J. Phytol. Res. **36**(1): 45-52, 2023 **ISSN 0970-5767**

FASTING FOODS OF FESTIVALS: AN OVERVIEW ON NUTRITIVE VALUES AND HUMAN HEALTH

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Religion and cultural traditions are integral parts of humanity. These practises have a significant impact on human lifestyles and the health of the community. Fasting is an important aspect of religio-cultural practise that is found in varying forms across the world. In India, religions of their origin also advocate ritual fasting as a part of the expression of their faith in the god. Fasting is the voluntary reduction of all or some types of foods, drinks, or both for a certain period of time. It is practised by people of all religions. Fasting is proven beneficial for human health as it gives the digestive tract a break from regular meal consumption. There are several ways to fast, including whole-day fasts, time-restricted feeding, and alternate-day fasting. There are various millets, such as *Amaranthus paniculatus, Celastrus paniculatus, Echinochloa frumentacea, Euryale ferox,* and *Fagopyrum esculantum*. The grains of these pseudocereals are used as food during fasting. In addition to this, starch obtained from *Cycas revoluta*, commonly known as sabudana, flour obtained from dry fruits of *Trapa natans*, and dry rhizomes of *Maranta arundinacea* plants are used during fasting. The food products prepared during the fasting periods are very good sources of proteins, carbohydrates, fats, and dietary fiber and contain various types of minerals such as calcium, potassium, magnesium, iron, and phosphorus, which are essential for human health. The food products prepared from these pseudo cereals are gluten-free and good for human health too; therefore, these foods are also included in the traditional dietary system. The objective of this review paper is to provide complete and updated information for the researchers about the major plants, their products, their nutritive values, and their impact on human health that are used during fasting times during various festivals, with special emphasis in Rajasthan (India).

Keywords: Fasting food, Festivals, Health, Millets, Nutritive value, Pseudo-Cereals.

Introduction

Religion and cultural traditions are an integral part of human life. These practices have a significant impact on life style and human health of the community. Fasting is an important religio-cultural practice that is found in various forms over the world. In India, religion with their origin also advocates ritual fasting as part of the expression of their faith to the God. It is often commended as part of the manifestation of faith in religions that originated in India[1]. It comprises the person in all of its aspects: body, soul, and spirit[2].

Fasting is essentially the practice of voluntarily reducing some or all sorts of foods, liquids, or both for a specific period of time. Fasting can be “nirahara” (without food), “phalahara” (with fruit and milk), or

"alpahara" (with broken rice and other similar foods) [1]. Fasting can be done in various ways, like alternate-day fasting, time-restricted feeding, and whole-day fasts. An alternate-day fasting entails alternating between ad libitum eating and fasting days. Time-restricted feeding involves a consistent daily eating schedule. Whole-day fasting consists of one to two days of total fasting every week, alternated with ad libitum eating on the other days[3].

Fasting rituals are quite ancient and constant; people in India still fast for numerous reasons[4]. It has been practised as a religious discipline for ages and also mentioned in religious scriptures such as the Bible, the Quran, and the Bhagavad Gita. According to the rituals and specific festival, Hindus fast for a day, a week, or a month. On the occasion of Shivratri, Janamashtmi, Karva Chauth, Teej, and Rishi Panchmi, people fast for a day. The Rishi Panchami fast is based on the seven sages, or Saptrishis, and is primarily performed by women to purify their souls and bodies from various sins. People keep fasts on a specific day of the week according to their belief in a deity. For example, people fast on Mondays to appease Lord Shiva. According to the Hindu saka calendar, devotees fast for the entire month of Karthik to seek Lord Vishnu's blessings. Muslims fast for the whole month of Ramadan, from sunrise to sunset, as they believe it helps to purify the soul and improve their sense of spirituality. Devotees also practice fasting on particular tithi of months like Ekadashi (11th day), Poornima (full moon) and Chauth (4th day). In Navratri, Hindus fast for nine days, either as phalahar or by eating a proper meal once a day[5].

Fasting is thought to promote metabolic health as well as many other physiological and molecular mechanisms that can be proven beneficial for human health. Fasting gives a break to the digestive tract from regular meal consumption. During fasting, people are permitted to take specific starchy foods as a source of energy[6]. Spices like red chilli powder and turmeric are avoided during the fasting, as they are considered tamasik in nature. Instead of common salt, people use pink salt (sendhanamak) in all the preparations.

