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Cotton Seed Milk and Its Products

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She has attended numerous National seminars, symposiums and International conferences and has 20 research articles, book chapters in international and national journals and 22 NCBI Gene bank accession numbers to her credit.

Introduction

Cotton is primarily cultivated for its lint. Cotton seeds, linters, hull, seed oil, seed cake are the by-products that have industrial uses. As we all know, cotton seed oil is traditionally used worldwide for salad dressing, frying vegetables, meat, mayonnaise, salad dressing and similar products because of its flavour stability and also for medicinal purpose. This article provides an

overview about a lesser known edible product - cotton seed milk - and the value-added products derived from it. Cotton milk is a unique product

that has not been exploited widely as a food product. Cotton milk is an extract of seeds, which contains lipids, proteins and sugars as an emulsion. The gossypol atoxic terpenoid compound having anti-nutritive value, present in the cotton seeds, must be removed to make cotton seed milk fit for human consumption. This can be done by chemical treatment, liquid or air separation. The de-gossypolised seeds can then be used to prepare cotton seed milk.



GUEST COLUMN

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To extract milk, cotton seeds are soaked in water for 12 hours and then ground. On an average 100 gm of cotton seed contains 23.1 g protein, 22.9 g fat, 43.2 total carbohydrates, 7.3g water, 3.5g ash (minerals). Several edible products include tamucurd, cheese, curd, yogurt, ice-creams, sausage type meet, cotton seed soup, chocolates, biryani and halwa.

In South India, Tamil Nadu, some households served cotton seed milk as a welcome drink. It is believed to flush out bad cholesterol, reduces body heat, and ensures good functioning of pancreas, bone marrow, nervous system and improves blood circulation and digestion. Palm

jaggery is usually added for sweetness. Cotton seed milk becomes an innovative health drink if added with palm jaggery/sucrose (2%) and sodium chloride (0.2%) which help in improving the taste. The milk from the cotton seed can be pasteurised by heating at 70° C for 10 minutes with continuous stirring, and then cooled rapidly in an ice bath. Butter or strawberry essence (0.05% each) can also be added to the pasteurised milk to increase the flavour. Compared to dairy milk the total solid content, acidity and viscosity is higher and pH is lower in the cotton seed milk. The cotton seed milk can be consumed as such or can be mixed with powdered full cream cow's milk in a proportion of 1:3 to 1:1 and preserved for consumption later. The mixed milks can be consumed as such. The physicochemical property and sensory characteristics are acceptable and comparable with the commercial powdered cow's milk. The total solid content in cotton seed milk ranges from 11.8% to 13%, acidity varies from 0.17% to 0.19% (lactic acid g/100ml), pH ranges from 6.5 to 7.1, and viscosity from 2.8 to 3.4 cP.

Recently, cotton seed milk has also been used in the cosmetic industry for making moisturising lotions, shampoos, conditioners; skin creams, herbal medicine, etc. and these products are available commercially in the market.



Cotton seed milk is an innovative health drink served in households of Tamil Nadu

Cotton milk products: As mentioned earlier several value-added products can be prepared using cotton seed milk. A brief description of these products is given below.

- (1) **Tamucurd:** It is a tofu-like product, prepared from glandless cotton seed milk and has a bland flavour.
- (2) **Cheese:** It is a by-product with glandless cottonseed milk. It can be used as a substitute for cream cheese in cooking. Glandless cotton seed flour is used to prepare processed cheese.
- (3) **Curd:** It can be prepared by adding lactic acid (10%) to cotton seed milk and at pH 4.5 it

precipitates the constituents in milk into curd.

- (4) **Yoghurt:** It can be prepared from cotton seed milk by heating at 85° C for 30 minutes and then cooling to 43° C. The product is then mixed with a 2% yoghurt starter and incubated for three to four hours at 40° C. After coagulating, the yoghurt refrigerated at 4° C overnight.
- (5) **Ice-cream:** In vanilla-flavoured ice cream, 10% of defatted glandless cotton seed milk can be added to replace non-fat milk solids and also 15% of defatted glandless cottonseed milk can be added in chocolate ice creams.
- (6) **Sausage-type meat:** Cotton seed flour milk can be used in the preparation of a links sausage-type meat-substitute product and as a substitute for cream cheese.
- (7) **Cotton seed milk soup:** Cotton seed milk soup is a famous dish in Nigeria. This milk is prepared by soaking the cotton seeds overnight. The seeds are then mixed with ginger and Nigerian walnut (*Plukenetia conophora*) seeds in warm water. The cotton seed milk is then squeezed and seasoned with vegetables and cooked meat to make a soup.



