

Laja (Parched Paddy): A Nutraceutical in Debility

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Abstract

Laja (parched paddy) is a soft, light, whitish, commonly edible food product prepared by roasting paddy (*Oryza sativa* Linn, family Gramineae). According to *Ayurvedic* classics, *Laja* has *deepan*, *laghu*, *grahi*, *sneha*, *kapha-meda-chedak*, *balya*, *rasayan* and *ojo-varadhak* properties and it has been widely used as a remedy for *chardi* (emesis), *atisara* (diarrhoea), *rakta-pitta* (bleeding disorder), *madatyaya* (alcoholism), *trishna* (thirst), *medo-rog* (obesity), *sangrahni*, ailments of upper respiratory tract, for suppressing milk regurgitation in babies and treatment of colic in anti natal period in the form of various *kalpa*'s (pharmaceutics). In modern researches, it has been found that *Laja* has good portion of digestible nutrients. It is rich in carbohydrate (88%), low fat (0.2%), protein (8.6%), low salt, low cholesterol, no preservatives, easily digestible (greater coefficient of digestibility as compared to wheat and other rice products Table 4 & 5) and immediate source of energy (high calorific value 1,754/pound) makes it healthy nutritive, and balanced diet. In future *Laja* may be used as a substitute of rice based ORS and good dietary supplement for debilitating and hypertensive persons. This article throws light on classical uses of *Laja*, its method of preparation, difference from parched rice, change in nutritive value during parching and its future research aspect.

Keywords: *Laja*; Parched Paddy; Nutraceutical; Ayurveda; *Oryza sativa*.

Source- Paddy

Family- Gramineae

Latin name- *Oryza sativa* Linn.

Derivation- In *Samhita* / Compendias (*Maitrayni Samhita*, *Vajsnæ Samhita*) and *Bramhan* (*Shatpath Bramhan*, and *Taitariya Bramhan*) *granth*, *Laja* is representative of roasted grains [1].

Hindi- *Kheel*

English- Parched paddy

Texture- *Laja* is a soft, light, whitish, commonly edible food product prepared by roasting paddy (*Oryza sativa*) [2] (Table 1).

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Introduction

Chemical compositions of Paddy

Oryza sativa Linn.contains moisture 10.90-13.78, protein 5.50-9.32, carbohydrate 73.35- 80.8%, fibers 0.18- 0.95, minerals 0.79- 2%. It contains mainly starch 72.2-74.9, glucose 1.45-2.65, sucrose 0.3-0.43, and dextrin 1.56-2.05%. Main protein of paddy is oryzynin (glutinin). Besides this, paddy also contains essential amino acids like Argenine,

Table 1: Difference between *laja* (parched paddy) and *lai/murmura* (parched rice)-²

S.No.	Specifications	Laja (Kheel)	Lai (Murmura)
1.	Yield of product	Yield of <i>laja</i> from paddy is approximately 61%.	Yield of <i>lai</i> from paddy is approximately 58.5%
2.	Texture	Soft, white	Crispy, grayish to brilliant white in colour, salted or unsalted.
3.	Method of preparation	 <p>For preparation of <i>Laja</i>, paddy is dried in the sun and towards evening filled in earthen jars. It is then moistened by adding hot water which is decanted off after 2-3 minutes. Jars are kept inverted overnight. Next morning, paddy is exposed to sun for a short period, after which it is kneaded while still moist, and then parched in hot sand. During parching process, the grains swell and burst into a soft, white product. Parched grains are sieved to remove sand and finally winnowed to separate husk.²</p>	 <p>For preparing <i>murmura</i>, sand in iron pot is heated to a high temperature over fire. 3 or more handfuls of par boiled rice are then thrown in and rapidly stirred into the hot sand. As soon as the rice begins to crack and swell, the contents of pan are removed and passed through a sieve to separate the parched rice from sand.</p>

Histidine, Lysine, Tryptophan, Phenyl alanine, Methionine, Lucine etc. Vitamin B (especially thiamin, pantotheic acid and pyridoxine) and Vitamin E are excessively found in paddy. In minerals Calcium (14.3-85.7), Phosphorus (171.6-558.8 mg par 100gm), Sodium (20mg), Potassium (100mg par 100gm), Mg, S, Cl, Cu, Zn, As, I₂ etc., trace elements and Amylase, Protease, Lipase, Phenolase etc., ferment elements found [3].

