

Table 10: Summary of Machine Performance of the three feed rate at 2,600rpm for Dura

Moisture content (%)	Cracking Efficiency (%)	Percentage losses (%)	Recovery Rate (%)	Mass flow rate (Kg/Min)	Mechanical Damage (%)
9.0	98.18	1.85	98.15	22.45	0.63
11	97.16	2.12	97.88	21.38	0.93
13	94.85	1.21	98.79	19.09	1.81
Average	96.73	1.72	98.25	20.98	1.32

Table 11: Summary of Machine Performance of the three feed rate at 2,200rpm for Tenera

Moisture content (%)	Cracking Efficiency (%)	Percentage losses (%)	Recovery Rate (%)	Mass flow rate (Kg/Min)	Mechanical Damage (%)
9.0	96.53	0.68	99.32	21.14	1.06
11	96.53	0.72	99.28	19.47	1.30
13	95.64	0.93	99.08	18.20	1.67
Average	96.39	0.78	99.23	19.60	1.34

Table 12: Summary of Machine Performance of the three feed rate at 2,400rpm for Tenera

Moisture content (%)	Cracking Efficiency (%)	Percentage losses (%)	Recovery Rate (%)	Mass flow rate (Kg/Min)	Mechanical Damage (%)
9.0	97.61	0.75	99.25	22.29	0.76
11	97.03	0.67	99.33	20.72	1.06
13	96.27	1.02	98.97	19.54	1.48
Average	96.97	0.81	99.18	20.85	1.10

Table 13: Summary of Machine Performance of the three feed rate at 2,600rpm for Tenera

Moisture content (%)	Cracking Efficiency (%)	Percentage losses (%)	Recovery Rate (%)	Mass flow rate (Kg/Min)	Mechanical Damage (%)
9.0	98.15	0.71	99.29	23.87	0.52
11	97.53	0.60	99.40	22.56	0.87
13	96.77	0.99	99.01	20.88	1.26
Average	97.48	0.77	99.23	22.44	0.88

Table 14: Analysis of variance (ANOVA) for the effect of moisture content, rotor speed and feed rate on cracking efficiency of Dura Palm Kernel

Source of Variation	Sum of squares	Degree of freedom	Mean squares	Computed F.
A (Moisture content)	249.11	2	124.56	0.3201
B (Rotor speed)	247.99	2	124.00	0.3186
C (Feed rate)	248.55	2	124.28	0.3193
Treatments	17.64	2	8.82	0.0227
Combination	2307.47	8	288.43	0.7411
Error	3891.72	10	389.17	-
Total	6962.48	26	-	-

Table 15: Analysis of variance (ANOVA) for the effect of moisture content, rotor speed and feed rate on cracking efficiency of Tenera Palm Kernel

Source of Variations	Sum of squares	Degree of freedom	Mean squares	Computed F.
A (Moisture content)	201.14	2	100.57	0.3275
B (Rotor speed)	201.09	2	100.55	0.3274
C (Feed rate)	201.06	2	100.53	0.3274
Treatments	6.82	2	3.41	0.0111
Combination	1837.06	8	229.63	0.7478
Error	3070.82	10	307.08	-
Total	5517.99	26	-	-

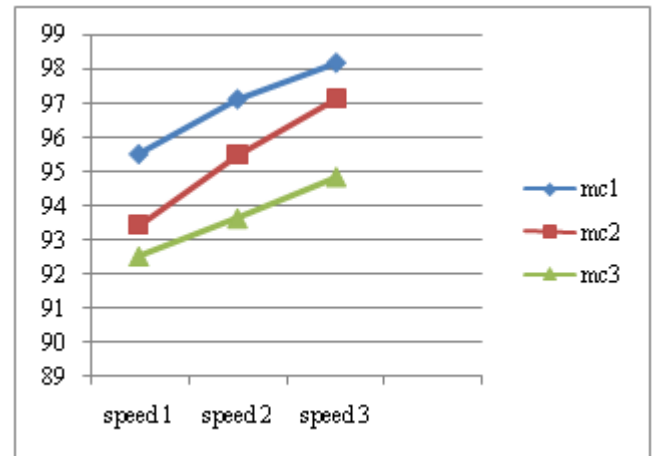


Figure 2: Cracking efficiency at different moisture content and speed for Dura

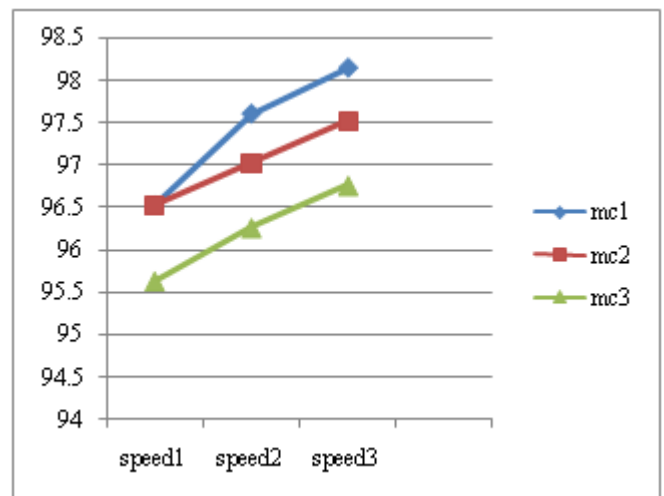


Figure 3: Cracking efficiency at different moisture content and speed for Tenera

5. Conclusion

The results showed that there was tremendous improvement over the machine that has no curve casing. Compressive strength of palm nuts was significantly affected by moisture content and shell thickness. Strength decreased with decrease in moisture content but increased with increase in shell thickness. Drying the palm nut on the sun to reduce its moisture content pave the way for appropriate performance of palm nut cracker and with minimum mechanical damage.

The cracking efficiency of the machine increase as the speed of the rotor increases. That means the cracking efficiency was highest at 2600rpm and 9.0% moisture content for both varieties. But the feed rate of the machine vary which shows that cracking efficiency was highest at 80kg and 140kg for Tenera and Dura palm nuts respectively.

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