

NUTRITION

Diet in Health and Disease

By

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The Nature of Foods (Cont'd)

Pulses.

It has been observed by the National Sample Survey of 1950-51 that 66.3% of the total income of an Indian was spent on food but that the expenditure on pulses was only 3.58% and this varied from State to State. The Nutrition Advisory Committee of the Indian Council of Medical Research have suggested that there should be at least 3 ounces of pulses in the daily diet of an average healthy Indian. The diet survey records that the actual average consumption figure in ounces in the various States was 1.63 in Assam, 3.13 in Bihar, 2.73 in Bombay, 5.21 in Madhya Pradesh, 1.66 in Hyderabad, 0.93 in Madras, 2.34 in Orissa, 3.93 in the Punjab, 0.93 in Travancore and 1.57 in West Bengal. Thus it will be seen that pulses form a very insignificant part of the total calorie consumption, the figures being only 7.3% for agriculturists, 8.7% for industrial labourers and 11.4% for students. The common types of pulses consumed are red gram, Bengal gram, green gram, black gram and lentil.

In a country such as India, where the diet is predominantly of cereals, pulses should form an important constituent of the daily diet because of their rich protein content, for which reason they are called "poor man's meat". The digestibility of pulses is lower than cereals but is increased by cooking. Pulses are quite good sources of iron. The biological value of pulses is as follows :

Bengal gram	76	Green gram	51
Black gram	64	Horse gram	59
Cowpea	61	Lentil	58
Field pea	41	Red gram	74

Pulses form a very rich source of vitamin C if they are allowed to germinate and of these, green gram contains the highest amount of the vitamin, i.e., 10-15 mgm. per 100 grams. Pulses are also rich sources of thiamine. On cooking they take up a considerable amount of water and become a bulky food. If properly prepared and present in a state of finer divisions, pulses are absorbed in the intestine very thoroughly; green gram is the most easily digestible while black gram, cowpea and horse gram are the most difficult. It is unfortunate that the people of India consume so little of these pulses in their daily dietary, as the shortage of animal protein in the normal diet makes it desirable that there should be an adequate quantity of the pulses to make good the deficiency, if not wholly, at least to a considerable extent.

Nuts.

Nuts are valuable food, possessing a high caloric value, approaching that of cheese. They have a high protein content, and are rich in calcium and fat. Due to the large quantity present in the compact frame-work of cellulose, they are difficult to digest but this can be overcome to a considerable extent by thorough mastication and, if necessary, by cooking. In spite of being such important foods, their contribution in the daily dietary

is almost negligible and is probably due to their high cost or to social customs and habits. Their digestibility is high but there is a greater waste of the protein in the excreta.

Of the nuts, almonds are very rich in nitrogenous matter. They are a type of compact, concentrated food. The *Ayurvedic* system of medicine has very high praise for this nut and the *Vaidyas* suggest that they should first be soaked over night in warm water to break up the cellulose, then peeled and made into a thin paste by rubbing each nut against a stone. The latter procedure reduces the substance of the almonds to very fine particles and thereby renders their digestion much easier.

Sugar.

It is an important article of diet since it is a cheap, concentrated source of calories. It has its disadvantages too which are :

(i) It is a source of calories only, and if the appetite is sated on it, other nutrients such as proteins and fats, and vitamins and minerals are crowded out of the diet.

(ii) It is believed that excess consumption of it causes caries of teeth.

(iii) It is possible that excess of it in food may lead to diabetes.

Sugars are of two types : (i) Monosaccharides (simple sugars) such as glucose, galactose and fructose.

(i) Monosaccharides. The best example is glucose which is present in grapes and is derived from the splitting of starch or maltose. Commercially it is produced from starch. Invert sugar is a mixture of glucose and fructose of which the most familiar example is honey. Glucose and fructose is present in equal parts in honey and the flavour is due to the volatile substances derived from flowers. Honey gives about 288 calories per 100 grams or nearly 1,320 calories per pound or 82 calories per ounce. Fructose is fruit sugar.