Cotton seed soup

- (8) **Biryani :** Cotton seed milk is an ingredient in a biryani recipe in Tamil Nadu and regularly used in other food preparation by farmers of this region.
- (9) **Cosmetic industry:** Cotton seed milk is used in the cosmetic industry for making moisturising lotions, shampoos, conditioners, skin creams. These are available in the market.



Moisturising Handwash

Other lesser known cotton food products:

Although not a milk product, cotton buds or squares (of pin head, match head and candle stage) can be used as a vegetable in making the Chinese dish Manchurian vegetables.

Indian roti: The defatted glandless cotton (that contains less than 0.03% free gossypol) seed flour can be used in preparing rotis. The glandless cotton seed flour protein has a lighter colour and blander taste and can be used for making rotis and the digestibility is 91%.

Conclusion

Cotton seed milk is indeed a novel product that can be commercialised in India. This versatile product has immense potential in the prevention of malnutrition in children and adults. It can also help to lower the cost of animal milk in countries like India where there is immense shortage of animal protein sources. Cotton seed flour can be used to supplement wheat flour and other minor millet flours in preparing food, thereby improving the vegetable protein intake.

(The views expressed in this column are of the authors and not that of Cotton Association of India)

COTTON ASSOCIATION OF INDIA
Established 1921

Cotton India 2018

Register Now
<http://www.caionline.in/conference>

05th & 06th October, 2018

Cotton Association of India's
2nd Domestic Conference for
the Season 2017 - 2018

Co-hosted by
"The Maharashtra Cotton Ginners Association"

Enhancing The Brand Value of Indian Cotton

Venue: Hotel Rama International, Aurangabad, Maharashtra

Indoor Games Tournament 2017-18

The CAI organised its annual Indoor Games Tournament on the Association's premises starting from July 30, 2018. The event witnessed a large number of enthusiastic participants for events like carrom, table tennis and chess.



Chess

Winner: Shri. Kamlesh D. Raigagla

Ist Runner-up: Shri. Sunil Suware

2nd Runner-up: Shri. Mukesh Siyal

Table Tennis Single

Winner: Shri. Amit Thakkar

1st Runner-up: Shri. Manish Daga

2nd Runner-up: Shri. Vishal Karalkar

Table Tennis Double

Winner: Shri. Manish Daga and Shri. Dipen G. Shah

1st Runner-up: Shri. Amit Thakkar and Shri. Kartik Khatau

2nd Runner-up: Shri. Raja Gokulgandhi and Shri Krishna Gopal Sain

Carrom Single

Winner: Shri. Satish Shirke

Runner-up: Shri. Sunil Sonawane

2nd Runner-up: Shri. Dilip Ghadigaonkar

Carrom Double

Winner: Shri. Satish Shirke and Shri. Sudesh Kochare

1st Runner-up: Pankaj Narsey and Shri. Nilesh Kadlak

2nd Runner-up: Shri. Dilip Ghadigaonkar and Shri Kasturchand D. Shah

Glimpses of Independence Day Celebrations

The 72nd Independence Day of our country was celebrated on Wednesday August 15, on the premises of the Cotton Association of India. The flag hoisting ceremony was performed by senior member Shri. Shirish R. Shah, who also distributed the prizes to the winners and runners-up of the CAI Indoor Games Tournament 2017-2018 for carrom, chess and table tennis. This was followed by the screening of a short documentary patriotic film on Dr A.P.J. Abdul Kalam



Flag hoisting by Shri. Shirish R. Shah.



Chief Guest Shri. Shirish R. Shah with CAI President Shri. Atul Ganatra and Additional Vice President Shri. Vinay Kotak.