Fasting can be associated with religious aspects as well as contemporary influences. Some people believe that by fasting, they can reduce their weight. Fasting properly results in a high level of strength and a lack of hunger[2]. It has been found that fasting can restore the whole immune system by making new white blood cells, despite the fact that fasting diets have been denounced by nutritionists as being unhealthy[7]. This review deals with the major food options (Table 1), their nutritive values (Table 2), and their impact on human health (Table 3) that are used during fasting times in Rajasthan.

1. *Amaranthus paniculatus* L.

Amaranthus paniculatus, popularly known as Amaranth and Rajgira, belongs to the family Amaranthaceae. Amaranth is grown easily in any vegetation, but primarily in the southern states of India. The edible part is the grains, which are harvested from the plant and used as whole grains or flour (Photo plate 1A). Rajgira flour consists of 73.04% carbohydrates, 15.70% protein, 8.23% fat, 3.03% ash, 4.2% fiber, and 7.68% moisture[8]. The grains are popped by heating and used in various dishes. The popped rajgira grains are mixed with jaggery syrup and ghee to make rajgira laddu[9]. The grains are cooked with milk, sugar, and dry fruits to prepare rajgira kheer. Rajgira flour is used to make halwa, which is prepared with water, sugar, and ghee, which has a significant grey color. Rajgirapakodas are also made with rajgira flour, boiled potatoes, green chillies, fresh coriander, and spices. The flour of amaranth is gluten-free, so to make puris and parathas, mashed potato is mixed with flour to prepare dough.

2. *Celastruspaniculatus* Willd

Celastruspaniculatus, popularly known as Jyotishmati or malkangani, belongs to the

family Celastraceae. It is cultivated in the southern districts of Rajasthan. The edible part is the grains, which can be eaten whole, and the oil is extracted from the seeds, which has multiple medicinal properties. Milling has traditionally been used to process grains, which includes dehulling and polishing. The grains have a considerable amount of husk and bran, which are removed, and the grains are then polished. The grains are presoaked in lukewarm water for a few hours and cooked with spices and vegetables like carrots, potatoes, beans, and peas to make kangni ki khichdi. It is eaten with raita. Jyotishmati contains 45.5% fat, the majority of which are unsaturated fatty acids (70.11%), followed by saturated fatty acids (25.2%) [10].

3. *Cycas revoluta* Thunb.

It is commonly known as sago palm, is used to make sago or sabudana in India. It belongs to the family Cycadaceae. Sago is also derived from the leaves of *Cycas* plants which are grown in Southeast Asian countries such as Indonesia and Malaysia[11]. Fresh tubers of *Manihot esculenta* contain anti-nutrients like nitrate, polyphenols, oxalate, and saponins, which can lower the bioavailability of nutrients. The major anti-nutrient found in the tubers is cyanide, which is highly toxic for human consumption. Therefore, the tubers are initially processed by various methods like fermentation, soaking, roasting, and drying for the detoxification of anti-nutrients[12]. Tapioca is cultivated in Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and a few North Eastern states of India. The extracted starch is sized and roasted further. The roasted globules are then sun-dried, after which they are further polished and graded accordingly[13]. Sago consists of 80% carbohydrates, 0.15% protein, 0.65% fats, 0.4% fiber, 66.2% moisture, 0.69% ash, and 528kJ/100g energy[14]. Sabudana is the most versatile fasting food, and it is used in both sweet and savoury (Photo plate 1B). Presoaked sago is cooked with milk and dry fruits to prepare sabudana kheer. Sago is also used to prepare snacks like sabudana vada and sabudanapakoda. Soaked sabudana is combined with boiled potatoes, spices, green chilies, fresh coriander, and crushed peanuts. This mixture is then shaped into a vada and deep-fried (Photo plate 1E). Sabudana is incorporated with rajgira flour, boiled potatoes, fresh coriander leaves, green chillies, and spices to prepare sabudanapakodas. Sabudanakhichdi is also prepared with boiled potatoes, tomatoes, green chilies, coriander leaves, peanuts, and spices (Photo plate 1D). Sago flour is used in making faraali paratha. Sabudana is soaked overnight and boiled with water, cumin seeds, rock salt, and black pepper. The batter is spread on the plastic sheet in the shape of papad and sundried. The dried papads are then deep-fried in oil (Photo plate 1C). Sabudana is also use to make faraali namkeen with potato flakes, fried peanuts, curry leaves and spices.

