

Moisture Content Of The Two Varieties Of Cowpea(*Vigna Unguiculata L.*) Seedsduring Storage

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Abstract:

The present evaluated air oven moisture content procedure for cowpea(*Vigna unguiculata L.*) by using two verities of three different storage samples like Farmers, Whole sellers and Retailers. The procedure includes 110°C for 2 hrs in Air oven moisture content. Analysis of the moisture content levels shows the little difference between white and brown cowpea seeds. From all results estimated shows that the white cowpea seeds shows the little high moisture content in all three storage samples compared to the Brown cowpea seeds.

Key words: Air oven moisture content, Cowpea seeds, *Vigna unguiculata L.*

Introduction:

Cowpea is an important leguminous Crop. Cowpea is one of the main pulses in Telangana. It contains high protein content and commonly used in daily food habits. Cowpea rich in fibre, protein, iron, potassium, low in fat and calories. The cowpea seeds possess fiber (11.1g), Protein (32.22), Iron(4.29mg), Potassium (475 mg), Fat (0.91 g) and calories (198).

Due to its high protein content, it's used in malnutrition among children. The production of the cowpea only dependent on propagated material of the cowpea seed. Cowpea is a legume and mostly self-fertilizing food crop, farmers mostly use their own seeds for next season (**Francis and Waithaka, 2015**), and rarely they purchasing commercial seeds or developmental agencies seeds during period of crop failure or any specific resistant variety. Usually, farmers use traditional forms of seed storage like hanging seed pods in the kitchen, use of gourds and pots or storage in sisal bags.

The cowpea seeds are contained in the pods and they open by splitting at maturity. The pod and seed maturity of the cowpea seeds were assessed by their pod colour from green colour at

starting to brown colour at maturity through light brown to yellow colour. The best harvest time for cowpea seeds is before pods turns into brown.

The amount of moisture present in the cowpea seeds were is most important factor for viability of seeds during storage (**O'Hareet al.,2001**). Cowpea seeds which were damaged will show the poor germination when they are used as planting material in subsequent seasons (**Olasoji et.al.,2013**). The environmental conditions acting on the plant will influence seed performance during the germination processes (**Wulf 1995; Hilhorst and Toorop, 1997; Salisbury and Ross, 1992**). Now a days the improved quality seed varieties were a main key for agricultural progress. The production potential and other selected characteristics of seeds set the limits on production. The declined rate of seed quality is largely dependent on storage temperature, relative humidity, seed moisture content, type and quality of the seed (**Yin et al.,2000: Hung et al.,2001; Amjad and Anjum, 2002**).

The removal of water content from the cowpea seeds can be achieved through three principal techniques (**Chen et al., 2003**). Drying with heated air for a fixed period of time is the simplest technique among all the methods. This method usually carried out using either a hot air oven or a vacuum oven. The Hot air ovens are commonly used as they are less expensive than the vacuum ovens. Most moisture content determination standards, the hot air oven is widely used (**Hart et al.,1959**). The Hot air oven drying method is using heating period, and the mass of the grain either whole or ground is usually specified (St. Joseph ,1982). The Karl Fischer technique (**Hart. J.R. et all.,1957**) and the method outlined by international organization for Standardization have been used to standardize simplified oven methods that are regarded as practical working methods.

In air -oven methods have been standardized for moisture determination of several common whole grains. They used the AOAC method as a standard, incorporating two -stage drying over method gave significance higher moisture contents compared to the AOAC method. Thus, there is a need to develop a standard oven method for whole-cowpea moisture content determination to would be accurate, rapid and easy to use.

Material methods:

Collection of the sample:

The samples of Cowpea (**Vigna unguiculata** L.) seeds of both brown and white coloured seeds were taken from Tarnamvillage,Adilabaddistrict, Telangana (Fig.1). The seeds were taken from 3 different sources like Farmers, Whole sellers and Retailers for identifying the moisturecontent of cowpes seeds in different storage areas



1. White coloured cowpea seeds

2. Brown coloured cowpea seeds

Experimental procedure:

The experiments were carried out at laboratory in Department of Botany, University Collage for Women, koti, Telangana. The air -oven method is used to determine the percent moisture content in cowpea seeds. The cowpea seeds are taken from the local area in Adilabad district. The sample of the cowpea were cleaned initially to remove foreign matter, dust, dirt, and immature seeds. The intial moisture content of the sample was determined by oven drying method at 110°C for 5 hrs(Dry Air Oven Method AOAC Method 1947).

