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RAW RUBBER AND LATEX PROPERTIES OF CLONAL RUBBER

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SUMMARY

Properties of dry rubber and concentrated latex depend on clonal characteristics of field latex. Hence, effect of clonal characteristics on dry rubber and latex properties were studied. Latex samples were collected from locally available clones from several rubber growing areas. Latices obtained from RRIC 121 and RRIC 100 found to be suitable for manufacture of concentrated latex and crepe rubber, respectively. Further, lattices of Sri Lankan origin have low magnesium levels irrespective of clone. Mooney viscosity of Sri Lankan rubber generally lies between 70-85 irrespective of clone and region.

INTRODUCTION

After early years of seedling rubber plantations, the clone PB 86 dominated the rubber plantations in Sri Lanka (Jayasekara & Fernando, 1981). However, introduction of new RRIC series clones with high yield potential and disease resistance has increased percentage of non- PB 86 clones significantly.

The technical and technological characteristics of the rubber from some of RRIC clones have been recorded (Perera *et al*, 1981 & Yapa & Lionel, 1981). According to Perera *et al* (1981), clones RRIC 100 and RRIC 103 are comparable to PB 86 and could be recommended for manufacture of crepe rubber while RRIC 101, 102 and 112 are not suitable for manufacture of crepe rubber.

Clones have been classified into 5 groups according to their Mooney viscosity and Plasticity Retention Index values (Yapa & Lionel, 1981). They have shown that technical and technological properties could vary with the clone of the tree from which latex is obtained.

It is well known that properties of dry rubber and concentrated latex depend significantly on characteristics of field latex. Therefore, knowledge on properties of clonal latex could be useful in both dry rubber and latex production.

The latex and dry rubber properties of the NR latex from some clones are evaluated and presented in this paper.

MATERIALS AND METHODS

Latices from several clones were collected from different parts of the country. Approximately about 3 liters of field latex were collected from each clone. One liter sample out of 3 liters of latex was preserved with ammonia (0.4% on latex phase) to evaluate latex properties of the sample. The rest of the latex sample was coagulated by adding 150 ml of 2% formic acid, after diluting with two parts of water. The coagulum was passed three times through horizontal roller, thorough diamond roller and once through smooth roller. The resulted thin laces were dried in a drying tower. Tests such as initial plasticity, Plasticity Retention Index (PRI) (ISO 2930-1981E), Mooney Viscosity (V_R) (ISO/DIS 289-1), Nitrogen content (ISO 1656-1974E), Ash content (ISO 247), Colour (ISO 4660-1977) and Gel content were carried out on the above dry rubber samples.

Tests such as TSC (ISO 124-1974E), DRC (ISO 126-1972E), Mg content (EDTA titration method) and Viscosity (ISO 1652 - 1974E) were carried out on the latex sample preserved with ammonia. MST (ISO 35-1972E) was determined on field latex samples with known but undiluted DRC.

RESULTS AND DISCUSSION

Dry rubber properties and latex properties of samples collected are given in Table 1 and 2 respectively.

Table 1. *Dry rubber properties*

Estate	Clones	Po	PRI	V_R	Nitrogen %	Ash %	Colour (Lovibond)	Gel contnet (%)
Dartonfield	RRIC 100	41	78	85	0.41	0.12	1.5	17.72
	102	37	94	83	0.35	0.14	1.5	15.58
	110	35	91	77	0.43	0.14	1.5	17.42
	120	-	-	-	-	-	-	-
	121	46	78	78	0.40	0.11	3.0	16.76
	130	33	91	76	0.44	0.11	1.5	15.68
	RRIM 600	28	93	68	0.44	0.11	3.0	16.20
	PB 217	-	-	85	0.50	0.14	4.0	10.12
	PB 28/59	-	-	-	-	-	-	-