Nutritional value of *Laja*

In *Laja* moisture content 14.7, protein 7.5, carbohydrate 74.3, fibers 0, fat 0.1, and ash 3.4% [4]. (Table 4)

Pharmacological properties

Rasa (taste appreciation of the substance by the chemical receptors on the tongue)- *Kashay* (astringent), *madhur* (sweet); *Guna* (attribute or property of any substance)- *Laghu*, *ruksha guna*; *Virya* (potency)- *sheeta* (cold); *Prabhav* (speciûc action through specialized receptors)- *Pitta- kapha shamak* [5, 6].

Dose: Powder 5-10 gm

Classical Therapeutic uses of *Laja* (Table 2 & 3)

Emesis and diarrhoea (*Chardi- atisara*)

Laja is the best remedy for emesis [7] and it has been kept under 10 antiemetic decoctives (*chardi-nighrhan mahakashay*) [8]. *Laja* has been used both as anti-emetic as well as in form of whole some diet (*pathya*) after bio-purification therapy (*sanshodhan*) in emesis (*Chardi rog*) [9]. **Laja-saktu** (flour of parched paddy) used with appropriate amount of honey and ghee alleviates emesis [10]. *Laja-saktu* mixed with water and honey alleviates all *vata, pitta, kaphaj chardi* (emesis) [11]. In *pittaj chardi* (emesis due to disorders of pitta), after *sanshodhan* (bio-purification), at the time of meal, *laj-saktu* or *laj-peya* mixed with honey and sugar should be consumed [12]. Linctus made of *laja*, *kapittha* (*Feronia limonia* L.), *pippali* (*P.longum* L.), *marich* (*P.nigrum* L.) and honey checks vomiting and anorexia [13]. *Laja* is said to be anti-emetic and anti-diarrhoeal in all compendiums and *nighantus*.

Thirst (*Trishna*)

In *Ayurvedic* compendia, *laja* has been used widely as *trishna-shamak dravya* (anti-thirst drug) in the form of different pharmaceutical preparations (*manda, peya, yavagu, manth* etc.). Use of *laja*, as an ingredient of *pipasanashak yavagu* [14] (thirst alleviating medicated gruels), as *laj-peya* (*Shrama nashak*) under the class of cooked food [15], as different pharmaceutical preparations (*laj-mand* [16], *laj-manth* [17] etc.) in treatment of thirst (*trishna*). *Laj-saktu* has *trishna-shamak* [18] (anti thirst) properties and *laj-tarpan* is best for treatment of thirst (*trishna*) [19]. Another pharmaceutical preparation, *lajodak* (the cold infusion of *laja* mixed with honey, jaggery, *gambhari* (*Gmelina arborea* Linn.) fruit powder and