4. *Echinochloa frumentacea* Link

Echinochloa, popularly known as barnyard millet or Sama rice, belongs to the family Poaceae. It is a grass that grows with rice in the field and contains similar nutrients as rice; thus, it is known as sama rice[15]. In India, the two major species are *E. esculenta* and *E. frumentacea* which are cultivated in Uttarakhand and Tamil Nadu[16]. The edible part is the grain, which is consumed during the fasts. They are white in color and look similar to rice (Photo plate 1F). In the machines, the grains are polished and sorted. This reduces the nutritional value to some extent[17]. Barnyard millet has 68.8% carbohydrates, 10.1% protein, 3.9% fat, 6.7% fiber, 3.79% ash content, and 8.7% moisture[18, 19]. This millet is consumed either as a grain or as flour. Flour is used to make halwa, and savoury snacks. The grains are used to make sama ki khichdi (porridge) and sama ki kheer. Sama ki khichdi is prepared with potatoes, green chillies, tomatoes and various spices (Photo plate 1G).

5. *Euryale ferox* Salisb.

Euryale ferox, commonly known as fox nut or makhana, is a monotypic genus that belongs to the family Nymphaeaceae. It is typically grown in the northeastern states of India, primarily in Bihar. The edible part is the round, puffy kernel with a tough black seed coat. Fox nuts are processed to obtain makhana by traditional methods. The seeds are collected from water and thoroughly washed multiple times with water. The seeds are then dried and popped by heating, creating the pressure that causes the expansion of the kernel (Photo plate 1H). Makhana have high nutritional value with 12.8% moisture, 76.9% carbohydrates, 9.7% proteins, 0.1% fat, 0.5% minerals, 0.02% calcium, 0.5% fiber, 15.2% moisture, 0.66% ash content, 0.9% phosphorous, and 0.0014% iron[20-23]. Due to its high nutritional value, it has been incorporated into day-to-day eating habits. They are roasted with ghee, salt, and some spices and can be consumed as a snack. Makhana curry, made with tomato puree and spices, is also prepared and consumed as a vegetable. During fasting, makhana kheer is prepared with milk and other dry fruits (Photo plate 1I).

6. *Fagopyrum esculentum* Moench

Fagopyrum esculentum, popularly known as buckwheat, phaphar and kuttu, belongs to the family Polygonaceae. It is a pseudocereal, as its grains are structurally and chemically similar to cereals. The major buckwheat-cultivating states are Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Mizoram, Nagaland, Sikkim, Tamil Nadu, Uttarakhand, and West Bengal[24]. The fruit of buckwheat is a one-seeded achene inside a coat. Usually, buckwheat achene is dehulled before milling. Milling is done either by roller milling or by the conventional stone mill method[25]. Buckwheat flour have 65.1% carbohydrates, 10.3% protein, 2.4% fat, 8.6% fiber, 11.9% moisture, 2.8% ash content and 2.3% minerals[26-28]. Flour is used in various food preparations (Photo plate 1K). Kuttu ka atta is used to make faraali paratha, pakoda (fritters), and puri. The dough is prepared with boiled potatoes, which help the flour to bind since the flour is gluten-free. Kuttu ka halwa is also prepared with buckwheat flour, ghee, and sugar (Photo plate 1L). Kuttu ki khichdi (porridge) is prepared with broken buckwheat cereals and vegetables.

7. *Maranta arundinacea* L.

Maranta arundinacea, commonly known as ararot or arrowroot, belongs to the family Marantaceae. It is an herbaceous plant that is cultivated in Assam, Bihar, Kerala, Orissa, Uttar Pradesh, and West Bengal. The starchy rhizomes are used for the preparation of flour. The rhizomes are washed and sundried. The sundried rhizomes are then grinded to get a fine starchy powder. Arrowroot flour is used as a substitute for corn starch during fasts (Photo plate 1J). It helps as a binding agent in several snacks, such as sabudana vada and faraalipattice. Arrowroot starch comprises 80.77% carbohydrate, 7.06% moisture, 1.43% fat, 3.75% protein, 3.96% fiber, and 3.60% ash content[29].

8. *Trapa natans* L.

Trapa natans, commonly known as water chestnut or singhada, belongs to the family Lythraceae. It is a rooted, floating plant that grows in nutrient rich shallow, marshy lakes and ponds. It is extensively found in eastern states such as Bihar, Jharkhand and West Bengal. The edible part is the fruit, which has barbed spines and a thick outer pericarp that is violet-green in color (Photo plate 1M). Fruits can be consumed either fresh, steamed, or as flour in various dishes. The fruits are thoroughly washed, and the pericarp is peeled off. After that, the internal white fruit is sun dried, and flour is prepared, which is used during fasting[30]. The flour is used in making puris, pakodas, and vadas (Photo plate 1N). The flour is also used to make Singhade ka halwa. It is a popular sweet dish prepared during fasts. The flour is

roasted with ghee on a low flame, and hot water is poured. The flour absorbs all the water, and the sugar is then added. Singhada has 81.25% carbohydrates, 4.18% protein, 0.52% fat, 1.51% fiber, 0.035% calcium, 0.20% phosphorous, 96.67% moisture, 0.18% ash content, and 3.85% potassium[31, 32].