Estate	Clones	Po	PRI	V_R	Nitrogen %	Ash %	Colour (Lovibond)	Gel content %
Ambetenna	RRIC 100	-	-	-	-	-	-	-
	PB 28/59	40	95	78	0.34	0.14	1.5	19.0
Neuchattle	RRIC 100	51	90	84	0.36	0.12	3.0	11.7
	RRIC 102	43	80	81	0.39	0.09	2.5	12.0
Sorana	RRIC 100	-	-	-	0.51	0.15		
	RRIC 102	-	-	-	0.47	0.12		
	RRIC 121	-	-	-	0.39	0.16	-	
Peenkanda	RRIC 100	60	78	88	0.37	0.09	4.5	
	RRIC 121	50	90	72	0.41	0.10	1.5	
	PB 28/59	45	84	84	0.57	0.09	1.5	
	PB 217	61	88	75	0.50	0.12	1.5	
Padukka	RRIC 100	40	75	66	0.36	-	1.5	
	RRIC 102	57	93	86.5	0.30	-	2.5	
	RRIC 121	56	91	76	0.26	-	3.0	
	RRIC 130	47	87	79	0.26	-	1.5	
Palmgarden	RRIC 121	64	84	81	0.43	0.24	3.5	
	RRIC 100	40	90	69	0.34	0.22	2.5	
	RRIC 120	48	58	79	0.55	0.22	2.5	
Nakiyadeniya	PB 217	50	98	85	0.44	0.13	4.0	
	RRIC 101	56	82	37	0.33	0.11	2.5	
	RRIC 89	59	81	90	0.24	0.16	5	
	PB 28/59	50	88	83	0.41	0.20	4.5	
	RRIC 07	47	92	83	0.37	0.15	4.0	
	RRIC 100	51	76	84	0.39	0.17	1.5	
Elston	RRIC 100	52	86	76	0.39	0.02	1.5	
	RRIC 102	44	91	66	0.41	0.04	1.5	
	RRIC 110	48	100	67	0.34	0.05	1.5	
	RRIC 121	57	93	72	0.35	0.02	3	

Table 2. *Latex properties*

Estate	Clones	TSC%	DRC%	Mg/ppm	MST/sec	Viscosity/cps
Dartonfield	RRIC 100	38.03	34.64	100	99	10.5
	102	28.22	26.07	105	2680	7.0
	121	42.01	40.25	76	430	12.5
	130	32.79	30.52	119	210	7.0
	RRIM 600	27.89	25.08	162	208	9.0
	RRIC 110	35.78	33.21	131	150	7.0
	PB 217	33.20	30.25	95	130	8.0
Ambetenna	RRIC 100	35.13	32.22	92	116	10.5
	PB 28/59	42.36	41.26	90	135	15.0
Neuchattle	RRIC 100	33.07	30.73	76	120	9.0
	RRIC 102	37.16	34.33	68	110	11.0
Sorana	RRIC 100	30.89	28.40	60	55	7.5
	RRIC 102	34.57	32.23	78	80	8.0
	RRIC 121	44.86	43.45	195	1260	11.0
Peenkanda	RRIC 100	31.16	28.86			
	RRIC 121	32.03	28.83			
	PB 28/59	30.42	27.72			
	PB 217	38.35	34.83			
Padukka	RRIC 100	35.19	32.74	104	468	9.5
	RRIC 102	40.50	37.50	59	1686	8.0
	RRIC 121	39.16	37.00	72	980	9.0
	RRIC 130	33.38	31.32	130	1800	7.5
Palmgarden	RRIC 121	37.72	35.27	47	1800	7
	RRIC 100	32.52	30.91	116	201	12
	RRIC 120	34.79	31.95	343	-	8.5

From Table 2 and Figure 1, it is clear that highest set of DRC values were recorded in clone RRIC 121 while the lowest was recorded in clone RRIM

600. Further, RRIC 121 has shown comparatively low magnesium content values (Figure 3). Furthermore, it can be noted that the clone RRIC 121 has recorded a much higher MST value compared to other clones indicating good latex stability. Since the MST test was carried out on undiluted latex samples the effect of DRC on MST cannot be excluded. However, the high MST values recorded for samples from RRIC 121 clone even with high DRC values such as 43% show high stability associated with the clone. However, colour of dry rubber sample produced is darker. Hence, one can recommend RRIC 121 clone for centrifuged latex manufacture where colour of latex is not much important, but higher DRC, stability and low Mg contents are advantages.

Crepe rubber produced from RRIC 100 and PB 217 clone found to give high Po, PRI ,VR values and light colour (Table 2, Figures 4 & 5). From latex properties (Table 1), it is found that stability of latex of RRIC 100 clone is very good, too. Therefore, RRIC 100 clone can be used in manufacture of crepe rubber. This is in accordance with findings of Perera *et al.* (1979).