Table 2: Laja in ayurvedic texts, therapeutic actions and indications

S.no	Actions	Indications	Classical references
1.	<i>Shramaghani, Dhatusamyak, Agni-janan,</i>	<i>Trishna, Atisaar, Daha, Murcha, Mandagni, Vishmagni</i>	<i>Charak Samhita Chardi-nigrhan⁸ (Anti-emetics), Shonitasthapan⁸⁵ (Hemostatics), Daha-prashaman⁸¹ (Refrigerants) mahakashya, Kritann varga (Class of cooked food).</i>
2.	<i>Pathya, pachaka, deepana, kaphanashak, vatamulomaka, hridya, rakta-pittahar, balya,</i>	<i>Chardi, Atisaar, Daha, Heat stroke, Jwara</i>	<i>Sushurata Samhita Kritann varga⁸²</i>
3.	<i>Kapha chedaka, pittop shamana, deepana</i>	<i>Trit, Chardi, Atisaar,</i>	<i>Ashtang Hriday Anna- swaroop vigyaniya adhyaya.⁸³</i>
4.	<i>Rudhir sthapan⁸⁴ Dahahar⁸⁵, Vami-nigran⁸⁶</i>	<i>Meha, Meda, Kasa Rakta-Pitta, daha, Vami</i>	<i>Ashtang Sangrah Rudhir sthapan⁸⁴Dahahar⁸⁵, Vami-nigran⁸⁶ maha kashay.</i>
5.	<i>Sheetal, laghu</i>	<i>Chardi⁸⁷</i>	<i>Saraswati nighantu Bhaktadi varga</i>
7.	-----	-----	<i>Hriday Deepak Mishrak varga⁸⁸</i>
8.	-----	-----	<i>Along with udashvita, modak, laj, prithuka.⁸⁹</i>
9.	-----	-----	<i>Abhidhan manjari Shook dhanyadi varga⁹⁰.</i>
10.	<i>Deepan,laghu,sheetal, kapha chedak, pitta- shamak, santarpan karak</i>	<i>Trit,chardi,daha tisaar,kasa,rakta- meda, prameha</i>	<i>Sodhal nighantu Santarpan dravya (Mishrak varga⁹¹,Kritann varga⁹²)</i>
11.	<i>Madhur, laghu, sheeta, deepan, ruksha, balya, swalp mala mootra karak, pitta kapha chedak</i>	<i>Chardi, atisaar, daha, rakta-pitta, prameha, medo rog, trishna</i>	<i>Bhav Prakash Mishra prakaran-Kritann varga⁹³</i>
12.	<i>Balya, pitta-kapha chedak, laghu, sheeta</i>	Similar to BP Nighantu	<i>Madanpal nighantu Dhanya-kritannadi varga⁹⁴</i>
13.	<i>Grahi, madhur, laghu, sheeta, (laj saktu, sita, honey)</i>	<i>Rakta-pitta, daha, trishna, chardi, jwara, atisaar, visha, murcha</i>	<i>Madhav dravya guna Pan-bhakshay varga⁹⁵</i>
14.	<i>Pitta –shamak</i>	<i>Tarpan</i>	<i>Raj nighantu Shalyadi-varga⁹⁶, Mishrakadi-varga- Santarpan dravya.⁹⁷</i>
15.	<i>Pitta shamak, deepan, laghu, sheetal, kapha chedak</i>	<i>Trit, chardi, atisaar, prameha, medo rog</i>	<i>Raj-vallabha nighantu Madhayahika paricheda⁹⁸</i>
16.	<i>Sneha meha kapha chedan</i>	<i>Chardi atisaar</i>	<i>Dravya guna sangraha Bakshaya varga⁹⁹</i>
17.	<i>Balya, rasayan, hridya, veerya vridhi kar</i>	<i>Eye diseases</i>	<i>Dhamvantari nighantu Mishrakadi varg Santarpan dravya¹⁰⁰</i>
18.	<i>Madhur, kashay, laghu, sheeta, deepan, ruksha, balya, swalp mootra malaprada, kapha chedak</i>	<i>Trit,chardi,Daha atisaar, kasa, rakta-pitta,Medo rog prameha,</i>	<i>Amar dwitiya 4/47 dwitiya kand - 4, vaishya varg 185-186¹⁰¹</i>

khand is indicated for treatment of *pittaj trishna* (thirst due to vitiation of *pitta*) [20].

During pregnancy

In medicinal compendia, *laja* is indicated during pregnancy/ anti-natal period in treatment of *shool* (colic pain) and *sangrahani* (mal absorption syndrome). *Priyala* (*Buchanania lanzan Spreng*), *Draksha* (*Vitis vinifera L.*) and *laja* powder pulverized with water and consumed, alleviates *garbh vedana*[21]. *Kapittha* (*Feronia acidissima L.*), *supari mool* (roots of

Areca catechu L.), *laja* pulverized with cold water, mixed with milk and sugar, alleviates *garbh shool* [22] on drinking. *Amra* (*Mangifera indica L.*), *Jambu* (*Syzygium cumini L.*) bark decoction mixed with *laja* powder on drinking alleviates *sangrahani* (mal absorption syndrome) during pregnancy [23].

