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Changes of amylase content and some other chemical properties of rice grains during storage

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實驗目的:

水稻의 品種群別 貯藏期間에 米質 變化에 影響하는 程度를 檢討하기 爲하.

材料 및 方法:

1. 材料: 1982-1985年(40年)에 各各 生産된 一般型(어명, 농복, 천릉, 주정, 장금), 統一型(조성동진, 씨복, 남송, 진양23, 경정, 서광), 雜種型(V20A/씨복, V20A/남송, V20A/경정)의 14個 品種을 正租狀態로 室溫에서 貯藏된 것.

2. 分析 및 調查內容: Starch, Amylase, Moisture, Protein, Total sugar, Reducing sugar, Fat, ADV, Hardness, Germination ratio, Accumulative temperature.

實驗結果:

1) Amylase, Moisture, Total sugar, ADV, Hardness, 發芽率은 品種群에 따라, Protein, Total sugar, Reducing sugar, ADV, 發芽率은 貯藏期間에 따라 差異가 있었다.

2) 品種群에 따른 差異: Amylase 含量은 雜種型이 統一型보다 一般型 보다 높고, ADV의 一般型과 統一型이 雜種型 보다 높았으며, Total sugar 含量은 一般型, 雜種型, 統一型의 順序로 높았다. 또한 Hardness는 統一型이 雜種型보다 一般型 보다 높았으며, 發芽率은 雜種型과 統一型이 一般型 보다 높았다.

3) 貯藏期間에 따른 差異: 貯藏期間이 길수록 Total sugar와 Reducing sugar 含量은 증가했고, ADV는 증가했으며, 發芽率은 낮아졌는데 특히 一般型 品種의 發芽率이 가장 낮아졌다.

4) 調查된 形質을 互의 相關關係: Starch와 Moisture, Amylase와 Fat 및 發芽率 Protein과 登熟期 積算溫度, Total sugar와 Reducing sugar 및 ADV, Reducing sugar와 ADV, Fat와 發芽率 互에의 正의 相關이 있었고, Starch와 Protein 및 登熟期 積算溫度, Amylase와 Protein 및 ADV, Total sugar와 登熟期 積算溫度, 및 發芽率, Reducing sugar와 登熟期 積算溫度 및 發芽率, ADV와 登熟期 積算溫度 및 發芽率 互에의 負의 相關이 있었다.

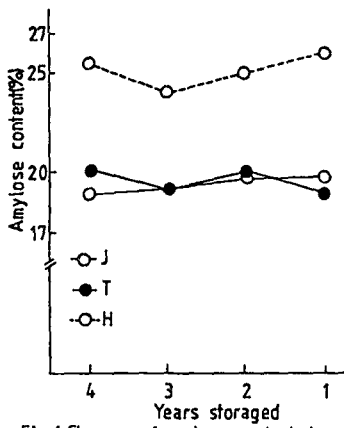


Fig.1.Changes of amylose content by varietal group.

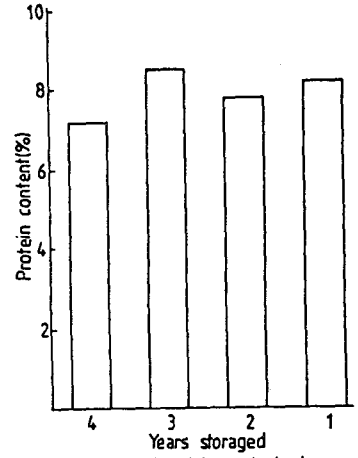


Fig.2. Changes of protein content along the storage years.

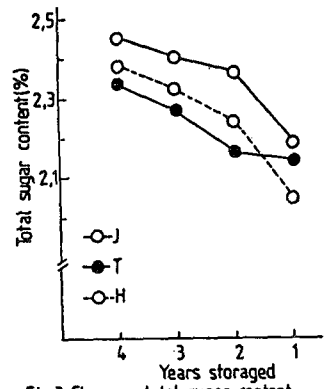


Fig.3 Changes total sugar content along the storage years.

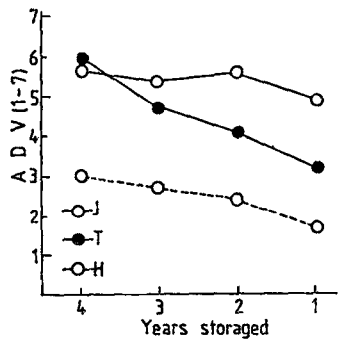


Fig.4. Changes of ADV along the storage year.

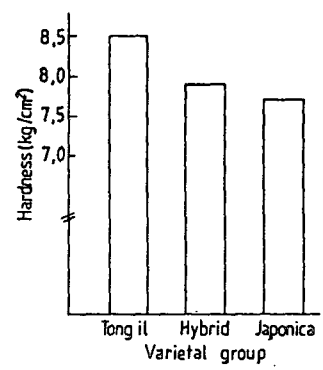


Fig.5. Changes of hardness by varietal group.

Table 1. Polled ADV changes along the storage years.

	Years stored				F value
	4	3	2	1	
	5.24±1.6	4.49±1.5	4.27±1.6	3.48±1.7	23.86**
Diff. 4		0.75**	0.97**	1.76**	
3			0.22	1.01**	
2				0.79**	

Table 4. Changes in germination ratio along the stored years and the accumulative temperature during maturation.

	Years stored				
	4	3	2	1	
Germi. temp.	37.7±38	60.1±44	86.4±21	97.4±2	18.42**
Difference 4		22.4*	48.7**	59.7**	
3			26.3**	37.3**	
2				11.0	
Accum. temp.	973.8±65	1023.0±70	963.7±78	1073.0±86	50.44**
Difference 4		49.2**	10.1	99.2**	
3			59.3**	50.0**	
2				109.3**	

Table 2. Changes of ADV along the storage year by varietal group.

Varietal group	Years stored				F-value
	4	3	2	1	
Japonica	5.70±1.4	5.36±1.6	5.58±1.7	4.92±1.9	
Tongil	5.98±0.8	4.67±0.8	4.10±0.6	3.17±0.2	
Hybrid	3.00±0.5	2.70±0.8	2.43±0.6	1.70±0.5	
J-T	0.28	0.69	1.48	1.75	
J-H	2.70**	2.66**	3.15	3.22**	
T-H	2.98**	1.97**	1.67	1.47	
F-value	8.666**	5.046**	7.035**	7.403**	

Table 3. Changes in germination ratio along the storage years by varietal group.

Varietal group	Years stored				F-value
	4	3	2	1	
Japonica	0.0±0.0	2.5±1.8	66.7±27.2	96.0±3.0	
Tongil	54.0±37.0	91.3±8.1	96.4±2.3	97.5±2.1	
Hybrid	67.9±18.8	93.8±2.5	99.2±0.7	99.6±0.7	
J-T	54.0**	88.8**	29.7**	1.5	
J-H	67.9**	91.3**	32.5**	3.6	
T-H	13.9	2.5	2.8	2.1	
F-value	8.325**	403.0**	5.586**	2.250	