(ii) Disaccharides (double sugars). Cane-sugar or sucrose is the most common example. It is derived from the juice of sugar-cane. When derived from other sources, special names are given *e. g.* beet-sugar. Chemically all types of sugars in this group *e. g.*, lactose, malt sugar and sucrose are indistinguishable.

Sugar from sugar-cane was probably known in China 2000 years before it was known in Europe. In the course of exchange of goods, it was brought to India and then travelled westward to Greece and other parts of Europe. It was in the middle ages that Europeans came to know and use it.

Sugar-cane juice contains about 13 to 14% sucrose. Pure crystalline cane-sugar contains 99.7% pure sucrose. Before the introduction of sugar mills, the cane juice was made into what is called *Gur* or *Jaggery*, and even now this process is in practice in almost every village though on a smaller scale. Its process of preparation is that the sugar-cane juice is expressed in crushers, then put in big flat vats, boiled and milk is added to clarify the juice. The thickened juice is then put into moulds to set, each of which may weigh from 5 to 20 seers. Our investigations have revealed that *Gur* contains 0.25 g protein, 0.05 g fat, 84.89 g carbohydrate per 100 grams. It contains about 59.71% of pure sucrose and 21.18 of glucose and fructose. Cane-sugar does not contain any calcium or phosphorus while *gur* contains 0.4 and 0.045 grams per 100 grams respectively. *Gur* contains a number of trace elements and vitamins B₁, riboflavin and vitamin D but none of these are present in cane-sugar. Thus *Gur* should be more widely used to replace refined white sugar.

Since the introduction of prohibition in some of the States, palm juice is being utilised for the purposes of production of *Palm Gur*. Analysis of the different types of *Palm Gur* have been carried out, the results of which are given as follows :

	Grams per 100 grams			
	Protein	Fat	Cane-Sugar	Glucose and Fructose
Cane gur	0.25	0.05	59.71	21.18
Fan-palm gur	1.37	0.11	75.16	3.12
Date-palm gur	1.46	0.26	72.01	1.48
Coconut palm gur	0.96	0.15	71.89	3.70
Sago-palm gur	2.28	0.11	84.31	0.53

It can be seen that other types of *gur* are nutritionally superior to cane *gur*. Nutritionists acknowledge the superiority of *gur* over cane-sugar and encourage its use.

Digestibility.

In whatever form sugars or *gur* are consumed, all must first be reduced to the stage of glucose before absorption and utilisation is possible. From a dietetic stand-point we may call the monosaccharides predigested sugar because it is fit for direct absorption and utilisation hence its therapeutic value. Sugars depress the acidity of stomach so a hyperchlorohydric can take it with impunity, but not a hypo-chlorohydric.

Sugar is extremely useful in raising the blood sugar quickly and supplying energy, one gram of which gives 3.92 calories.

According to the National Sample Survey, 66.3% of the total annual income was spent on food and of this 2.66% was spent on sugar. The average consumption of sugar per consumption unit per day, in ounces, is: Assam 0.29, Bihar 0.37, Bombay 0.11, Madhya Pradesh 0.24, Hyderabad 0.34, Madras 0.29, Orissa 0.22, Punjab 0.54, Travancore 0.54 and West Bengal 0.55. This would show that in every State the consumption was much less than the desired level of 2 ounces per head per day. Efforts are required to raise the consumption of sugar to this suggested level to fill up the deficiency in calories.

Oils and fats.

These include butter, meat fat, oils from seeds and nuts etc. The importance of fat in our diet is very

great and is the most concentrated of the energy food, supplying weight for weight and two and half times more calories than cereals or pulses; and secondly, that animal fats are the best sources of some of the fat soluble vitamins such as vitamins A & D.

The type of vegetable oil used for culinary purposes varies *e.g.* in Bihar, Bengal and Orissa: mustard oil; Madhya Pradesh: linseed oil; Madras: gingilly oil; Bombay: groundnut oil and Malabar: coconut oil. Nutritionally there is no difference, all being of equal caloric value and all are devoid of fat soluble vitamins.

