

# Studies on shelf-life of coconut poonac

By

N. RAJASEKHARAN, C. K. BALAKRISHNAN NAMBIAR

AND

K. K. JANARDHANAN PILLAI

*Central Coconut Research Station, Kasaragod*

## INTRODUCTION

COCONUT poonac, a bye-product of coconut oil industry, is a valuable feed for livestock<sup>1</sup> and is also used as a fertilizer<sup>2</sup>. Due to its high sugar content, the cake is prone to moisture absorption and consequently to mould attack and deterioration. The most important factor that governs the initiation and progress of deterioration of coconut poonac is its moisture content. Analysis of samples from local mills showed that the moisture content of poonac obtained from power ghanies usually varies from 9 to 12 per cent; poonac from *chekkus* may have little higher moisture (about 13 per cent). The storage of poonac becomes increasingly difficult during monsoon, which lasts for about five months in Kerala, and when the humidity is high. This investigation was carried out to study the keeping quality of coconut poonac stored in different modes of packaging and

also to study the relation between the incidence of mould growth and the moisture content of coconut poonac.

## EXPERIMENTAL

Coconut poonac obtained from a power ghani in a local oil mill was used for this study. The analysis of the sample is given in Table 1. Samples were stored under the following six conditions:

1. Heap exposed to atmosphere.
2. Closed bin.
3. Closed bin in which a desiccant was kept.
4. Alkathene bag.
5. Alkathene lined gunny bag.
6. Gunny bag.

All the samples were stored in a dry store-house. Samples were drawn monthly from each lot and analysed for moisture, nitrogen, oil and F.F.A. The data obtained are given in Table 2.

STUDIES ON SHELF-LIFE OF COCONUT POONAC

TABLE 1  
Analysis of experimental coconut poonac

	(%)
Moisture	9.4
Protein (N x 6.25)	20.5
Carbohydrates (by diff)	40.1
Fibre .. ..	11.0
Ash .. ..	5.2
Oil .. ..	12.9
Total reducing sugars	13.7
F. F. A. of oil ..	40.0
Expressed as eq. of 0.1 N KOH per 100 gms. of poonac.	

The sample stored in a closed bin along with a desiccant remained good even after 8 months' storage. The cake was crisp, and had the characteristic fresh smell of coconut poonac. The F. F. A. content was lowest in this sample. The sample stored in a heap, exposed to atmosphere had definite rancid odour at the end of six months' storage and was 'soft'. The samples stored in alkathene bag and alkathene lined gunny bag stored better than those stored in ordinary gunny bag and closed bin.

All the samples remained free from fungal growth during the period of study, except the one kept exposed to atmosphere which developed fungal growth after 7 months' storage.

The Moisture Content and Mould Growth in Coconut Poonac

The major factor that influences the growth of mould in coconut poonac is its moisture content. Desikachar *et al*<sup>3</sup>, reported that rancidity sets in the poonac with the growth of moulds. The critical water content at which no mould growth was evident on poonac on storage was determined by exposing small samples of poonac flour (passed through 50 mesh sieve) to various relative humidities at room temperature (31°C.). The samples were spread on petri dishes in a thin layer and kept in dessicators containing solutions of sodium chloride to give desired relative humidities. The concentrations of sodium chloride solution and the relative humidity maintained by them are given below.<sup>4</sup>

NaCl gms per 100 cc of water	0	4	8	12	16	20	24	28	32	Satd. soln.
Relative humidity	100	97.5	95.1	92.6	90.2	87.7	85.1	82.5	79.1	76

The samples were daily scrutinized to see any mould attack and the time of appearance of mould

