https://doi.org/10.29321/MAJ.10.A04638

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Sorghum Grain for Food

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Sorghum (*Cholam, Jola* or *Jonna*) is the second important grain crop in the Madras Presidency. It is grown annually on an area of about five million acres in this Province and on about 36 million acres in India. The sorghum grain is the main article of food of the rural population in the dry areas. It is used extensively as human food in Africa, Asia Minor and China also. It is the chief diet of the natives in Africa. It is reported that sorghum grain is the most important source of flour in Egypt and is used in bread-making mixed with wheat, barley and fenugreek or beans.

Now that there is scarcity of rice in many parts of the Province and the people have to manage with available substitutes an attempt is made in this brief note to indicate the common methods of utilizing sorghum. There may be slight variations or modifications in the different processes involved in preparing the same or similar product in different localities. The object of this note is only to present an idea of how sorghum can be prepared for food.

The Sorghum grain is a naked grain. That is, the grain obtained on threshing the earheads and which is sold in the market has no protective covering of husk as in rice. Threshing separates the grain from the husk. The colour of the grain may be white, yellow, red or rarely brown. The colour is confined only to a thin outer layer of the grain which is the seed coat. In all the grains the inner portion, called the endosperm, is white.

In food value the sorghum grain is superior to rice though only second to wheat. It is richer than rice in protein content and richer than wheat and infinitely richer than rice in fat content. The protein content of sorghum grain varies from 8 to 12 per cent and the fat (oil) content from 1·5 to 5 per cent in the different South Indian varieties. The analyses of samples of

sorghum, rice and wheat, according to Dr. Aykroyd (*Government of India. Health Bulletin No. 23, 1937*), are given in the following table.

	Moisture	Protein	Fat	Mineral matter	Fibre	Carbohydrate
Sorghum	11·88	10·42	1·93	1·76	...	73·99
Rice (raw, milled)	12·96	6·85	0·55	0·50	...	79·14
Wheat (whole)	12·77	11·77	1·45	1·49	1·20	71·30

For most of the preparations, except when the dry grain is converted into flour, the outer seed coat or bran is removed by pounding it lightly in a wooden mortar moistening the grain slightly by sprinkling water. The pounded grain is winnowed and washed with water. The amount of material lost in this process varies from 10 to 25 per cent depending upon the variety.

Annam or Cooked grain The grain after removal of the bran is washed and cooked as it is or after breaking it into small bits in a stone mill. About twice the quantity of water is used for cooking. This is similar to cooked rice and consumed with curry and butter milk. To make *pongal* a small proportion of greengram *dhal* is mixed with the grain and then cooked.

Sankatti, Mudda or Kali The grain after removal of the bran is dried and ground into coarse powder in a stone mill. The finer portions of the powder are sieved out. The coarse powder thus obtained is cooked with about three times its quantity of water. When the whole matter is cooked to the consistency of paste, the finer portion of the powder is also added, and mixed well and cooked. A thick pasty product thus obtained is rolled into balls and eaten. This is considered to be more easily digested than the *annam*.

Kanji or Kulu The process of making this is the same as that for *sankatti*, except that a higher proportion (5 : 1) of water is added, so that the cooked matter is in a more liquid state.

Rotti This is the most common preparation of sorghum in the Bellary district and the adjoining Deccan tract which is the main sorghum area in India. The whole grain is ground into fine flour and sieved to remove coarse particles or bits of seed coat. The fine flour is made into dough by adding water preferably hot water. The dough is kneaded well and is divided into small balls of the size of a tennis ball. The balls are spread out by hand to form circular discs of about quarter of an inch or less thickness and eight to ten inches in diameter. This is baked on a hot pan. A small quantity of wheat or blackgram flour and a few pinches of salt may be added to improve the quality of the sorghum flour and the taste of the product. *Rotti* is sometimes preserved for use for about a week.

Dosai or Pan cake The fine flour obtained by grinding the whole grain is used for this, or the whole grain or the grain after removing the bran is soaked in water and ground into a paste. Sorghum alone or

sorghum and rice is ground first and a small quantity of similarly prepared paste of black gram is added. Salt, chillies and onions are added according to taste; butter milk may also be added. The paste is made into *dosai* by baking on a hot pan on which oil is smeared. Sorghum mixed with red gram and black gram *dhal* may be soaked in water, ground into thick coarse paste and made into another kind of pan cake known as *adai* also.

Pops Another common or easy preparation of sorghum is the pop (*pori* or *pelalu*). All sorghums do not pop well. The grain of the variety known as *Konda jonna* in the Northern districts and *Alangara cholam, Vensamarai cholam* or *Talaivirichan cholam* in the Central and Southern districts is the best for popping. The grain of this variety pops better than that of others. When small quantities (a handful at a time) of dry grain is put on a hot pan or pot and stirred, the grains 'pop'. The pops are taken off the pan or pot immediately. The pops can be made into balls mixed with jaggery and preserved for use. The pops as such or pounded can also be used mixed with milk and sugar, or butter milk, salt and chillies.

Other preparations which are not widely known but common in some places are *kudumulu* or *hidlee*—for which the sorghum flour is mixed with cowpea or Bengalgram and condiments, converted to paste, made into balls or thick flat cakes and cooked in steam; *chakkadam*—for which the flour is moistened with boiling water, salt added, made into small balls, cooked in steam, the cooked balls pressed in a hand press with perforated socket and the pressed stuff fried in oil; and *burelu*—for which the sorghum flour is mixed with jaggery, moistened with water, made into small balls and fried in oil. These show that sorghum can be substituted for rice to prepare many products for every day cunsumption.

A Trial with Cocanada Cottons

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Since there had been a good market for the short staple cotton of white and red mixture and there had been increasing demand for pure red cotton I had to replace the local variety by a suitable one. For this purpose I conducted a trial in 1941-42 with the following varieties: (i) local (Kandukur); (ii) Kanigiri (Nellore district) (iii) Ambapuram (Guntur district) and (iv) X-20—a 'Cocanada' strain of the Madras Agricultural Department. All these varieties are classed as 'Cocanadas' by the trade.

The trial was conducted in black soil of medium fertility. A rectangular block of the field was divided into seven plots and the different varieties were sown in these in the following arrangement: Plot 1—local, plot 2—X-20, plot 3—local, plot 4—Kanigiri, plot 5—local, plot 6—Ambapuram and plot 7—local. Each plot contained 8 rows of plants 165 ft. long and