

Studies on Rice Bran and Rice Bran Oil “ Influence of Parboiling on the Quality and Quantity of Rice Bran Oil ”

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In the present study it was found that parboiling of paddy increased the resistance to milling thus reducing the outturn. Also, the parboiling process helped in increasing the oil content and also saponification value and reduction in initial FFA content and iodine value. Further, considerable amount of varietal difference due to parboiling were observed in the 30 varieties studied.

The rice bran oil is useful both as an edible and industrial oil. In view of acute shortage of edible and industrial oils now, there is an urgent need to increase the oil content and at the same time maintain its quality. In India, during 1979—80 a deficit of at least 10 lakhs tonnes of edible oil as against the annual requirement of 42 million tonnes has been reported.

Subramanyam (1971), Padua and Juliano (1974), Chandrasekaran and Pilliyar (1976), Desikachar (1977) and Kumaresan and Sree Ramulu (1978) have reported an increase in the oil content in the bran upto 25 to 35 per cent due to parboiling. Further, due to parboiling, the development of FFA in the bran oil and consequently the deterioration of the quality of bran could be reduced and thus help in improving the quality of oil. Hence a study to find out the effect of parboiling on the content and quality

of rice bran oil of different varieties was carried out.

MATERIAL AND METHODS

Thirty paddy varieties were collected and were soaked in cold water for 8 hours and then boiled uniformly for half an hour. The time of soaking and boiling adopted were as per the method used by Subramanyam and Dakshinamoorthy (1977). Then the samples were dried in shade and the bran was separated by using polishing machine and the outturn of bran was calculated. The oil was extracted from the bran with hexane and quality of oil was assessed as per A. O. A. C. (1962) methods and the results are presented in Table I.

RESULTS AND DISCUSSION

1. Bran Out turn (per cent)

The out turn of raw bran of the different varieties varied from 1.51

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(ADT 31) to 3.15 (TKM 6) at 2 minute polishing and in case parboiled bran it varied from 1.34 (Kannaki) to 2.10 (TKM 6) indicating that it required greater abrasive force to remove the bran from parboiled paddy. Raghavendra Rao *et al.*, (1967) have also reported similar result in one of their trials. Further this study has shown that there were considerable varietal differences in the amount of bran that could be removed from the paddy.

2. Bran oil content (per cent)

The oil content of the raw paddy bran of different varieties ranged from 17.16 (TNAU 4372) to 22.10 (TNAU 13253/T/2) and in case of parboiled paddy bran, it varied from 19.60 (TKM 6) to 27.31 (IR 28) at 2 minute polishing indicating an increase in oil content due to parboiling. Subramanyam (1971) and Kumaresan and Sree Ramulu (1978) have also reported higher oil content in parboiled bran possibly due to movement of oil from the lower to the upper stratum of the aleurone layers during parboiling.

3. Bran oil yield (Kg/ha)

The yield of oil from raw bran was highest in Co 40 (32.40) and lowest in Co 41 (14.94) and in case of parboiled bran, the same ranged from 18.52 (TNAU 13253/7/2) to 38.44 (Co 38). The yield of bran oil from raw paddy surpassed that from parboiled paddy. This is due to the greater outturn of bran from raw

paddy in comparison to parboiled paddy.

4. Free Fatty Acid (per cent)

The initial FFA content of raw bran oil ranged from 1.24 (Co 37) to 2.45 (TNAU 13613) and for parboiled bran oil, it ranged from 1.17 (Co 35) to 2.35 (TNAU 1756) at 2 minute polishing, indicating a reduction in FFA content due to parboiling. The parboiling operation involves the boiling of paddy to high temperature just like heat treatment of bran that was reported to control the FFA development (Kumaresan and Sree Ramulu 1978) and this could have been the cause for the reduction in FFA content.

5. Saponification and Iodine values

Saponification value of bran oil was also observed to increase due to parboiling. The iodine value of raw bran oil was highest in GEB 24 (100) and lowest in Co 39 (81). In case of parboiled bran oil, Co 35 recorded highest iodine value (98) and Co 39 the lowest value (81). Generally there was a decrease in the iodine value due to parboiling similar to that reported by Shabeen *et al* (1975). This decrease in iodine number of the bran oil might be due to the saturation of double bonds of fatty acids during the parboiling process.

