

# FOOD PROCESSING OF MILLET'S

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# Introduction

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- ✓ Cereals are staple foods, and are important sources of nutrients in both developed and developing countries
- Wheat, rice, and corn are the major important grains in the human diet.
- The minor grains include oats, barley, rye, triticale, sorghum and millets
- ✓ Cereals grains are rich sources of fibre, vitamins, minerals, and photochemicals



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- After harvest, correct storage of the grain is important to prevent mould spoilage, pest infestation and grain germination
  - Dehusking (Dehulling) and Milling are the main processing techniques associated with cereals

# Cereals and Millets

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- Sorghum
- Maize
- Foxtail Millet
- Pearl Millet
- Finger Millet
- Kodo Millet
- Little Millet
- Proso Millet
- Barnyard Millet



# Maize

- It is a cheap form of starch and is a major energy source for animal feed
- Commercial important varieties of maize are
  1. dent maize (identified by the dent in the crown of the kernel);
  2. flint maize (hard, round kernels);
  3. sweet corn (a dent-type maize);
  4. popcorn (flint-type maize which expands when heated).



# Sorghum

- It is an important food crop in sub-Saharan Africa on account of its drought tolerance
- Low glycemic index and increase satiety
- Gluten Free foods





# Foxtail Millet



- Foxtail millet (*Setaria italica*) is one of the important food crops in parts of the Indian subcontinent, African countries and China. Telugu : Korra
- Foxtail millet ranks second in the total world production of millets.
- Foxtail Millet contains 9-14% protein, 70-80% carbohydrates and is a rich source of dietary fiber.
- It contains maximum amount of chromium among all the millets with an account of 0.030mg per 100g.
- Foxtail Millet is a starchy food with a 25:75 amylose to amylopectin ratio. Lipids are 3-6% having about 50% of the lipids in the form of polyunsaturated fatty acids

# Pearl Millet



- India is the largest producer of pearl millet in Asia, both in terms of area about 9 million ha and production 8.3 million tons. Telugu: Sajja
- A pearl millet grain comprises about 8% pericarp, 17% germ and 75% endosperm.
- Pearl Millet Protein 7.3, Fiber 3.6, Minerals 2.7, Iron 3.9, Calcium 344.
- Pearl millet for increasing its acceptability as ready to serve break-fast food and improving rural economy and health of rural people.



## Production status

Crop	Production (Million Tonnes) (2012-2013)
Rice	101.8
Wheat	92.2
Sorghum	5.2
Maize	21.0
Pearl Millet	8.1
Finger Millet	1.7
Small Millets	0.4
Ref: Ministry of Agriculture, GOI	

## Nutritional composition

Crop	Protein (g)	Fat (g)	Fiber (g)	CHO (g)	Minerals (g)	Iron (mg)	Calcium (mg)
Rice raw milled	6.8	0.5	0.2	78.2	0.6	0.7	10
Wheat	11.8	1.5	1.2	71.2	1.5	5.3	41
Sorghum	10.4	1.9	1.6	72.6	1.6	4.1	25
Maize	11.1	3.6	2.7	66.2	1.5	2.3	10
Foxtail Millet	12.3	4.3	8.0	60.9	3.3	2.8	31
Pearl Millet	11.6	5.0	1.2	67.5	2.3	8.0	42
Finger Millet	7.3	1.3	3.6	72.0	2.7	3.9	344
Kodo Millet	11.0	3.6	10.0	66.6	1.9	0.5	27
Little Millet	7.7		7.6		1.5	9.3	27
Proso Millet	12.5	4.2	2.2	73.0	1.9	0.8	14
Barnyard Millet	12.2	3.85	10.1	55.8	3.2	1.4	24





### Sector-wise Number of Registered Food Processing Units

S. No.	Year	Meat, Fish, Fruits, Vegetables and Oils	Dairy Products	Grain Mill Products	Other Food Products	Beverages	Total
1	1998-1999	4241	737	12164	5682	1029	23853
2	1999-2000	3819	795	12405	5810	1113	23942
3	2000-2001	3740	735	12446	5985	1082	23988
4	2001-2002	3454	865	12429	5688	1049	23485
5	2002-2003	3284	769	12856	5899	1008	23816
6	2003-2004	3352	912	12741	5757	1078	23840
7	2004-2005	3484	927	13639	6093	1219	25362
8	2005-2006	3549	1049	13893	6009	1225	25725
9	2006-2007	3459	1015	13880	6245	1160	25759
10	2007-2008	3667	1096	13805	6300	1351	26219
11	2008-2009	3580	1100	14599	6577	1362	27218
12	2009-2010	3697	1112	14673	6681	1316	27479
13	2010-2011(P)	4910	1493	18549	9071	1815	35838

(Source: Annual Survey of Industries), P: Provisional Results

# Health tags for Millets and coarse cereals

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- Gluten free
- High fibre
- Diabetic foods
- Mineral rich foods
- Multi benefit foods Food for life style diseases



# Reasons for low consumption

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- Coarseness, colour and overall appearance
- Considered as staple of food of poor
- Difficulty in processing at domestic level
- Non-prestigious
- Non availability of ready to use or easy to cook foods from millets in the market
- Govt. subsidy to fine cereals

# Primary processing

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- Dehulling technology is available for various capacity dehulling fabrication of machine is possible
- Whole grain flour
- Dehulled grain flour
- Coarse rawa
- Semolina



# Naturally processed ingredients

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- Fermented flour and rawa
- Germinated rawa and flour
- Autoclaved rawa and flour for RS3 enhancement
- Composite flours

# Value-Added Supply Chain

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- Excellent food products can be and are made from millets.
- The value-added supply chain includes
  - Seed supplier (seed production) - quality and purity
  - Grain producer
  - Harvesting
  - Storage
  - Handling and transportation
  - Processing into products
  - Marketing



# Milling

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- The millet was decorticated in pilot-scale rice milling machinery with suitable adaptations.
- Husking was done in a centrifugal sheller.
- The husked material was debranned in a horizontal emery cone according.
- The husk and the bran fractions together (seed coat material) formed 26% of the millet

# Conclusion

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- World over increasing number of NCD is leading to Commercialization of millet products is the need of the hour
- Ready-to-eat food industry should come forward to provide a healthy food to the mankind keeping in view the changing demography
- Public private partnership helps for better commercialization
- Farmer encouragement