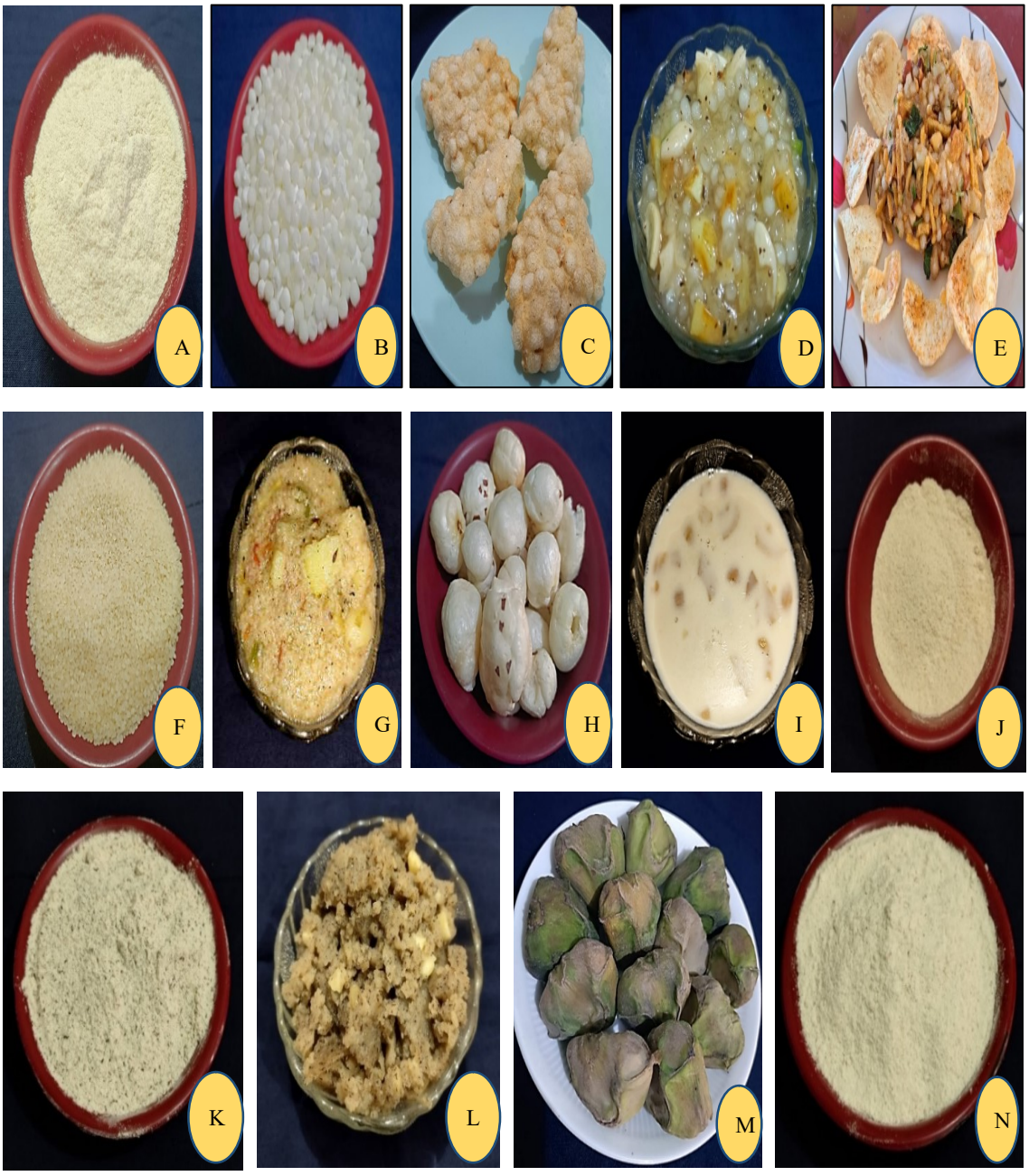

Photo plate 1: Major fasting foods (A) *A.paniculatus*flour (B) Sabudana (C) SabudanaPapad (D) Sabudana khichdi (E) Sabudana vada (F) *Echinochloa*grains (G) Sama ki khichdi (H) Makhana (I) Makhana ki kheer (J) *M.arundinacea*flour (K) *F. esculentum* flour (L) Kuttu ka halwa (M) *T. natans* fruits (N) *T. natans*flour.