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TABLE I Effect of parboiling on the content and quality of rice bran oil

Variety	Bran Outturn		%Oil		Content		Oil Yield kg/ha		FFA per cent		Saponification Value		Iodine Value	
	R	P	R	P	R	P	R	P	R	P	R	P	R	P
TKM 6	3.15	2.10	18.30	19.50	24.70	34.59	1.78	1.65	173	150	93	84		
Kannaki	2.44	1.34	18.93	21.88	17.59	27.64	1.74	1.66	197	198	88	90		
Bhavani	2.61	1.58	20.77	21.87	24.28	36.01	1.76	1.57	202	200	87	94		
Co 40	2.26	1.71	20.33	24.22	32.40	36.80	1.61	1.41	184	183	85	84		
Ponni	2.21	1.82	20.10	21.27	17.42	20.00	1.40	1.42	188	187	97	92		
Co 38	2.71	1.59	20.23	22.67	25.16	38.44	1.82	1.62	185	185	94	94		
Co 36	2.45	1.73	19.50	22.23	19.12	23.99	1.45	1.30	180	181	90	90		
IR 28	1.52	1.39	20.89	27.31	15.81	18.84	1.58	1.31	195	194	97	95		
ADT 31	1.51	1.49	20.47	23.04	18.63	20.53	1.65	1.44	191	192	95	97		
IR 20	2.07	1.39	21.70	25.96	21.55	26.91	1.30	1.45	194	196	85	92		
Co 35	2.66	1.61	18.23	22.60	21.33	28.99	1.35	1.17	134	135	95	98		
Co 37	2.10	1.63	18.23	21.53	10.16	20.97	1.24	1.25	187	189	91	93		
GEB 24	1.99	1.44	22.64	24.58	17.70	22.47	1.94	1.86	185	187	100	97		
Co 41	1.84	1.35	19.64	25.40	14.94	18.52	2.11	1.85	194	195	99	96		
Co 39	2.76	1.70	20.53	34.79	21.07	28.33	1.83	1.34	195	196	81	81		
IET 5721	2.69	1.89	20.50	22.30	25.37	33.31	2.06	1.84	192	193	91	87		
IET 5656	2.91	2.01	19.67	21.20	20.56	25.84	2.13	1.48	190	190	92	89		
TNAU 13253/7/2 (17005)	2.97	2.15	22.10	22.26	23.82	45.25	1.92	1.39	193	192	85	94		
TNAU 17005	2.70	1.72	19.20	22.98	23.67	31.10	2.19	1.95	183	185	90	87		
TNAU 15869/2	2.80	1.89	20.42	24.65	27.85	33.08	1.85	1.41	195	197	95	95		
TNAU 20892	1.97	1.24	21.30	27.20	15.10	18.91	2.05	1.92	194	196	90	85		

TNAU 18610	1.77	1.59	20.13	25.87	21.34	24.84	1.81	1.63	199	200	83	86
TNAU 4372	1.89	1.35	17.60	23.17	18.77	28.88	1.82	1.73	190	191	86	83
TNAU 157614/1	1.90	1.73	11.43	22.72	20.33	23.40	2.23	2.18	192	193	64	82
TNAU 13613	1.56	1.63	20.10	22.62	18.32	23.52	2.45	1.51	188	190	84	86
TNAU 18520	1.56	1.62	20.30	22.53	23.66	24.36	2.36	2.05	196	196	85	85
TNTU 1756	1.81	1.74	17.78	22.56	21.59	27.60	2.38	2.35	196	188	91	91
TNAU 12590	2.05	1.68	20.53	25.30	23.30	25.25	2.02	1.65	185	185	90	91
TNAU 15776/3	2.77	1.62	18.29	23.54	19.07	25.24	2.28	1.93	185	186	82	79
TNAU 17059	2.93	1.95	18.28	22.47	21.97	27.05	1.82	1.79	187	188	89	88

* R = RAW P = PARBOILED