The liquid vegetable oils when hydrogenated assume the colour and texture of ghee and are sold in the market under various trade names. Considerable work has been done on this article of food and so far the consensus of opinion is that its consumption is not deleterious to health.

Animal fats are consumed in this country in two forms *i.e.*, butter and *ghee*. The latter is prepared after boiling and clarifying the butter. The average vitamin A content of *buffalo ghee* has been reported to be 25.4 I. U. per *g.* when *ghee* is stored at room temperature, but deteriorates on long keeping. At the end of four months of storage the loss is about 25%. It has been observed that by the Indian methods of cooking, this vitamin is destroyed. Frying *purees* causes a loss of 63 to 69.5%; frying of vegetables in *ghee* for 22 to 45 minutes causes a total loss while in ordinary cooking in water the loss was about 20 to 24%. In making *parathas* the loss is 8.7% and 32 to 39% in making *halwa*. In making *ghee* from butter the loss of vitamin A is almost negligible.

Butter usually contains 16 to 17% of moisture, 2% of non-fatty organic matter, chiefly caseinogen and milk sugar. An ounce of butter may be reckoned as the equivalent of 4/5 ounce of pure fat. It is rich in vitamin A

(520 I. U. per 100 g) but not as much as those of Western countries for the reason that our cattle are not so well fed. Absorption of butter in the intestine is complete. Even when quarter pound of butter is taken per day, less than 0.5 per cent is wasted which is due to its lower melting point.

The consumption of oils and fats per consumption unit per day in ounces in the various States is: Assam 0.67, Bihar 0.42, Bombay 4.9, Madhya Pradesh 0.40, Hyderabad 0.55, Madras 0.41, Orissa 0.71, Punjab 1.14, Travancore 5.19, and West Bengal

0.98. The suggested standard is at least 2 ozs a day. There is thus a wide gap which needs to be filled up. The annual expenditure over this item per head in this country is only 8.32 rupees or 3.79% of the total expenditure on foods.

Nutritionally, except for the availability of vitamins in animal fats, there is practically no difference between vegetable oils and butter or *ghee* though no doubt the latter is preferable but for the time being our purpose would be served if even the consumption of oils is raised.

Independence Day Celebrations

Chest Hospital, (Civil) Aundh, Poona

15th August was a red-letter day in the history of the Chest Hospital, Aundh (Camp). It began with a Flag Hoisting Ceremony which was attended by the entire staff of the Hospital and their families, and the patients.

After the ceremony a variety entertainment programme was arranged by the patients in the gaily decorated Recreation Hall.

The first item was the unveiling of a portrait of Mahatma Gandhi by the Superintendent, Dr. F. J. Mendonca. This was followed by the switching on the new Radiogram by Mrs. Mendonca. The Superintendent then spoke of the various achievements of the Government during the past six years. After his speech many patients came forward with donations for a fund to be called "The Patients Welfare Fund". We collected Rs. 500/-.

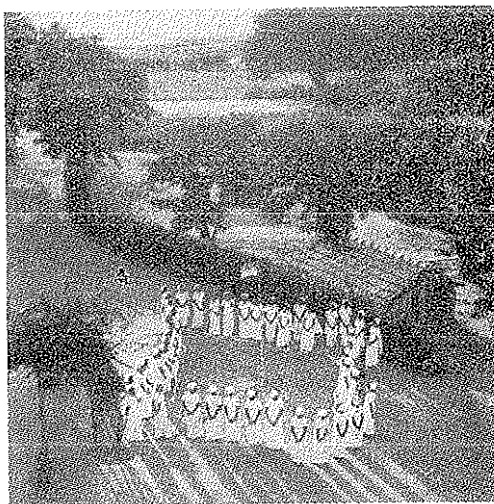
Refreshments were served; then followed a programme of songs, playlets and comics which everyone enjoyed.

Thanks are due to Mrs. Pinto and Mrs. Menon for their great help and suggestions.

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It was with great joy we gathered together in front of the hospital for flag hoisting. There, a map of India, outlined with chunam was drawn on



Nurses form Map of India

the ground with 'Jai Hind' written in the centre. Also in the centre of the map stood a flag pole.