Pediatric care

Possessing *madhur, mridu, laghu, sheeta* properties *laja* has been used in pediatric treatment [24]. *Amrasthi*

Table 3: Use of laja in different diseases as dietary preparation (wholesome diet)¹⁰²

Serial no.	Disease	Dietary Preparation	Reference
1.	Jwara (fever)	Laja (parched paddy)	B.R.T 3/34
2.	Chardi (emesis)	Laj-mand	B.R.T 19/29
3.	Trishana(thirst)	Laj-saktu	B.R.T 20/32
4.	Daha (burning sensation)	Laj-saktu and Laj-mand	B.R.T 23/19
5.	Murcha (Syncope)	Laj-mand	B.R.T 21/24
6.	Rakta-pitta (bleeding disorders)	Laja	B.R.T 15/170
7.	Grahani (mal absorbtion syndrome)	Laj-mand	B.R.T 8/622
8.	Atisara (diarrhea)	Laj-mand	B.R.T 7/183
9.	Medo-rog (obesity)	Laja	B.R.T 39/68
10.	Vrana (ulcer)	Laj-mand	B.R.T 47/84
11.	Garbhini chikitsa (disorders during pregnancy)	Laj-saktu	B.R.T 68/102
12.	Amla-pitta (Dyspepsia)	Laj-saktu	B.R.T 56/6
13.	Kasa(cough)	Laja	B.R.T 15/220
14.	As pathya after sanshodhan in pittaj chardi	Laj-manth	B.R.T 19/5
15.	Pittaj-rog	Laja	B.R.T pari. 18
16.	(Urinary disorders) Prameha	Laja	B.R.T 37/245
17.	(diseases due to kapha dosa) Kaphaj- rog	Laja	B.R.T pari. 37

Table 4: Coefficient of digestibility of wheat and rice¹⁰³

Food article	Protein	Fat	Carbohydrate	Energy
Wheat product, malted, ready to eat	75.4	90	91.4	84.7
Rice products	83.0	90	93.8	86.4

Table 5: Total and digestible nutrients and food values of Rice, Puffed Rice and Wheat-¹⁰³

Food Grain	Proportion of total water and nutrients in food (%)					Proportion of Digestible nutrients					Fuel value (per pound)
	Water	protein	fats	Carbohydrate		Ash	Protein	Fats	Crabohydrates	Ash	
				Nitrogen free extract	Fibre Rice						
Whole rice, polished	12.3	6.9	0.3	80	-	0.5	5.8	0.3	78.4	0.4	1,546
Flaked steam cooked	10.2	8.3	0.3	79.7	1.2	0.3	6.9	0.3	79.2	0.2	1,595
Puffed rice	7.1	6.2	0.6	85.7	-	0.4	5.1	0.5	84	0.3	1,639
Popped rice (Laja)	0.7	8.6	0.2	90	-	0.5	7.1	0.2	88.7	0.4	1,754
					Wild rice						
Whole grain	9.9	13.7	0.9	72.7	1.2	1.6	-	-	-	-	-
Parched grain	9.6	13.0	0.9	74.1	1.1	1.4	10.1	0.8	70.4	1.1	1,566
					Wheat						
Whole grain	10.5	11.9	2.1	71.9	1.8	1.8	-	-	-	-	-
Cracked wheat	10.1	11.1	1.7	73.8	1.7	1.6	8.1	1.5	68.7	1.2	1,501
Boiled wheat	10.6	10.2	1.8	74.1	1.8	1.5	8.5	1.6	70.7	1.1	1,541
Entire wheat flour	11.4	13.8	1.9	71.0	0.9	1.0	-	-	-	-	1,675
Graham flour	11.3	13.3	2.2	69.5	1.9	1.8	-	-	-	-	1,670

(seeds of *Mangifera indica* L.), *laja*, *saindhav* and honey mixed together, on licking (*lehan*) suppress infantile milk regurgitation [25, 26, 27, 28]. Decoction of *Bilva* (*Aegle marmelos* Corr.) root mixed with *laja* powder and sugar alleviates vomiting and diarrhea in children [29, 30]. *Laja* and *Mulethi* (*Glycyrrhiza glabra* Linn.) powder mixed with equal quantity of *khand*, honey and then diluted with 1 tola *tandulodak* (rice water) on drinking alleviates childhood dystentry [31, 32, 33, 34]. *Mishreya* (*Foeniculum vulgare* Mill.), *pippali* (*P. longum* Linn), *Rasanjan* (extract of *Berberis aristata* DC), *laja*, *karkatshringi* (*Pistacia integerrima* Stewart ex Brandis), *marich* (*P. nigrum* Linn.) powder mixed with honey and licking children alleviates them from vomiting, cough and fever [35].

