	Visishta (TCGS 1694)		
Background	ANGRAU, Tirupati (20)22)	
Salient Features (in	Spanish Bunch		
Bullets)	• Tolerant to foliar dis	seases viz.,	
	early leaf spot, late l	eaf spot and	
	rust diseases;		
Benefits/Utility	Pod yield (Kg/ha): 248	9 (kharif);	
	2495 (rabi)		
Scalability/ Target	Andhra Pradesh		at Mr.
market / Market		50	
intelligence		1.3	SAME LO
Business and	Oil content (%)	50	
commercial potential	Shelling (%)	72-75	



Variety : Improved JL 24 (DBG 3)

Name of the Variety	Improved JL 24 (DBG 3)		
Background	UAS, Dharwad (2022)		
Salient Features (in	Spanish Bunch		
Bullets)	• Resistant to late leaf spot;		
	Susceptible to late leaf spot		
Benefits/Utility	Pod yield (Kg/ha): 2736 (Kharif)		
Scalability/ Target	Karnataka		
market / Market			
intelligence			
Business and	Oil content (%)	53.8	
commercial potential	Shelling (%)	75-76	



Variety : GG 37 (Sorath Gaurav)

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



Variety: GG 38 (Sorath Navin)

Name of the Variety	GG 38 (Sorath Navin)		A
Background	JAU, Junagadh (2022)		A DE TON
Salient Features (in	Spanish Bunch		
Bullets)			
Benefits/Utility	Pod yield (Kg/ha): 2966	6 (Kharif)	ARE
Scalability/ Target	Gujarat		A A A
market / Market			1771
intelligence			11.4
Business and	Oil content (%)	48.9	
commercial potential	Shelling (%)	72.4	

Variety : Super TMV 2 (DBG 4)

Name of the Variety	Super TMV 2 (DBG 4)		194	San Still
Background	UAS, Dharwad (2022)		alt.	RANK.
Salient Features (in	Spanish Bunch			THAT
Bullets)	• Resistant to late leaf s	pot		
Benefits/Utility	Pod yield (Kg/ha): 2440	(Summer)	TMV 2	DBG 4
Scalability/ Target	Karnataka		Ann	MAG
market / Market				B B B B B
intelligence				
Business and	Oil content (%)		RXC .	
commercial potential	Shelling (%)	78	w la	- V

Variety : VRI 10 (VG 17008)

Name of the Variety	VRI 10 (VG 17008)			
Background	TNAU, Vridhhachalam	(2023)		
Salient Features (in	Spanish Bunch	Spanish Bunch		
Bullets)	• Moderate resistance	to late leaf		
	spot, rust diseases ar	spot, rust diseases and moderately		
	resistant to sucking p	ests and		
	defoliators			
	• Early maturity			
Benefits/Utility	Pod yield (Kg/ha): 2535	5 (kharif);		
	2448 (rabi)			
Scalability/ Target	Tamil nadu			
market / Market				
intelligence		1	GROUNDNUT VRI 1	
Business and	Oil content (%)	46-48	Providencial	
commercial potential	Shelling (%)	70-72	Alter Star	
			at a second	

Variety : Raj Mungfali-2 (RG 578)

Name of the Variety	Raj Mungfali-2 (RG 578	3)		
Background	SKRAU, Durgapura (20	SKRAU, Durgapura (2015)		
Salient Features (in	Virginia Bunch			
Bullets)	• Resistant to LLS, dr	• Resistant to LLS, dry root rot, ELS		
	and rust ; tolerant to	and rust ; tolerant to S. litura,		
	thrips, jassids and lea	af min	er	
Benefits/Utility	Pod yield (Kg/ha): 1480 (Kharif)			
Scalability/ Target	Odisha, WB and Manij	pur		
market / Market				
intelligence				
Business and	Oil content (%)	4 6		FACE
commercial potential	Shelling (%)	72		MAN



Variety : Birsa Groundnut 4 (BAU 25)

Name of the Variety	Birsa Groundnut 4 (BA	U 25)	
Background	BAU, Kanke (2015)		
Salient Features (in	Virginia Bunch		
Bullets)	• Large seeded; resistant to LLS		
Benefits/Utility	Pod yield (Kg/ha): 2000-2200		
	(Kharif)		
Scalability/ Target	Jharkhand		
market / Market			
intelligence			
Business and	Oil content (%)	50.8	
commercial potential	Shelling (%)	72	



Variety : Raj Mungfali 3 (RG 559-3)

Name of the Variety	Raj Mungfali 3 (RG 559-3)		
Background	SKNAU, Durgapura (20)16)	
Salient Features (in	Virginia Bunch		
Bullets)	• Large seeded; tolerar	nt to <i>S.litura</i> ,	
	leafminer and thrips		
Benefits/Utility	Pod yield (Kg/ha): 3173 (Kharif)		
Scalability/ Target	Rajasthan, UP and Punjab		
market / Market			
intelligence			
Business and	Oil content (%)	49	
commercial potential	Shelling (%)	69	





