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Commonly used storage and primary processing techniques for the selected food grains in scarce rainfall zone of Andhra Pradesh

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Present study was aimed at examining different storage and processing techniques used by farmers in the scarce rainfall zone of Andhra Pradesh. A total of 30 farmers (Maize, Bengal Gram, groundnut and *Jowar* growing) were purposively selected for the present study by adopting the purposive sampling method. The results found that 100 % of farmers used gunny bags for storage of grains and 63 per cent of farmers have utilized the Cold storage facility to store their produce. The farmers stored the maximum quantity of grains for home consumption. The common primary processing techniques used by farmers were dry milling, wet milling and popping for selected grains. Finally, it can be said that nutritional quality of grains is influenced by pre-processing treatments and processes which retain all parts of whole grains as beneficial for health and consumption of highly refined products should be discouraged.

Key Words : Food grains, Cereals, Legumes, Maize, Groundnut, Jowar

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INTRODUCTION

Cereals and legumes are major staple foods, specifically in Asian dietaries. They are rich sources of nutrients especially when used as whole grains. However, most grains are processed further after cleaning and grading to yield end products useful for industry. These pre-processing operations such as dehulling, milling, refining, polishing, etc. alter the nutritional composition of resultant product to varying degrees. These could also modify the matrices, the surrounding in which nutrients are embedded in a grain, which in turn influences the nutrient availability *in vivo*. While some cereal grains like rice or legumes are consumed as whole grains, most cereals are converted to flour before usage (Oghbaei and Prakash, 2016)

Milling is defined as an act or process of grinding, especially grinding grain into flour or meal (Bender, 2006). It is an important and intermediate step in post-production of grain. The basic objective of milling process is to remove the husk and sometimes the bran layers, and produce an edible portion that is free of impurities and in the form of a powder with varying particle size. The concentration of essential nutrients decreases with the degree of milling with minor alteration in energy density of pre- and post-meal (Ramberg and McAnalley, 2002). Structurally, all grains are composed of endosperm, germ, and bran. The endosperm comprises < 80% of the whole grain, whereas the percentages accounted for the germ and bran components vary among different grains. Milling

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process can be of two kinds, (1) wherein the whole grain is converted into flour without abstracting any parts or, (2) it could undergo differential milling to separate the grain into different parts. For example, maize could be milled as whole maize flour.

Cereals are the most important sources of food, and cereal-based foods are a major source of energy, protein, B vitamins, and minerals for the population of the world. Many scientific studies support the observation that consumption of whole grain cereals can protect against diabetes, obesity, constipation, cardiovascular disease, and other lifestyle disorders (Anderson, 2003; Fardet, 2010; McKevith, 2004 and Priebe *et al.*, 2008). The changes in composition and matrix of grain due to milling process can explain why whole grain consumption can be advisable. Elements in whole grain associated with health status include lignans, tocotrienols, phenolic compounds, and antinutrients including phytic acid, tannins, and enzyme inhibitors. In the process of refining grain, the bran is separated, resulting in the loss of dietary fibre, vitamins, minerals, lignans, phytoestrogens, phenolic compounds, and phytic acid. Thus refined grains are more concentrated in starch since most of the bran and some of the germ is removed in the refining process. The phytochemicals are involved in health-improving activities which are very important for stressful life. So using whole grain or milled flour without sieving and separating different portion can be beneficial for health (Schatzkin *et al.*, 2007 and Slavin, 2004).

The present study undertaken to know the commonly used storage and primary processing techniques used by farmers in maize, Bengal gram, groundnut and *Jowar*.

METHODOLOGY

Sample selection:

A total of 30 farmers (Maize, Bengal Gram, groundnut and *Jowar* growers) from Kurnool and Anantapur districts were purposively selected for the present study by adopting the purposive sampling method.

Questionnaire:

A pre-tested and structured questionnaire was prepared and used for the present baseline study.

Survey method adopted:

Personal interview method of data collection was applied to collect primary data from the targeted respondents to study the commonly used storage and primary processing techniques for the selected food grains in scarce rainfall zone of Andhra Pradesh.

Data analysis:

The results of the collected data were statistically analyzed by using tabular and simple percentage method.

By using a structured questionnaire information was collected from 30 farmers on package of practices in relation to commonly used storage and primary processing techniques.

The results were statistically analyzed by using simple percentile method (Snecdor and Cohran, 1983).

OBSERVATIONS AND ASSESSMENT

The package of practices in relation to commonly used storage and primary processing techniques in maize, Bengal gram, *Jowar* and groundnut in the scarce rainfall zone of Andhra Pradesh were studied

The study shows (Fig.1) that the grains are stored before sale and before consumption by farmers. Eighty three per cent of farmers stored grain for < 6 months, 10 per cent stored them for period ranging from 6 months to one year and the remaining 7 per cent of the farmers have stored the grains for more than one year before sale. Twenty three per cent of farmers stored grains for < 6 months, 44 per cent of whom have stored in the range of 6 months to one year and 33 per cent of the farmers have stored the food grains above one year before consumption.