Shri. Shirish R. Shah distributes prizes to the winners and runners-up of the Indoor Games Tournament.



Excerpts from India Meteorological Department's Weather Report of 16th August 2018

Forecast for next two week

Weather systems & associated Precipitation during Week 1 (16 to 22 August, 2018) and Week 2 (23 to 29 August, 2018)

♦ A Depression lay centred over Vidarbha & neighbourhood. It is very likely to move west-northwestwards and weaken gradually into a well marked low pressure area during next 24 hours. Under its influence, widespread rainfall with heavy to very heavy rainfall at a few places with extremely heavy falls at isolated places is very likely over Vidarbha & Marathwada during next 24 hours and heavy rainfall at isolated places over West

Vidarbha & Marathwada during subsequent 24 hours. Widespread rainfall with isolated heavy to very heavy rainfall and extremely heavy falls very likely over Madhya Maharashtra and north Konkan during next 48 hours. However, fairly widespread to widespread very likely to continue over these regions thereafter for remaining days of 1st week.

♦ Gujarat region is very likely to receive rainfall at most places with isolated heavy to very heavy rainfall during next 24 hours and isolated heavy to very heavy rain with extremely heavy falls for subsequent 24 hours. Saurashtra and Kutch

Annexure III

METEOROLOGICAL SUB-DIVISIONWISE WEEKLY RAINFALL FORECAST & Wx. WARNINGS-2018

Sr. No	MET.SUB-DIVISIONS	16 AUG	17 AUG	18 AUG	19 AUG	20 AUG	21 AUG	22 AUG
1	ANDAMAN & NICO.ISLANDS	WS	WS	WS	FWS	FWS	FWS	FWS
2	ARUNACHAL PRADESH	SCT	SCT	SCT	SCT	FWS	FWS	FWS
3	ASSAM & MEGHALAYA	FWS ^{**}	SCT	SCT	FWS [*]	WS [*]	WS [*]	WS [*]
4	NAGA.MANI.MIZO.& TRIPURA	FWS [*]	FWS	FWS [*]	WS ^{**}	WS [*]	WS [*]	WS [*]
5	SUB-HIM.W. BENG. & SIKKIM	FWS	FWS	FWS	FWS	FWS	WS [*]	WS [*]
6	GANGETIC WEST BENGAL	FWS	SCT	SCT	FWS [*]	WS [*]	WS [*]	FWS
7	ODISHA	FWS	SCT	SCT	FWS [*]	WS [*]	FWS	SCT
8	JHARKHAND	FWS	SCT	SCT	FWS	WS [*]	WS [*]	FWS
9	BIHAR	SCT	SCT	SCT	SCT	FWS	FWS [*]	FWS [*]
10	EAST UTTAR PRADESH	ISOL	ISOL	ISOL	SCT	FWS [*]	WS [*]	WS
11	WEST UTTAR PRADESH	ISOL	ISOL	ISOL	SCT	FWS [*]	WS [*]	WS [*]
12	UTTARAKHAND	FWS	FWS [*]	SCT	FWS	WS	WS [*]	WS
13	HARYANA CHD. & DELHI	ISOL	ISOL	ISOL	SCT	FWS	WS [*]	WS
14	PUNJAB	ISOL	ISOL	ISOL	SCT	SCT	FWS	FWS
15	HIMACHAL PRADESH	SCT	FWS [*]	SCT	SCT	FWS	WS	WS
16	JAMMU & KASHMIR	SCT	SCT	FWS	SCT	SCT	ISOL	SCT
17	WEST RAJASTHAN	SCT	SCT	FWS	SCT	SCT	ISOL	SCT
18	EAST RAJASTHAN	FWS [*]	FWS [*]	FWS [*]	FWS	FWS	FWS [*]	FWS
19	WEST MADHYA PRADESH	FWS [*]	FWS [*]	FWS	FWS	WS [*]	WS [*]	WS [*]
20	EAST MADHYA PRADESH	FWS	FWS	FWS	WS	WS [*]	WS [*]	WS [*]
21	GUJARAT REGION D.D. & N.H.	FWS ^{**}	WS ^{***}	WS ^{**}	SCT	SCT	SCT	SCT
22	SAURASTRA KUTCH & DIU	ISOL	FWS ^{***}	WS ^{**}	FWS	SCT	ISOL	SCT
23	KONKAN & GOA	WS ^{***}	WS ^{***}	WS [*]	WS	WS [*]	WS	WS
24	MADHYA MAHARASHTRA	WS ^{***}	WS ^{***}	FWS [*]	FWS	FWS	FWS	FWS
25	MARATHAWADA	WS ^{***}	FWS	SCT	SCT	SCT	ISOL	ISOL
26	VIDARBHA	WS ^{***}	FWS [*]	FWS	FWS	WS [*]	FWS	FWS
27	CHHATTISGARH	FWS	FWS	FWS	WS ^{**}	WS [*]	WS	FWS
28	COASTAL ANDHRA PRADESH	FWS	FWS	SCT	SCT	FWS	SCT	ISOL
29	TELANGANA	WS [*]	SCT	SCT	SCT	SCT	SCT	ISOL
30	RAYALASEEMA	SCT	ISOL	ISOL	ISOL	ISOL	ISOL	ISOL
31	TAMILNADU & PUDUCHERRY	ISOL ^{**}	ISOL [*]	ISOL	ISOL	ISOL	ISOL	ISOL
32	COASTAL KARNATAKA	WS ^{**}	WS ^{**}	WS ^{**}	WS [*]	WS	WS	FWS
33	NORTH INT.KARNATAKA	WS ^{**}	FWS	FWS	FWS	FWS	SCT	SCT
34	SOUTH INT.KARNATAKA	WS ^{**}	WS [*]	FWS	FWS	FWS	FWS	SCT
35	KERALA	WS ^{**}	WS ^{**}	WS [*]	WS	WS	FWS	FWS
36	LAKSHADWEEP	WS	FWS	FWS	SCT	SCT	SCT	ISOL

