

GAMMA RAY INDUCED VARIATIONS IN FRUIT QUALITY OF BANANA [*MUSA*(AAB) NENDRAN]

Vegetatively propagated crops are a very suitable group of plants for the application of mutation breeding methods (Broertjes and Harten, 1978). Nendran, a banana variety has the lowest frequency of seedset while crossing and is without much clonal variation. The

lack of clonal variability and the limitation of getting further crop improvement in Nendran by hybridization tempted us to adopt induced mutagenesis in this particular variety to create a base population for further selection and isolation of desirable type.

Table 1. Acidity percentage

Ti. No.	vM ₂ generation							vM ₃ generation						
	Control	Gamma exposures, kR						Control	Gamma exposures, kR					
		1.0	1.5	2.0	2.5	3.0	Mean		1.0	1.5	2.0	2.5	3.0	Mean
T1	0.51	0.47	0.45	0.44	0.44	0.41	0.45	0.49	0.48	0.48	0.46	0.44	0.41	0.45
T2	0.52	0.49	0.47	0.45	0.45	0.46	0.46	0.51	0.47	0.47	0.45	0.44	0.41	0.45
T3	0.48	0.49	0.44	0.42	0.49	0.29	0.43	0.48	0.48	0.41	0.39	0.38	0.36	0.40
T4	0.48	0.44	0.44	0.42	0.41	0.42	0.43	0.46	0.41	0.29	0.38	0.38	0.41	0.37
T5	0.54	0.51	0.44	0.38	0.35	0.33	0.40	0.51	0.48	0.41	0.26	0.31	0.31	0.35
T6	0.42	0.42	0.42	0.39	0.39	0.38	0.40	0.38	0.38	0.38	0.35	0.35	0.35	0.36
T7	0.43	0.44	0.44	0.41	0.41	0.39	0.42	0.39	0.39	0.39	0.38	0.37	0.34	0.37
T8	0.41	0.44	0.51	0.54	0.49	0.42	0.48	0.38	0.41	0.46	0.51	0.44	0.37	0.44
	0.47	0.46	0.45	0.43	0.43	0.39	-	0.45	0.44	0.35	0.40	0.39	0.37	-

CD(0.05) for vM₂ generation: Treatment - 0.009, Exposure - 0.006, Interaction - 0.01

CD (0.05) for vM₃ generation: Treatment - 0.01, Exposure - 0.003, Interaction - 0.01

Suckers of three age groups of banana (one, two and three months old) with different portions of pseudostem (25, 50 and 75 per cent) were used as the material for irradiation. Thus the irradiated material consisted of one month old whole corm (T1) and two months old whole corm (T3) one, two and three months old corm with 75% pseudostem (T2, T3 and T6 respectively) two and three months old corm with 50% pseudostem (T5 and T7) and three months old corm with 25% pseudostem (T8). Ten suckers each in all age groups and sizes were exposed to 1.0, 1.5, 2.0, 2.5 and 3.0 kR ⁶⁰Co gamma rays at a rate of 0.228 MR h⁻¹. Planting was done on the day after the exposure in split plot design with two

replications at the College of Agriculture, Vellayani during the year 1989-90.

The fruits collected from well ripe bunches were used for quality analysis. The middle fruit in the top row of the second hand was selected as the representative sample. Samples were taken from each fruit from three portions viz. top, middle and bottom. These triplicate samples were used for analysis following the method described by (AOAC,1965). Significant variation among treatments and decreased with increase in dose of gamma ray exposures in vM₂ and vM₃ generations. Decrease in acid content and increase in sugar : acid ratio are found to increase the quality of banana fruit.

Table 2. Sugar acid ratio

Tr. No.	vM ₁ generation								vM ₂ generation							
	Control	Gamma exposures, kR						Mean	Control	Gamma exposures, kR						Mean
		1.0	1.5	2.0	2.5	3.0	1.0			1.5	2.0	2.5	3.0			
T1	20.47	21.89	22.31	24.48	25.00	31.54	25.04	20.20	21.92	22.48	24.58	25.05	27.56	24.32		
T2	20.62	22.38	22.78	22.84	24.92	25.77	23.74	20.28	21.45	22.64	22.70	24.06	26.49	23.47		
T3	22.49	21.51	27.79	29.47	31.20	24.27	26.85	23.60	22.63	25.64	27.11	28.66	31.27	27.06		
T4	22.70	26.67	27.02	29.38	30.86	30.47	28.88	22.00	24.60	24.89	27.02	28.31	28.03	26.58		
T5	20.22	22.71	26.55	30.97	24.48	35.00	27.94	19.49	21.14	24.47	28.12	30.75	32.50	27.40		
T6	28.88	29.19	29.56	33.25	34.62	36.57	32.64	26.50	26.78	27.12	30.79	31.47	33.36	29.90		
T7	27.79	27.14	29.08	31.93	32.52	35.64	31.26	30.47	25.88	26.79	29.25	29.81	32.41	28.83		
T8	27.52	27.88	23.54	22.71	25.97	26.62	25.34	25.33	25.67	21.94	21.49	24.12	29.04	24.45		
	23.84	24.92	26.08	28.13	28.70	30.74	-	23.48	23.76	24.50	26.38	27.78	30.09	-		

