



Indian Society of Agricultural Engineers

...Connecting Engineers in Agriculture

G-4, A- Block (GF), National Societies Block, National Agricultural Science Centre (NASCI) Complex
Dev Prakash Shastri Marg, Pusa Campus, New Delhi – 110012, India

ISAE HQ: 011-21520143; Email: isae1960@gmail.com, info@isae.in; Website: www.isae.in



Popped makhana

Makhana is popped kernel of gorgon nut grown in stagnant water bodies

Popped makhana contains about 12% moisture, 84.9% carbohydrates, 11% protein, 0.33% fat, 0.38% total minerals, 0.02% calcium, 0.12% phosphorus and 0.002% iron

Minerals (mg/100 g dry matter)	Raw kernel	Popped makhana	Bran	Amino acid mg/g protein	Raw makhana kernel	Popped makhana
Calcium	14.50	20.94	133.00	Lysine ^a	2.46	6.77
Sodium	2.92	4.06	10.74	Histidine ^a	300.99	204.14
Potassium	50.25	48.39	85.60	Arginine	17.2	1.93
Magnesium	13.83	12.71	79.96	Isoleucine ^a	14.74	2.91
Phosphorus	132.53	124.01	213.84	Leucine ^a	49.15	8.71
Iron	5.73	2.67	114.06	Methionine ^a	15.97	3.87
Manganese	1.30	1.24	4.76	Phenylalanine ^a	31.95	4.84
Molybdenum	0.03	0.04	0.08	Threonine ^a	121.63	29.02
Zinc	1.50	1.04	8.42	Aspartic acid	57.75	11.61
Copper	0.71	0.76	6.42	Serine	93.37	24.18
Cobalt	*ND	*ND	0.07	Glutamic acid	82.31	17.41
				Proline	70.03	15.48
				Glycine	58.97	51.28
				Alanine	17.2	3.87
				Valine ^a	17.2	3.87
				Cysteine	11.06	1.93
				Tyrosine	22.11	2.91
				Total essential amino acid ^a	451	273



SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	26 th Republic Day		

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December 2023						
S	M	T	W	T	F	S
31					1	2
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Notes

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25	26	27	28	29		

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Popped makhana



Cleaning of pond and transplantation of seedlings in the field

FEBRUARY
2024

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
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January 2024						
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March 2024						
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Popped makhana



Weeding and gap filling

MARCH

2024

SUN	MON	TUE	WED	THU	FRI	SAT
31	6 th Birthday of Swami Dayananda Saraswati	24 th Holika Dahan	25 th Holi/Dolyatra	29 th Good Friday	1	2
3	4	5	6	7	8	9
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Popped makhana



Growth stage of crop and leaf structure

A
P
R
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L
2024

SUN	MON	TUE	WED	THU	FRI	SAT
9 th Chaitra Sukladi	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	11 th Ed-ul-Fitr	13 th Vaisakhi	17 th Ram Navami	21 st Mahavir Jayanti

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31					1	2
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24	25	26	27	28	29	30

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Popped makhana



Fully covered pond/field with makhana crop leaves



SUN	MON	TUE	WED	THU	FRI	SAT
	8 th Birthday of Guru Rabindra Nath Tagore	23 rd Budha Purnima	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

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April 2024						
S	M	T	W	T	F	S
	1	2	3	4	5	6
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28	29	30				

Notes

June 2024						
S	M	T	W	T	F	S
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

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Popped makhana



Makhana flower



Makhana fruit

JUNE
2024

SUN	MON	TUE	WED	THU	FRI	SAT
30	17 th Id-Ul- Zuha (Bakrid)					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

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May 2024						
S	M	T	W	T	F	S
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Notes

July 2024						
S	M	T	W	T	F	S
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14	15	16	17	18	19	20
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Popped makhana



Harvesty stage of makhana plant and maturity stage of seeds

JULY
2024

SUN	MON	TUE	WED	THU	FRI	SAT
7 th Rath Yatra	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	17 th Muharram		

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June 2024						
S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
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Notes

August 2024						
S	M	T	W	T	F	S
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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Popped makhana