Table 1: List of plants and their parts used as fasting foods in Rajasthan

S.No.	Scientific name of plant	Common name	Family	Plant part used
1.	*Amaranthus paniculatus*	Rajgira	Amaranthaceae	Grains
2.	*Celastruspaniculatus*	Malkangani	Celastraceae	Grains
3.	*Cycas revoluta*	Sago palm	Cycadaceae	Starch obtained from leaves
4.	*Echinochloa frumentacea*	Sama	Poaceae	Grains
5.	*Euryale ferox*	Makhana, Fox nuts	Nymphaeaceae	Seeds
6.	*Fagopyrum esculantum*	Kuttu/Buckwheat	Polygonaceae	Grains
7.	*Maranta arundinacea*	Arrowroot	Marantaceae	Rhizome
8.	*Trapa natans*	Waterchestnut,Singhaada	Lythraceae	Fruit

Table 2: Nutrient composition of major fasting foods

S.No.	Plant name	Carbohydrate (%)	Protein (%)	Fat (%)	Moisture (%)	Fiber (%)	Ash content (%)
1	*Amaranthuspaniculatus*	73.04	15.70	8.23	7.68	4.2	3.03
2	*Celastruspaniculatus*	-	-	45.5	-	-	-
3	*Echinochloa*spp.	68.8	10.1	3.9	8.7	6.7	3.79
4	*Euryale ferox*	76.9	9.7	0.1	15.2	0.5	0.66
5	*Fagopyrumesculentum*	65.1	10.3	2.4	11.9	8.6	2.8
6	*Manihotesculenta*	80	0.15	0.65	66.2	0.4	0.69
7	*Marantaarundinacea*	80.77	3.75	1.43	7.06	3.96	3.60
8	*Trapa natans*	81.25	4.18	0.52	96.67	0.035	0.18

Table 3: Health benefits for human health of various fasting foods

S.No.	Fasting Food	Health benefits	Reference
1.	Amaranth	Antioxidant; Anticancerous; Cytotoxicity; Antitumor; Hypoglycemic Activity	8, 33-35
2.	Arrowroot	Anticancerous; Antioxidant; Antiinflammatory; Antibacterial; Analgesic; Antispasmodic; Immune stimulating; Antiallergic; Antiviral; Hypercholesterolemia; Hyperglycemia; Antidysenteric; Antidiarrheal	36-42
3.	Barnyard millet	Antioxidant; Hypoglycaemic Activity; Hypolipidemic Activity; Antiinflammatory Activity; Cytotoxic Activity; Antibacterial; Antifungal Activity	17, 43-51
4.	Buckwheat	Antioxidant; Antiinflammatory; Hepatoprotective; Antidiabetic; Antiallergic	52-63
5.	Fox nuts	Antifungal; Antioxidant; Antidiabetic; Antitumor; Antihyperlipidaemic; Antibacterial; Antiinflammatory; Antimelanogenic; Antiaging; Antifatigue; Cardioprotective; Hepatoprotective	23, 64, 65
6.	Malkangani	Neuroprotective; Antipsychotic; Antidepressant; Antibacterial; Antiarthritic; Antimalarial; Analgesic; Antiinflammatory; Antifertility; Cardiovascular; Locomotor; Anxiolytic; Wound Healing activity; Antispasmodic; Hypolipidemic; Anticancerous	66-68
7.	Sago	Cytoxic; Antioxidant; antimicrobial; anti-inflammatory; anticancerous; antitumor; chemo preventive	69-73
8.	Water chestnut	Antipyretic; Anticancerous; Antiinflammatory; Antihyperglycemic, Antihepatotoxic; Antioxidant; Antimicrobial	74-81

Conclusion

Nowadays, various snacks, based on the ingredients used during fasting, are prepared and consumed in daily life. All of the foods consumed during a fast are high in carbohydrates, which provide energy for a long time. Millets are predominantly eaten during the fasts. Pseudo cereals can be regularly included in a healthy diet because they are gluten-free and have a high carbohydrate content. These millets are eaten by gluten-intolerant people as a substitute for wheat flour in their daily lives. The knowledge about the millets and their nutritional composition should be further studied as a recipe to better incorporate them in daily meals. Following further research, the millets may be incorporated into the diets of diabetics, as the majority of millets are gluten-free.

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