Variety : Phule Warna (KDG 128)

Name of the Variety	Phule Warna (KDG 128)		
Background	MPKV, Digraj (2016)		
Salient Features (in	Virginia Bunch		
Bullets)	Moderately resistance	e to rust and	
	leaf spot		
Benefits/Utility	Pod yield (Kg/ha): 2425 (Kharif)		
Scalability/ Target	Tamil Nadu, Andhra Pradesh,		
market / Market	Karnataka, southern Maharashtra		
intelligence	Gujarat and Rajasthan		
Business and	Oil content (%)	50.9	
commercial potential	Shelling (%)	65	





Variety: Phule Morna (KDG 123)

Name of the Variety	Phule Morna (KDG 12	3)	-Konsellin Reday
Background	MPKV, Digraj (2016)		
Salient Features (in	Virginia Bunch		
Bullets)	Moderately resistance	e to rust and	MORE SAL
	leaf spot		
Benefits/Utility	Pod yield (Kg/ha): 2212	2 (Kharif)	
			A
Scalability/ Target	Gujarat, Rajasthan Odis	ha, WB,	
market / Market	Jharkhand, Manipur, Ta	amil Nadu,	2 B
intelligence	AP,Karnataka and Sout	hern	2723
	Maharashtra		
Business and	Oil content (%)	44	
commercial potential	Shelling (%)	70	15200



Variety: Konkan Bhuratna (RTNG-29)

Name of the Variety	Konkan Bhuratna (RTNG-29)		
Background	DBSKKV, Dapoli (2019)		
Salient Features (in	Virginia Bunch		
Bullets)	• Resistance toELS, L	LS, rust,	
	PBND, thrips, jassid	ls and leaf	
	miner		
Benefits/Utility	Pod yield (Kg/ha): 2500-3000		
	(Kharif)		
Scalability/ Target	Maharashtra		
market / Market			
intelligence			
Business and	Oil content (%)	50	
commercial potential	Shelling (%)	74	X



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	Virginia Bunch	
Bullets)	• Large seeded	
Benefits/Utility	Pod yield (Kg/ha): 288	35 (Kharif)
Scalability/ Target	Gujarat	
market / Market		
intelligence		3.0
Business and	Oil content (%)	48.8
commercial potential	Shelling (%)	68.6



Variety : Girnar 4 (ICGV 15083)

Name of the Variety	Girnar 4 (ICGV 15088	3)		
Background	ICAR-DGR, Junagadh	ICAR-DGR, Junagadh (2020)		
Salient Features (in	Virginia Bunch			
Bullets)	• Tolerant to Late Le	eaf spot, Rust,		
	Stem rot and Pean	ut Bud		
	Necrosis Disease, I	Leaf hopper,		
	Leaf miner, thrips a	and		
	Spodoptera litura			
Benefits/Utility	Pod yield (Kg/ha): 3218 (Kharif)			
Scalability/ Target	Rajasthan, Gujarat, Karnataka,			
market / Market	Tamil Nadu and Andh	Tamil Nadu and Andhra Pradesh		
intelligence		(
Business and	Oil content (%)	53	and the second second	
commercial potential	Shelling (%)	67		
Social impact of the	Recorded 78.5% oleic acid and			
technology	4.8% linoleic acid			



Variety : Girnar 5 (ICGV 15090)

Name of the Variety	Girnar 5 (ICGV 15090			
Background	ICAR-DGR, Junagadh	a (2020)		
Salient Features (in	Virginia Bunch			
Bullets)	• Tolerant to Late La	eaf spot, Rust,		
	Stem rot and Colla	r rot, Leaf		
	hopper, Leaf mine	r, thrips and		
	Spodoptera litura			
Benefits/Utility	Pod yield (Kg/ha): 312	Pod yield (Kg/ha): 3124 (Kharif)		
Scalability/ Target	Rajasthan, Gujarat, Ka			
market / Market	Tamil Nadu and Andr	nra Pradesh		
intelligence			Mar All	
Business and	Oil content (%)	53		
commercial potential	Shelling (%)	67		
Social impact of the	Recorded 78.4% oleic acid and		Gi	
technology	4.6% linoleic acid		WWW CERT	



Variety : Groundnut 23 (Sorath Kiran)

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





Variety : Raj Mungfali 4 (RG 638)

Name of the Variety	Raj Mungfali 4 (RG 63	8)	
Background	SKNAU, Durgapura (2022)		
Salient Features (in	Virginia Bunch		
Bullets)			
Benefits/Utility	Pod yield (Kg/ha): 369	98 (Kharif)	
Scalability/ Target	Rajasthan, UP and Punjab		
market / Market			
intelligence			
Business and	Oil content (%)	49	
commercial potential	Shelling (%)	74	