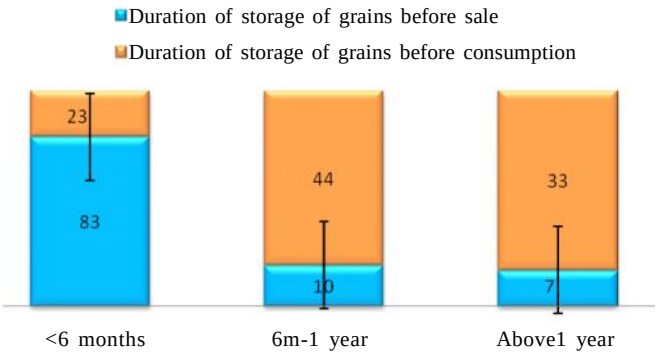

Fig. 1 : Duration of storage of grains before and after sale by farmers

Table 1 shows the type of storage structures used by farmers. Hundred per cent of farmers used gunny bags for storage of grains. Other storage structures such

as tins, pots, bins and pathara were unused by the farmers. 63 per cent of farmers have utilized the Cold storage facility to store their produce. A study by Aparna and Vijaya Lakshmi (2011) showed the usage of similar storage structures for food grains in and around southern zone of Andhra Pradesh.

Table 1 : Type of storage structures used by farmers

Type of storage	% of farmers
Gunny bags	100
Tins	0
Pots	0
Bins	0
Pathara	0
Cold storage	63

Table 2 explains the treatments given by farmers during storage of seeds. While storing the grains, 10 per cent of farmers had used red chillies and 27 per cent of them used neem leaves. Left over sixty three per cent of farmers did not give any kind of treatment to the grains during storage.

Table 2 : Treatment given to the grains during storage by farmers

Seed treatment	% of farmers
Red chillies	10
Neem leaves	27
None	63

In Table 3 its illustrated that Forty per cent of farmers have stored less than fifty kilograms (< 50 kg) of millets for home consumption, 53 per cent farmers stored millets in the range of 50-100 kg for domicile usage, left over 7 per cent of farmers stocked up above 100 kg millets for intake at home. Maximum storage of pulses by farmers for residential purpose of less than 50 kg was about 47 per cent, 50-100 kg of pulses were stored by 30 per cent of the farmers and above 100 kg of pulses were stored by the remaining 23 per cent of the farmers. A maximum of about 50 kg oil seeds were stored by farmers making a majority of 73 per cent of all the farmers, the left over 27 per cent have stored the oil seeds in the range of 50-100 kg quantities. No farmer had stored the oils seeds above 100 kg for domicile utilization in Anantapur and Kurnool districts.

Table 3 : Maximum storage of selected food grains by farmers for home consumption

Crops	% of farmers stored grains for home consumption		
	< 50 kg	50 -100 kg	> 100 kg
Millets	40	53	7
Pulses	47	30	23
Oil seeds	73	27	0

Table 4 exhibits the pre-processing techniques used by farmers for selected grains. Only ten per cent of farmers processed the maize using dry milling technique, while 17 per cent processed it by popping. A majority of sixty per cent of farmers processed Bengal gram. Nearly half of the *Jowar* was processed by dry milling technique. This technique was not used for groundnut by farmers. None of the farmers processed the grains by wet milling technique. Popping technique was not used by Bengal gram, groundnut and *Jowar* farmers.

Table 4 : Pre processing techniques used by farmers for selected grains

Processing	% of farmers using pre-processing techniques			
	Maize	Bengal gram	Groundnut	*Jowar*
Dry milling	10	60	0	50
Wet milling	0	0	0	0
Popping	17	0	0	0

Conclusion :

Cereals and legumes undergo different types of primary processing to enable their further use for product manufacture or cooking. Some of the primary processed products are also in ready-to-eat form such as expanded rice products. Generally processing alters the grain quality. As long as the whole grain is used, all nutrients and phytochemicals are retained; however, abstraction of any part of the grain results in reduced nutrients. The distribution of nutrients and phytochemicals in any grain is not uniform with the outer portion containing more nutrients and fibre contents. The storage structures gunny bag and cold storage was used by farmers of Anantapur and Kurnool districts. The farmers stored the maximum quantity of grains for home consumption. The common primary processing techniques used by farmers were dry milling, wet milling and popping for selected grains. Finally, it can be said that nutritional quality of grains is influenced by pre-processing treatments and processes which retain all parts of whole grains as beneficial for health and consumption of highly refined products should be discouraged.

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