For these Air ovens drying method, the 10 grams of cow pea seeds of brown and white coloured were taken. The knowing weight of both brown and white cowpea seeds were taken in a weighing dish of a known weight and kept in a hot air oven for 5 hrs at 110°C. The sample was removed from the hot air oven and then cooled in a container that may prevents loss or gain of moisture during the colling process. The excess moisture content of the sample was removed by placed over CaCl_2 in a desiccator. After the cooling the sample completely, the sample was reweighed. The mass of the sample was calculated as the percent moisture content of the seed. Then the process was repeated until the constant weight was obtained from the sample seeds. Due to this techniques, the commercial seed moisture methods were developed by comparing the seed moisture meter reading to grain moisture air-oven reference values. The Air -oven references methods also used to determine moisture values of seed samples that verify the accuracy and operation of commercial seed moisture meters.

The moisture content in the seed were calculated by following formula

$$\text{Percentage of moisture} = \frac{\text{Fresh weight of the seed} - \text{Dry weight of the seed}}{\text{Dry weight of the seed}} \times 100$$

Or

$$\text{Moisture \%} = \frac{W_1 - W_2 \times 100}{W_1}$$

The cowpea seed samples were then transferred to separate polyethylene bags and they were sealed tightly. The sealed samples were kept at 5°C in a refrigerator for a week to enable the moisture to distribute uniformly throughout the sample. Before experiment started, the required quantity of samples was taken out from the refrigerator and allow to warm at 110°C for 5 hrs in an air-hot oven to estimate the moisture content of the seeds.

Results and Discussion:

The results of the moisture content of the cowpea seeds were determined by using air oven moisture content determination methods for three different sample collections. In three we take three different storage samples for estimation of moisture content in cowpea seeds like Farmers, Whole seller and Retailers. Every storage sample of two varieties was taken 3 replicants about 6 months were taken for estimating the moisture content of the cowpea seeds shown in Table.1 and all three replicants of the two varieties was shown in the Table 2.

The effect of storage period on moisture content of two varieties of *Vigna unguiculata*

Variety		Moisturecontent(%)								
		StorageperiodinMonths								
		0	1	2	3	4	5	6	r	t
Vigna unguiculata L.	White cowpea	12.00	12.00	11.7	11.5	11.1	11.0	10.9	-	2.01 0.86
	Brown cowpea	12.00	12.00	11.6	11.4	11.4	11.6	10.3	-	1.52 0.62

Table -1 The Percentage of Moisture content in storage samples of two cowpea seed varieties

Moisture content percentage			
StorageLocation	SampleNo	Whitecowpea	Browncowpea
Farmers	1	12	12
	2	11.7	11.8
	3	11.5	11.5
Wholesalers	1	11.5	11.4
	2	11.3	11.2
	3	10.9	11.1
Retailers	1	10.9	10.7
	2	10.5	10.2
	3	10.6	10.1

Table - 2

From the Table -1, The white verity shows the little high moisture content compare to the brown cowpea verity. The r and t values of the White verity shows the 0.86 and 1.52 and Brown verity shows r and t values of 0.62 and 1.52.

From the Table -2, The percentage of the moisture content of two varieties of cowpea seeds shows the maximum similar moisture content with a little variation. In the three storage samples, the Farmer storage sample shows the highest moisture content compared to the Whole sellers and Retailers. White cowpea seed verity shows the high moisture content compare to the Brown cowpea seed verity from three storage samples.

Above Three storage samples like Farmers, Whole sellers and Retailers, The Farmers contains the high moisture content cowpea seeds compare to other two storage samples like Whole sellers and Retailers. The samples collected from the Farmers shows the moisture content percentage 12, 11.7 and 11.5 in White cowpea verity and 12, 11.8 and 11.5, in the brown verity from sample batch 2 shows the high moisture content. But in samples collected from Whole sellers and

Retailers the white cowpea seeds shows the high moisture content compared two brown cowpea seeds.

Conclusions: From the all these results it was concluded that the white verity of cowpea seeds shows the high moisture content compared to the brown verity of cowpea seeds in all three storage samples. And it also concluded that the storage samples from Farmers shows the high moisture content compared to the other two storage sample like Whole sealers and Retailer

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