Rakta-pitta (Bleeding disorders/Intrensic haemorrhage)

Laja has been kept under haemostatic decoctives (*shonit-sthapan mahakashay*) [36] due to its *madhur*, *kashay rasa*, *sheet virya*, *rakta-pittahar* [37] properties. Saturating drinks prepared with *laja* powder, added with ghee and honey, checks haemorrhage directed upwards (haemoptysis etc.) [38] and *pravridh rakta-pitta* (*rakta-pitta nashak kashay*) [39]. For alleviation of *rakta-pitta* equal quantity of *laja* and *rasanjan* (solidified water extract of *B. aristata* DC) powder in amount of 3-6 *masha* with honey is advisable [40]. *Shringatak* (*Trapa natans* Linn. Var. *bispinosa* (Roxb.) Makino), *laja*, *Kharjura* (*Phoenix sylvestris* Roxb.), *Mustaka* (*Cyperus rotundus* Linn.), *Padhamkesar* (*Nelumbo nucifera* Gaertn) powder with honey alleviates haemorrhagic disorders [41].

Madatyaya (alcoholism)

To cure thirst in alcoholism due to vitiation of *pitta* (*pittaj madatayaya*), *laja* along with *musta* (*C. rotundus* Linn.), *dadim* (*Punica granatum* Linn.) medicated water (prepared by method of *shadangpaaniya*) is given [42] or *laj-mand* mixed with sugar is given [43].

Utility of *laja* in *sanshodhan chikitsa* (bio-purification therapy)

Laja is used both as wholesome diet (*pathya*) after *panchakarma* procedure and in treatment of excessive emesis (*vaman atiyoga*). Different preparations of *laja* (*laj-mand*, *laj-peya* etc.) mixed with *Pippali* (*P. longum* Linn), *Shunthi* (*Z. officinale* Rosc.) used after *panchakarma* procedure act as *deepan*, *pachana*, and cardiotoxic (*hridya*) [44, 45, 46, 47, 48]. *Laja* powder (*kashay*, *madhur rasa*, *shita virya*), along with *Chandan* (*Santalum album* Linn), *Usheera* (*Vetiveria zizanioidis* (Linn.) Nash.) and *aja rakta* (goat's blood) are mixed with sugar and water. Prepared *mantha* has been indicated in treatment of *vaman atiyoga* [49, 50].

Fever (Jwara)

Laj-peya medicated with *pippali* (*P. longum* Linn), *nagar* (*Z. officinale* Rosc.) and *saindhav* are indicated in condition of digestive impairment (*jathragni-mandya*) associated with fever. It increases digestive-power (*deepan*) and is itself easily digestible (*laghu paki*) [51, 52]. Saturating drinks of *laja* (*Laj-tarpan*) added with sugar and honey should be given to the patients in case of burning sensation, vomiting, debility and thirst and when he does not take any other food [53,54].

Diseases due to vitiation of *pitta* (*pittajanya vyadhi*)

Laja is indicated with other drugs in treatment of bleeding haemorrhoids (*raktarsh*), *Pittaj vidradhi*, syncope (*murcha*), measles (*masurika*), blisters due to vitiation of *pitta* (*pittaj visphot*) [55, 56, 57, 58, 59].

Upper respiratory tract infections (*Pranvaha srotas*)

Laja is used abundantly along with *Draksha* (*V. vinifera* Linn.), *Pippali* (*P. longum* Linn) in treatment of hiccup (*hikka*), cough (*kasa*) in *vrihatryi* [60, 61, 62, 63, 64, 65].

As Santarpan karak dravya (As saturating drink)

Laja is mixed with sweet drugs like *draksha* (*V. vinifera* Linn.), *dadim* (*P. granatum* Linn.), *khajura* (*Phoenix sylvestris* Roxb.) etc, sugar and water for

preparing drink. This drink is cold (*sheetal*), alleviates eye diseases, strengthens body (*balya*), rejuvenator (*rasayana*), cardiotoxic (*hridya*) and increase potency (*virya vridhdhikar*).