was noted in each case. The data are given in Table 3

TABLE 2  
Analysis of stored coconut ponnac

No. of months	Stored in a heap exposed to atmosphere				Stored in a closed bin				Stored in a closed bin, in which a desiccant was kept				Stored in alkathene bag				Stored in alkathene lined gunny bag				Stored in gunny bag			
	Moisture %	Protein %	Oil %	F. F. A.	Moisture %	Protein %	Oil %	F. F. A.	Moisture %	Protein %	Oil %	F. F. A.	Moisture %	Protein %	Oil %	F. F. A.	Moisture %	Protein %	Oil %	F. F. A.	Moisture %	Protein %	Oil %	F. F. A.
1	10.64	26.18	12.34	70	10.17	19.75	12.52	72	6.93	18.57	11.66	66	9.48	20.00	12.80	68	9.63	20.44	13.21	68	10.28	21.94	12.53	70
2	10.64	23.75	12.19	90	10.14	19.75	12.25	89	6.93	19.37	12.37	98	9.70	19.69	12.60	72	9.90	20.00	12.53	80	10.66	20.93	12.48	99
3	10.46	19.82	12.16	118	11.06	23.88	12.27	103	6.19	18.62	12.36	84	9.34	19.56	12.60	91	10.18	20.56	12.52	113	10.87	20.68	12.36	116
4	11.16	23.19	11.12	138	10.47	23.05	11.85	120	5.62	19.44	12.25	92	9.63	19.88	12.12	97	10.16	20.81	12.44	126	10.87	21.31	12.02	135
5	10.49	23.56	10.30	144	10.34	23.18	11.79	137	5.67	18.69	12.24	99	9.08	20.07	11.88	105	10.07	20.81	12.48	130	10.85	21.56	11.60	147
6	13.93	24.38	10.24	235	10.96	23.31	11.02	203	5.07	19.50	12.22	113	10.67	19.56	12.00	180	10.35	20.87	12.40	200	10.64	21.56	11.70	203
7	14.06	24.44	10.24	500	10.97	23.09	11.68	306	5.04	19.50	12.22	122	10.08	20.56	11.93	190	10.28	21.13	12.50	222	10.61	21.50	11.65	312
8	15.24	25.07	10.12	554	10.99	22.75	11.54	360	5.05	19.50	12.21	146	10.01	21.13	11.87	213	10.38	21.13	12.56	249	11.03	21.93	11.54	327
	Soft, rancid, fungus growth				Highly rancid odour				Characteristic fresh ponnac flavour, crisp				Acceptable				Acceptable, slight rancid odour				Rancid odour			

Protein % = N% x 6.25

F. F. A. = Expressed as cc. of 0.1 N KOH per 109 gm. cake.

All values estimated on moisture free basis.

STUDIES ON SHELF-LIFE OF COCONUT POONAC

TABLE 3

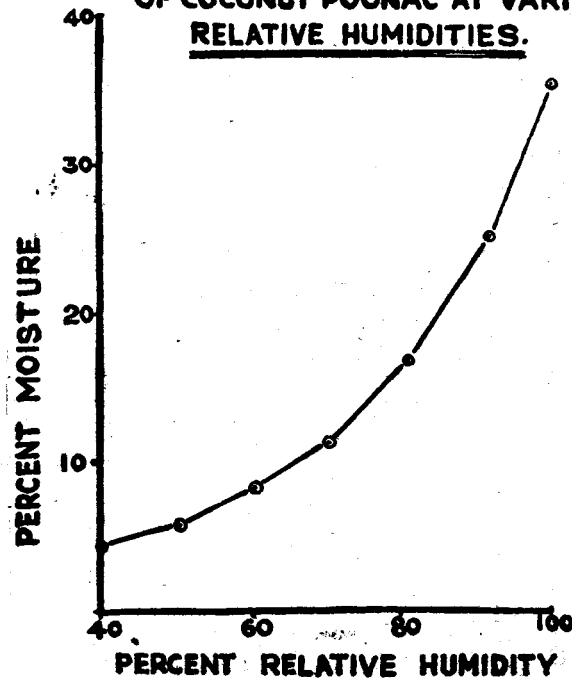
*Time in days for mould to appear on coconut poonac flour exposed to different relative humidities at room temperature*

Relative humidity	100	97.5	95.1	92.6	90.2	87.7	85.1	82.5	79.1	76
Days for appearance of moulds	5	5	6	8	10	15	25	31	—	—

In the case of poonac stored at 79.1 and 76 per cent relative humidities no mould attack was evident even after three months' storage. The above experiment suggests that the critical water content of poonac flour at which it will store free from moulds is the equilibrium

moisture content at 79 per cent R. H. The equilibrium moisture contents of the poonac at various relative humidities were next determined and the results are given in Fig. I. The moisture content of coconut poonac flour at 79 per cent R. H. is 15.2 per cent.

**FIG. I**  
**EQUILIBRIUM MOISTURE CONTENT**  
**OF COCONUT POONAC AT VARIOUS**  
**RELATIVE HUMIDITIES.**



**DISCUSSION**

Storage trials on coconut poonac show that it can be kept up to a period of six months without much deterioration, provided it is stored in a dry godown. The increase in the acidity of the poonac can be effectively checked if its moisture content is kept low. Storing the poonac in containers which prevent the absorption of moisture, like

alkathene bag and alkathene lined gunny bag improves its shelf-life. Studies on the moisture content and incidence of mould growth on the poonac flour show that the critical moulding moisture percentage is about 15.

**ACKNOWLEDGEMENT**

Our thanks are due to Dr. D. S. Bhatia and Dr. K. M. Pandalai for their keen interest in the work.

**REFERENCES**

1. Crawford, M. 1940 *Trop. Agri. (Ceylon)*; 94: 168.
2. Salgado, M. L. M. 1940 *Trop. Agri. (Ceylon)* 95: 3.
3. Desikachar, N. and Rao, B. L. 1949, *Indian Coconut J.*, 2: 185.
4. Barton, E. C. and Tomkins, R. G. 1940, *Cereal Chemistry*, 17: 332.