LEGENDS:

WS	WIDE SPREAD / MOST PLACES (76-100%)	FWS	FAIRLY WIDE SPREAD / MANY PLACES (51% to 75%)
SCT	SCATTERED / FEW PLACES (26% to 50%)	ISOL	ISOLATED (up to 25%)
[*] Heavy Rainfall (64.5-115.5 mm)	^{**} Heavy to Very Heavy Rainfall (115.6-204.4 mm)	^{***} Extremely Heavy Rainfall (204.5 mm or more)	D/DRY
[*] FOG	[*] SNOWFALL	[*] HAILSTORM	NIL RAINFALL
⁵ THUNDERSTORM WITH SQUALL/GUSTY WIND	^{DS/TS} DUST/THUNDERSTORM	⁺ HEAT WAVE (+4.5°C to +6.4°C)	⁺⁺ SEVERE HEAT WAVE (> +6.4)
		⁻ COLD WAVE (-4.5°C to -6.4°C)	⁻ SEVERE COLD WAVE (< -6.4)

is also very likely to receive heavy to very heavy rainfall at isolated places on 17th and 18th. Scattered to fairly widespread very likely to occur over these regions thereafter for remaining days of 1st week.

- ◆ Widespread rainfall with heavy to very heavy rainfall at isolated places is also very likely over Coastal & South Interior Karnataka and Kerala during first half of the 1st week and decrease in intensity thereafter.

- ◆ Fairly widespread to widespread rainfall with isolated heavy fall is likely over northeastern states, Sub-Himalayan West Bengal Sikkim during most days of the 1st week.