Variety : GJG 18 (JSP 49)

Name of the Variety	GJG 18 (JSP 49)		
Background	JAU, Junagadh (2015)	
Salient Features (in	Virginia Runner		State 1
Bullets)	Moderately resista	nt to PBND	- 5-1A
	and PSND		
Benefits/Utility	Pod yield (Kg/ha): 1450 (Kharif)		a contra
			0 m
Scalability/ Target	Odisha, WB, Jharkha	und and	
market / Market	Manipur		
intelligence			2 3
Business and	Oil content (%)	48	an
commercial potential	Shelling (%)	69	



Variety : GJG 19 (JSP 51)

Name of the Variety	GJG 19 (JSP 51)			
Background	JAU, Junagadh (2016)			
Salient Features (in	Virginia Runner			
Bullets)	• Tolerant to stem re	• Tolerant to stem rot, dry root		
	rot and rust as com	pared to		
	check (KDG 123)			
Benefits/Utility	Pod yield (Kg/ha): 1876 (Kharif)			
Scalability/ Target	Odisha, West Bengal,	Jharkhand	d	
market / Market	and Manipur			
intelligence				
Business and	Oil content (%)	47	Laise	
commercial potential	Shelling (%)	69		



Variety : Gujarat Groundnut 41 (Padma)

Name of the Variety	Gujarat Groundnut 41 (Padma)	
Background	JAU, Junagadh (2020)	
Salient Features (in	Virginia Runner	
Bullets)		
Benefits/Utility	Pod yield (Kg/ha): 2722 (Kharif)	
Scalability/ Target	Gujarat	
market / Market		
intelligence		
Business and	Oil content (%)	51.4
commercial potential	Shelling (%)	74



Linseed Value added products

BVDU, Pune, AICRP-Linseed

Roasted and Salted Flaxseed

Salient Features:

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

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: <u>anand.zanwar@bharatividyapeeth.edu</u>



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

Fibre and Lignan Rich Hull Powder

Salient Features:

- <u>Defatted (mechanically pressed) hull fraction of flaxseed mainly</u> containing <u>lignan and dietary fibre</u>
- Highly concentrated form of flaxseed to supplement lignan and dietary fibre

Nutritive value:

- Dietary fibre: 35-40%
- Lignan: upto 1%
- Protein: 15-20%

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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: <u>anand.zanwar@bharatividyapeeth.edu</u>



- 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 <u>virgin, cold press oil</u> extracted and sealed under nitrogen to ensure purity and avoid rancidity
- Oil can be used for <u>salad dressings</u>, chapattis, dal, rice, ghee, mayonnaise, sauce, curds, milkshakes, honey, curd and yoghurt etc.
- Nutritive values:
 - <u>Omega-3 FA: 50-55 %</u>
 - Vitamin E: 1%

FSSAI Lic. No. 1151603500506

Contact details:

 AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: <u>anand.zanwar@bharatividyapeeth.edu</u>



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

VELMEGA-1000 Flax Seed Oil Capsules 1000 mp Cite Capality In Bhore below 25" C, et a to Keep out of reach of childs Filte tened is the rightent of anne Cheapa 3 Feith Anne -ALA Alberta Umaleriz Anne of Chinega-3 Fatty Acid ential as not experiment in home large **Omega-3 Fatty Acids are crucial** lat, vital nutrients for disease free good health. Manufactured in India by SOFT CAPS PVT. LTD. aroda-Halof Highwin oda - 391 510 provinced from a reacter An Anarvedic Medici

Ayurvedic Lic. No. GA/505

Product cost:

- Rs. 600.00/90 capsule bottle
- Rs. 235.00/30 blister capsule pack
- Minimum order quantity: 25 packs
- Packing, forwarding and taxes at actual

Contact details:

 AICRP-Linseed Value Addition Centre, Interactive Research School for Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune-411043. E-mail: <u>anand.zanwar@bharatividyapeeth.edu</u>

Flaxseed Oil Emulsion

Salient Features:

- <u>Water soluble form of omega-3 fatty acid enriched</u> with multivitamins to fulfill the needs of growing children
- Can be used in <u>fortification of other food products</u> 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: <u>anand.zanwar@bharatividyapeeth.edu</u>



FSSAI Lic. No. 1151603500506

- 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 <u>enriched with omega-3 fatty acid</u>, tasty and delicious
- 5-10 Chocolates/pack and customized pack sizes

Nutritive value:

- Fat: 20%
- <u>Protein: 40%</u>
- Omega-3 FA: 1-2%

FSSAI loan Lic. No. 21521181000736

Contact details:

 AICRP-Linseed Value Addition Centre, Interactive Research School for P Health Affairs, Bharati Vidyapeeth (Deemed to be University), Pune 411043. E-mail: <u>anand.zanwar@bharatividyapeeth.edu</u>



- 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 <u>200±20% mg of omega-3</u> (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:

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









Thank you