CD(0.05) for vM₁ generation : Treatment - 1.39, Exposure - 1.11, Interaction - 3.14

CD(0.05) for vM₂ generation : Treatment=1.20, Exposure :0.84, Interaction :2.39

Table 3. T.S.S. (%)

Tr. No.	vM ₁ generation								vM ₂ generation							
	Control	Gamma Exposures, kR						Mean	Control	Gamma Exposures, kR						Mean
		1.0	1.5	2.0	2.5	3.0	1.0			1.5	2.0	2.5	3.0			
T1	20.06	20.15	20.00	20.10	20.40	20.20	20.17	21.90	21.90	20.50	20.90	21.30	21.20	21.16		
T2	20.01	20.02	19.01	19.10	20.06	19.15	19.47	21.01	21.02	20.01	20.10	21.06	20.15	20.47		
T3	21.06	20.85	20.55	20.15	20.20	20.05	20.04	22.06	21.85	21.55	21.15	21.20	21.35	21.04		
T4	21.35	20.45	20.40	19.05	18.95	17.45	18.85	21.85	20.65	20.25	20.20	21.20	20.35	20.33		
T5	21.15	20.65	20.05	18.50	19.25	18.85	19.46	21.20	20.80	20.10	19.10	18.45	18.85	19.46		
T6	26.65	26.45	26.05	21.15	20.85	20.80	23.06	27.75	27.45	27.05	21.65	21.85	21.80	23.96		
T7	26.70	26.40	26.05	20.65	20.85	20.80	22.95	25.50	24.50	23.50	22.05	22.20	21.85	22.82		
T8	23.50	23.50	22.05	21.15	20.85	19.65	21.44	24.50	24.50	23.05	22.15	21.85	20.65	22.44		
	22.56	22.31	21.77	19.98	20.18	19.62	-	23.56	22.83	22.00	20.91	21.14	20.78	-		

CD(0.05) for vM₁ generation : Treatment = 0.18, Exposure = 0.11, Interaction = 0.31

CD(0.05) for vM₂ generation : Treatment - 0.18, Exposure - 0.11, Interaction - 0.32

exposures were noted with respect to sugar : acid ratio. Treatments, exposures and their interactions were significant in total soluble

solids, total sugar, acidity and sugar : acid ratio (Table 1 to 4). Fruit quality analysis showed that total soluble solids and acidity

Table 4. Total sugar (%)

Tr. No.	vM, generation							vM, generation						
	Control	Gamma Exposures, kR						Control	Gamma Exposures, kR					
		1.0	1.5	2.0	2.5	3.0	Mean		1.0	1.5	2.0	2.5	3.0	Mean
T1	32.04	32.31	32.93	34.78	34.17	35.42	33.92	32.24	32.51	33.13	35.13	34.37	35.62	34.15
T2	32.50	32.78	33.17	33.54	33.81	36.15	33.89	32.70	33.01	33.06	33.74	34.01	35.05	33.83
T3	34.68	34.28	35.52	36.17	37.54	37.84	36.27	34.84	34.93	35.71	36.40	37.74	38.04	36.56
T4	32.73	34.06	33.97	35.93	36.37	37.36	35.54	33.93	34.27	34.17	36.13	36.57	37.75	35.78
T5	33.14	32.29	32.65	32.75	33.82	34.04	33.11	33.34	32.50	33.84	34.07	33.97	34.46	33.77
T6	34.45	34.68	35.13	38.13	38.22	48.01	37.24	34.66	34.88	35.32	37.83	38.42	40.26	37.34
T7	24.25	34.54	36.30	37.44	38.01	39.53	37.16	34.46	34.75	36.50	37.64	38.21	39.74	37.37
T8	34.14	34.60	34.88	36.03	36.53	37.74	35.96	34.34	34.80	35.07	36.22	36.74	37.94	36.15
	32.24	33.69	34.32	35.60	36.06	37.27	-	33.81	33.96	34.64	35.90	36.25	37.36	-

CD(0.05) for vM, generation : Treatment - 0.69, Exposure = 0.37, Interaction = 1.05

CD(0.05) for vM, generation : Treatment - 0.75, Exposure = 0.48, Interaction - 1.37

The results obtained in the present investigation was on par with the results obtained by Kukimura and Koyama (1982) in sweet potato, Sharma *et al.* (1983) in mango and Khairwal *et al.* (1984) in sugarcane.

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