- ◆ Under the influence of a low pressure area is likely to develop over north Bay of Bengal &

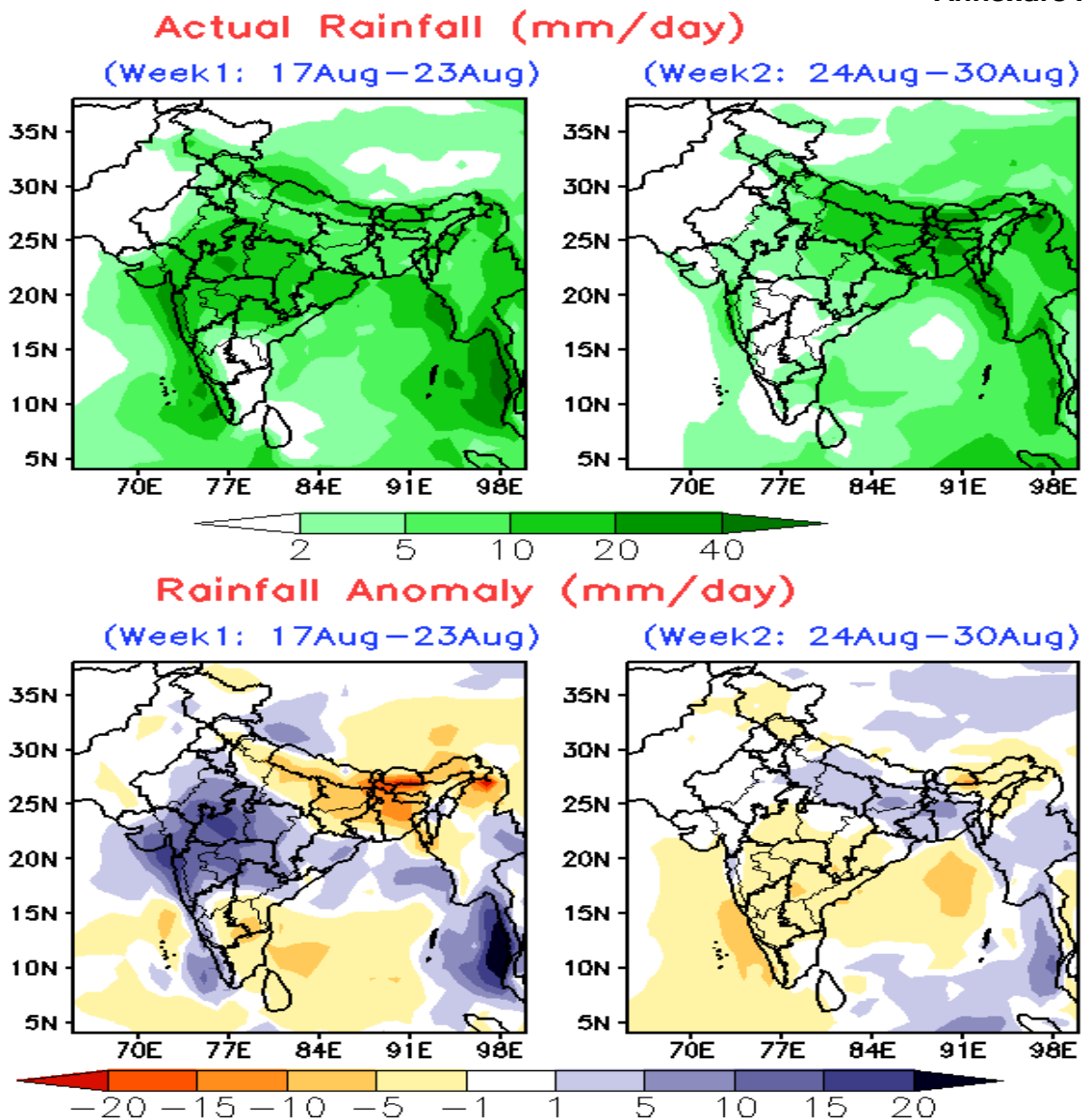
neighbourhood around 19th August, rainfall activity most likely to increase over east India (widespread rainfall with isolated heavy fall) during second half of the 1st week.

- ◆ Scattered to fairly widespread rainfall activity is very likely to occur over remaining parts of the country outside Rayalaseema and Tamilnadu, where light isolated rainfall is very likely to occur during the 1st week (Annexure III).

- ◆ Overall rainfall activity is likely to be normal to above normal over most parts of the country except parts of northern India during 1st week.

- ◆ During week 2, rainfall activity likely to be below normal over most parts of the country except its northern parts (Annexure IV).