The clones RRIC 121 and PB 28/59 could be classified as clones with relatively high DRC (Figure 1).

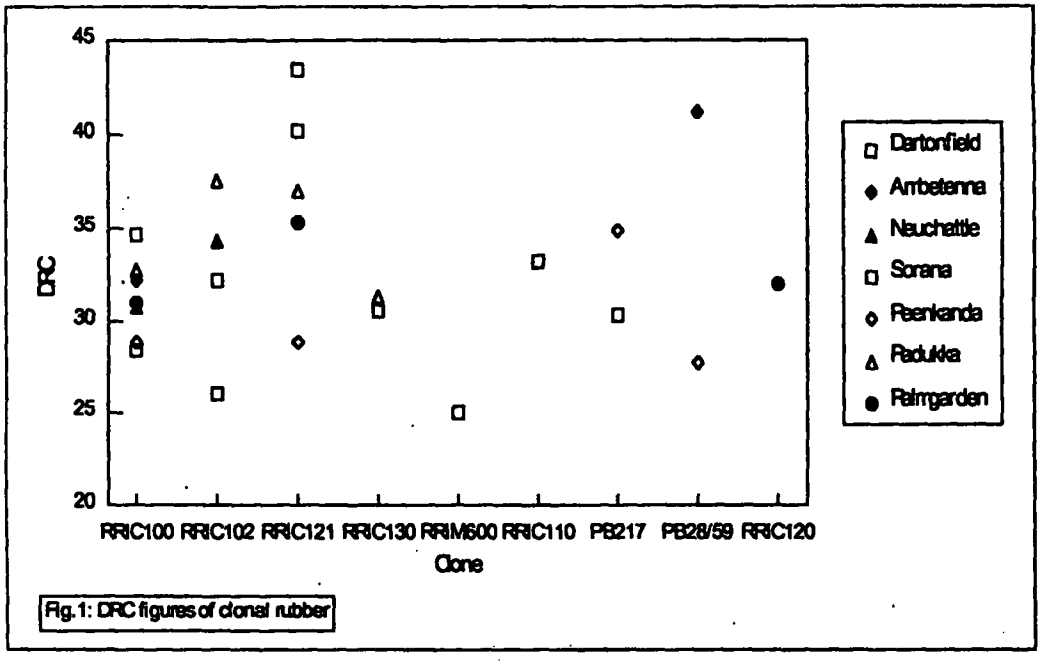

Fig.1: DRC figures of clonal rubber

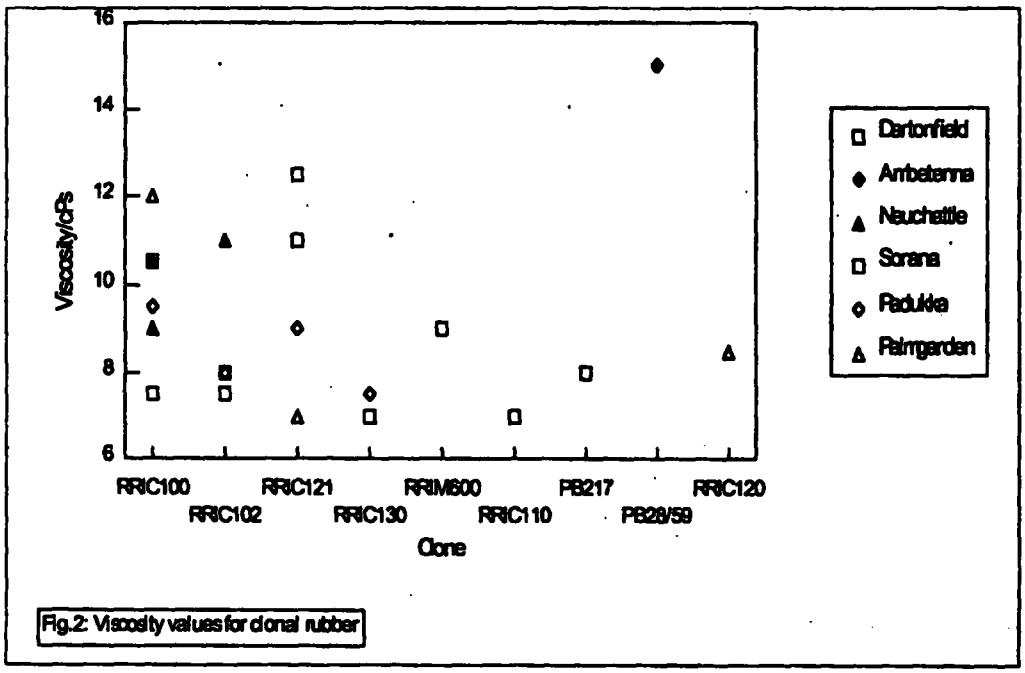

Fig.2: Viscosity values for clonal rubber

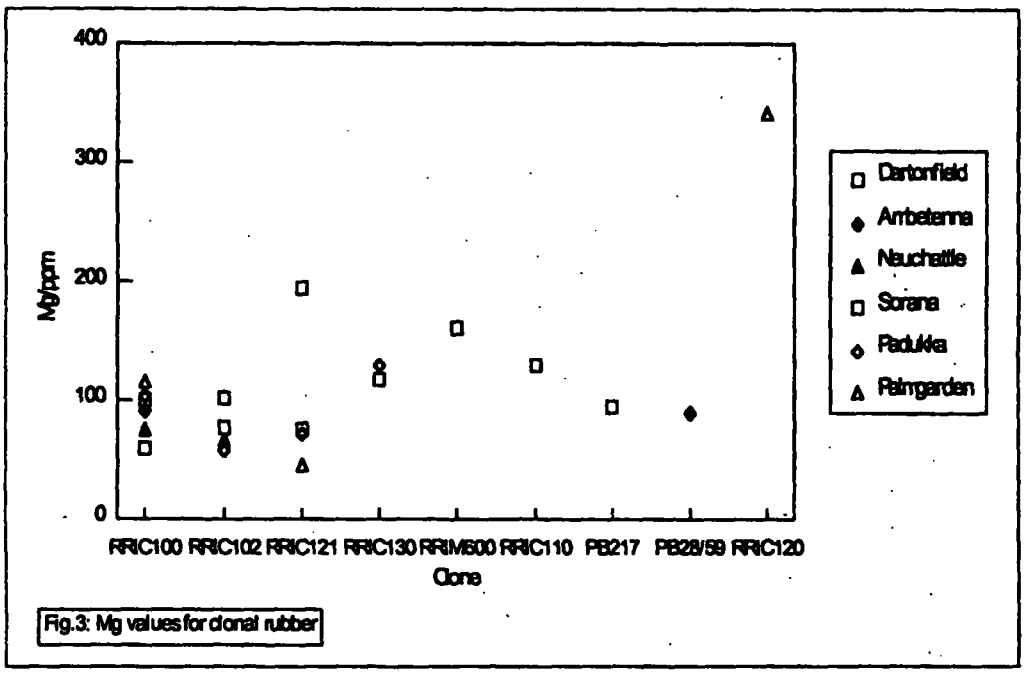

Fig.3: Mg values for clonal rubber

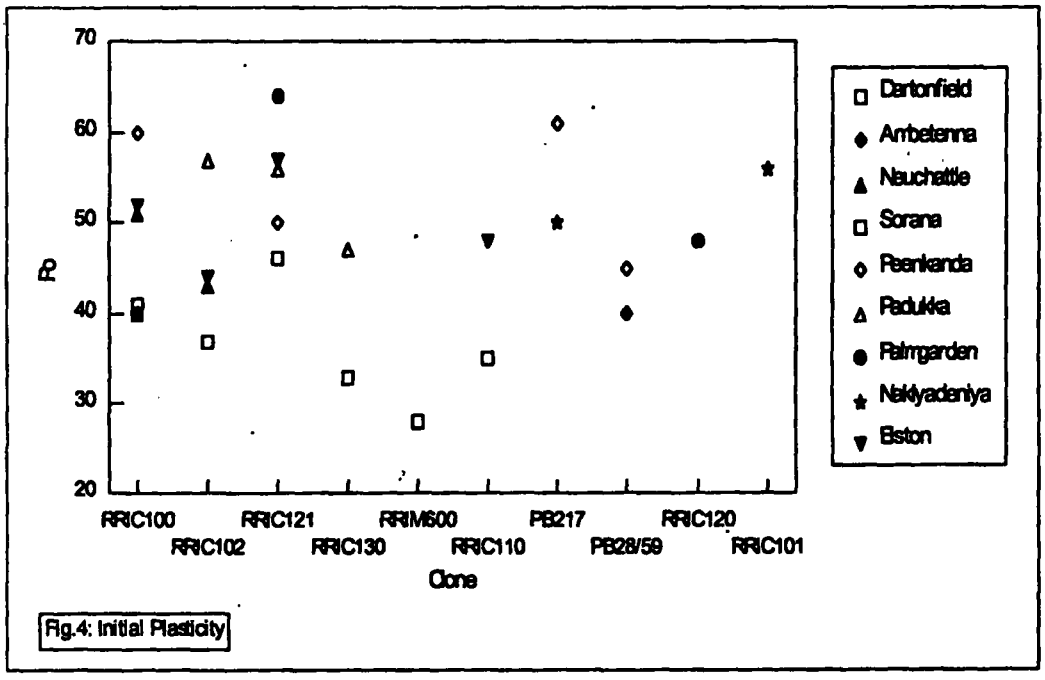