Laja as Rasayana

Bish decoction saturated with *laja* and honey promotes intellect and longevity [66]. Taking *laja* with *Swarna bhasma*, *Padmabeeja* (Seeds of *N. Nucifera*), *Priyangu* (*Callicarpa macrophylla* Vahl.), cow milk and honey alleviates poverty [67].

Laja as *ojovardhak dravya*

Due to similarity in properties of *oj* and *laja* like *mridu*, *madhur*, *sheeta* etc and odour of *oj* is like *laja* [68], *laja* has been used for different enculturation (*sanskar*) and wrecking/ inhibiting planetary hurdles (*graha badha*) since ancient times. *Laja* has been indicated for strewing all around the *vedi* (altar) in *putra-yeshti yagya* [69]. It is indicated that a pregnant lady should feed *laja*, *madhu*, *trinodak* to the cow before entering *sutika griha* (labor room) [70]. In *Upnayan sanskar* (*yagya* at the time of starting of learning), *laja* is said to be spread all around the *vedi* [71, 72]. *Laja* is also used for hallowing *Dev-graha* [73]. In daily life and enculturation, use of *laja* as a food product indicates its importance. On the basis of *samanya-vishesh siddhanta* given by *Acharya Charak*, the motive of use of *laja* would have been for *ojo-varadhan*.

Laja in Hindu Rituals

In *Ayurveda anna* is considered as *prana* [74] and is connected with religious enculturation. In *Hindu* traditions, use of *laja* is indicated in marriage, worship and other auspicious occasions. There is no scientific explanation behind use of *laja* in hindu rituals. It is a matter of further investigations and should be looked carefully. One possible explanations behind this is that *anna* has been considered as *Prana* and *laja* is one of the most widely used staple food item which increases *pranic shakti*. Its use in rituals establishes its auspicious nature.

Laja in ayurvedic formulations

1. *Eladi churna* [75]
2. *Khajuradi leha* [76]
3. *Pratham sarpi guna* [77]

Future research aspect for *laja*

As a substitute of ORS

It is seen experimentally that rice extracts were found to decrease intestinal losses by actively inhibiting chloride channels. Rice based oral rehydration solutions (ORS) has been proved effective in decreasing stool output and improving intestinal absorption in acute diarrhea. Rice based ORS are now preferred over glucose based ORS and have been included in WHO programme [78]. If we use *laja* (parched paddy) in place of rice, then it will be more fruitful due to its *madhur* (sweet in taste), *laghu* (easily digestible), *sheeta* (cool in potency), *deepan* (increase appetite), *balya* (energetic), *swalp mal-mootra-prada* (decreases production of urine and stool) properties.

As a pathya (whole some diet)

Laja is most widely used food preparation as *pathya* (wholesome diet) in treatment of almost all the diseases. Pathya has been considered as the basic and sole principle of treatment in Ayurveda which is reflected by verse of *vaidya Lolimbraj*. What is the need for medicine to a person taking wholesome diet [79]?

Conclusion

During preparation of *laja*, its association with fire makes it light weighted and easily digestible (*laghu paki*). In general debility, when digestive impairment occurs, then *laja* and its preparations give libation to all *dhatu*s from *rasa* to *shukra*, *oj* and do not increase *kapha* and *meda* in the body like other libating agents which increase *kapha* and *meda*, produce stage of *aavarana* (obstruction) or causative factor for *santarpan-janya rogas*. On the other hand most of the easily digestible food stuffs (*laghu paki dravyas*) are associated with *ruksha guna*, when used in generalised debility cause absorption of *dhatu*s. In Ayurveda *laghu*, *santarpan dravyas* are indicated for the treatment of emaciated persons [80]. From this point of view use of *laja* is ideal as whole some diet in ailing persons. *Laja* being prepared from paddy, is an excellent source of carbohydrate, that are broken down to glucose, most of which is used as energy and as essential fuel for the brain. Due to low fat, low salt, no cholesterol, *laja* can also be used in patients of hypertension. *Laja* contains no additives or preservatives, making it an excellent inclusion in a healthy and balanced diet. Paddy also contains resistant starch, which reaches the bowel undigested. This encourages the growth of beneficial bacteria, keeping the bowel healthy. *Laja*

is used as immediate source of energy, regulating intestinal peristalsis, for regulating blood sugar level and major source of vitamin B.

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