Annexure IV



UPCOUNTRY SPOT RATES							(Rs./Qtl)					
Standard Descriptions with Basic Grade & Staple in Millimetres based on Upper Half Mean Length [By law 66 (A) (a) (4)]							Spot Rate (Upcountry) 2017-18 Crop AUGUST 2018					
Sr. No.	Growth	Grade Standard	Grade	Staple	Micronaire	Strength /GPT	13th	14th	15th	16th	17th	18th
1	P/H/R	ICS-101	Fine	Below 22mm	5.0-7.0	15	12598 (44800)	12598 (44800)		12598 (44800)	12598 (44800)	12598 (44800)
2	P/H/R	ICS-201	Fine	Below 22mm	5.0-7.0	15	12738 (45300)	12738 (45300)	H	12738 (45300)	12738 (45300)	12738 (45300)
3	GUJ	ICS-102	Fine	22mm	4.0-6.0	20	9420 (33500)	9392 (33400)		9364 (33300)	9364 (33300)	9420 (33500)
4	KAR	ICS-103	Fine	23mm	4.0-5.5	21	10236 (36400)	10208 (36300)	O	10179 (36200)	10179 (36200)	10179 (36200)
5	M/M	ICS-104	Fine	24mm	4.0-5.0	23	11164 (39700)	11135 (39600)		11107 (39500)	11107 (39500)	11107 (39500)
6	P/H/R	ICS-202	Fine	26mm	3.5-4.9	26	12935 (46000)	12851 (45700)		12879 (45800)	12907 (45900)	12907 (45900)
7	M/M/A	ICS-105	Fine	26mm	3.0-3.4	25	11107 (39500)	11107 (39500)	L	11107 (39500)	11107 (39500)	11107 (39500)
8	M/M/A	ICS-105	Fine	26mm	3.5-4.9	25	11389 (40500)	11389 (40500)		11389 (40500)	11445 (40700)	11501 (40900)
9	P/H/R	ICS-105	Fine	27mm	3.5-4.9	26	12991 (46200)	12907 (45900)	I	12935 (46000)	12963 (46100)	12963 (46100)
10	M/M/A	ICS-105	Fine	27mm	3.0-3.4	26	11585 (41200)	11585 (41200)		11585 (41200)	11585 (41200)	11642 (41400)
11	M/M/A	ICS-105	Fine	27mm	3.5-4.9	26	12035 (42800)	12035 (42800)		12035 (42800)	12035 (42800)	12092 (43000)
12	P/H/R	ICS-105	Fine	28mm	3.5-4.9	27	13048 (46400)	12963 (46100)	D	12991 (46200)	13020 (46300)	13020 (46300)
13	M/M/A	ICS-105	Fine	28mm	3.5-4.9	27	12963 (46100)	12963 (46100)		12935 (46000)	12907 (45900)	12907 (45900)
14	GUJ	ICS-105	Fine	28mm	3.5-4.9	27	13273 (47200)	13244 (47100)	A	13188 (46900)	13132 (46700)	13132 (46700)
15	M/M/A/K	ICS-105	Fine	29mm	3.5-4.9	28	13413 (47700)	13329 (47400)		13273 (47200)	13188 (46900)	13188 (46900)
16	GUJ	ICS-105	Fine	29mm	3.5-4.9	28	13610 (48400)	13554 (48200)		13469 (47900)	13413 (47700)	13413 (47700)
17	M/M/A/K	ICS-105	Fine	30mm	3.5-4.9	29	13638 (48500)	13554 (48200)	Y	13469 (47900)	13357 (47500)	13357 (47500)
18	M/M/A/K/T/O	ICS-105	Fine	31mm	3.5-4.9	30	13891 (49400)	13807 (49100)		13751 (48900)	13638 (48500)	13638 (48500)
19	A/K/T/O	ICS-106	Fine	32mm	3.5-4.9	31	14426 (51300)	14341 (51000)		14285 (50800)	14229 (50600)	14229 (50600)
20	M(P)/K/T	ICS-107	Fine	34mm	3.0-3.8	33	17041 (60600)	16956 (60300)		16956 (60300)	16788 (59700)	16731 (59500)

(Note: Figures in bracket indicate prices in Rs./Candy)