Fig.4: Initial Plasticity

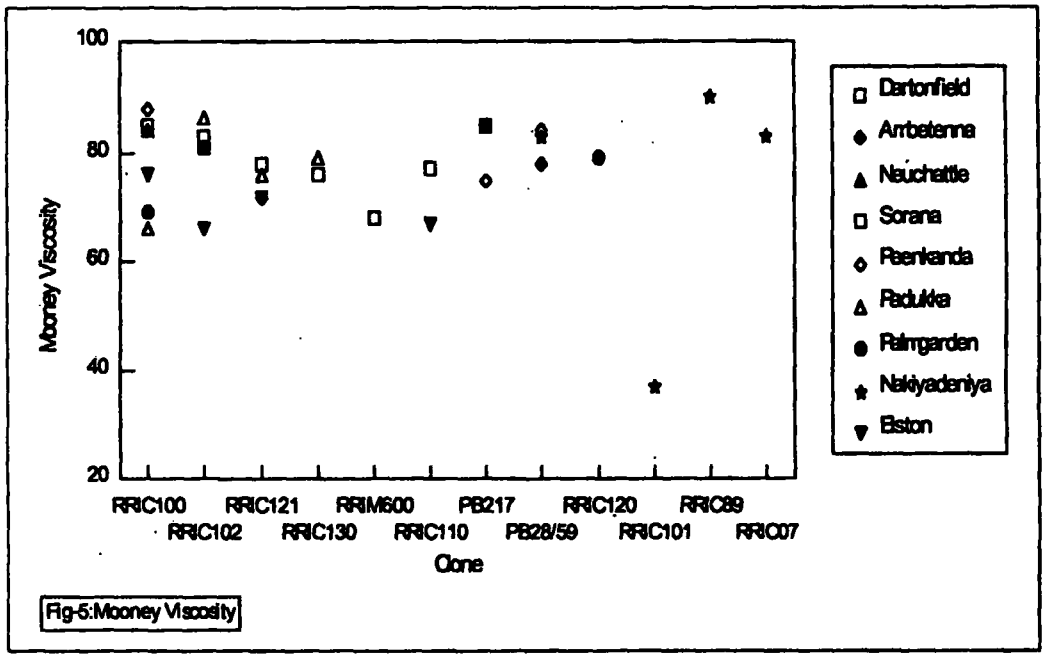

Fig-5:Mooney Viscosity

CONCLUSIONS

The clone RRIC 121 can be identified as a clone which possesses desirable properties for manufacture of concentrated latex. Further, RRIC 121 and PB 28/59 can be identified as clones which give high DRC field latex. The clone RRIC 100 which has shown high P_0, PRI, V_R values, light colour and high stability can be recommended for use in manufacture of good quality latex crepe.

Magnesium levels recorded for all clones studied are comparatively lower compared to that of other origins. Mooney viscosity of Sri Lankan rubber generally lies between 70-85 irrespective of clone and region.

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