Traditional harvesting



Manual threshing of makhana seeds



Clean makhana seeds

AUGUST
2024

SUN	MON	TUE	WED	THU	FRI	SAT
15 th Independence Day / Farsi New Year's Day	19 th Raksha Bandhan	26 th Janmashtami (Smarta)	26 th Janmashtami	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
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Notes

September 2024						
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29	30					

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SEPTEMBER
2024

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	7 th Ganesh Chaturthi	15 th Thiru Onam	16 th Id-e-Milad		

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Notes

October 2024						
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Popped makhana

Primary roasting

Makhana roasting and popping

Makhana and seed grader

SUN	MON	TUE	WED	THU	FRI	SAT
2 nd Mahatma Gandhi's Birthday	11 th Dussehra (Mahanavmi)	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	12 th Dussehra 20 th Karwa Chouth	31 st Diwali

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September 2024						
S	M	T	W	T	F	S
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Notes

November 2024						
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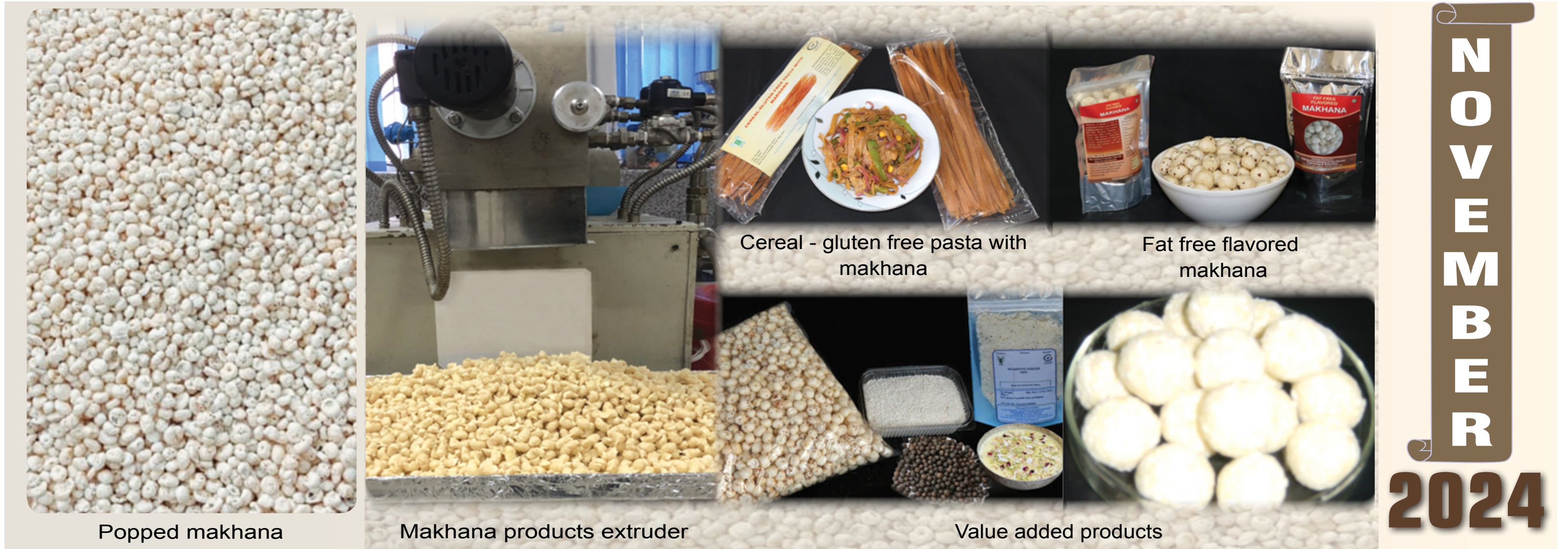
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NOVEMBER 2024

SUN	MON	TUE	WED	THU	FRI	SAT
2 nd Govardhan Puja	3 rd Bhai Duj	15 th Guru Nanak's Birthday	24 th Guru Teg Bahadur's Martyrdom Day		1	2
3	4	5	6	7	8	9
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Notes

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Popped makhana



DECEMBER
2024

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	25 th Christmas			

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S	M	T	W	T	F	S
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Notes

January 2025						
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