



G1239- 0858

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**Study on the Quality Improvement of Dried Fish Product
for the Export- Enlargement**

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40 50% 가 가

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30%

가 5% dextrin
10% 가 2 3% ,
가 가 2 (spray)

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가

25%

Q10

가

가 propolis

가

가

(0.5% green-tea extracts,

0.05% green-tea extracts, 0.05% green-tea extracts + 0.08% rosemary oleoresin, 0.1% grape fruit seed extracts, 0.08% rosemary oleoresin, 0.04% rosemary oleoresin, 5% , 5% , 10% , 10% , propolis, alcohol, antimold- pad) 5가 (; 0.1%

grape fruit seed extracts, 0.08% rosemary oleoresin, 0.05% grape fruit seed extracts+0.04% rosemary oleoresin, 0.5% propolis, 0.25% propolis,

; dextrin, sorbitol, 0.5% green-tea extracts, 0.5% propolis, Antimold pad,

; 0.1% grape fruit seed extracts, 0.08% rosemary oleoresin, 0.05% grape fruit seed extracts+0.04% rosemary oleoresin, 0.25% propolis)

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3가 (0.25% propolis, 0.08% rosemary oleoresin, 0.5% green-tea extracts) , , , 가

1
0.25% propolis 가
가 , 가
(with air) 가 , 가
(N₂, CO₂ gas)

CO₂가
(vacuum package)

0.25% propolis, 0.08% rosemary oleoresin, 0.5%
green-tea extracts

가 .

CO₂가 .

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SUMMARY

. Title

Study on the quality improvement of dried fish product for the export- enlargement

. Objective and significance

The dried fish products such as dried squid, seasoned squid and dried oyster are mainly consumed in our country including Asia and other countries which asian lives. The seasoned squid, one of the traditional foods contains various kinds of nutritional compounds and have been utilized as smoked, roasted and shredded types.

The squid and its seasoned products have been special foods for the various kinds of people. But its consumption ratios gradually decreased because of its lack of processing technology, related equipments and some problems such as rigid texture due to continuous drying and browning due to exposure to O₂, UV ray and microorganisms during distribution of longer period.

On the other hand, there have been methods which uses synthetic preservatives for the improvement of squid or oyster quality, but the synthetic preservatives is not permitted because of its unstability and other side effects. Thus, the use of natural preservatives showing antioxidative function or antimicrobial activity are thought to be necessary to its application to squid and oyster products.

In this study, we have studied effect of moisture content control,

treatment of natural preservatives and packing methods on the dried squid, seasoned squid and dried oyster quality to protect its continuous drying, lipid oxidation and other quality problems such as browning and contamination of microorganisms, and eventually to improve its quality.

. Contents and scope of research and development

A year	Contents and scope	Target
1995	<ul style="list-style-type: none"> · Process optimization of dried fish product for quality improvement · Development of quality maintenance for dried fish product by anti-browning agent · Quality of quality improvement for dried fish product by natural food additives 	<ul style="list-style-type: none"> · Quality improvement of dried fish products · Technical development on storage and packaging method
1996	<ul style="list-style-type: none"> · Scale up test of dried and seasoned squid using natural food additives. · Quality improvement of dried fish product by natural food additives and packaging method 	<ul style="list-style-type: none"> · Establishment of suitable storage condition of dried fish product an actual proof by scale up test · Development of effective storage and distribution techniques for dried fish product

. Results

1. Quality stabilize of dried fish product by new processing technology

Traditional dried fish product is made to have low moisture content for inhibit microbial contamination during distribution, and it roles as major

adversary hinderance in consumer's choice. Dried fish product was recommended to has moisture content less than 23%, but because most of dried fish product was still manufactured by sun-drying so it was overdried and too headstrong(less than 15%).

To improve the physical properties(soft) and antimicrobial properties, moisture content was adjusted to 26 27% and effect of various natural antimicrobial and antidxidative agent was searched and optimal concentration was defined.

In processing steps, the optimal addition point was after 1'st drying step(water content 60 65%) by spraying and immersing, and after succesive 2st drying step(water content 35 40%) by spraying.

In case of seasoned squid, moisture content was fixed to 30%, sorbitol (5% down) and dextrin(10% up) content was adjusted. So overall processing yield ups 2 3%. Addition of natural preservatives to seasoned squid was done by spraying process after 2nd seasoning.

Dried oyster was not consumed in our country but consumed in Taiwan, Hongkong, Singapore and Malaysia. So produced oyster was processed in field(chungmu-si) and all exported. Dried oyster has moisture content 25% and distributed under 0 , it has low possibility about quality deterioration. Among natural antimicrobial and antioxidative agent propolis showed effect in color maintenance and microbial growth inhibition.

2. Quality improvement of dried fish products by natural antimicrobial agent and packaging method.

Among natural food additive treatment(0.5% green-tea extracts, 0.05% green-tea extracts, 0.05% green-tea extracts + 0.08% rosemary oleoresin, 0.1% grape fruit seed extracts, 0.08% rosemary oleoresin, 0.04% rosemary oleoresin, 5% dried jinseng, 5% fresh jinseng, 10% dried jinseng, 10% fresh

jinseng, propolis, alcohol, antimold-pad), 5 treatment was selected by pretest (dried squid ; 0.1% grape fruit seed extracts, 0.08% rosemary oleoresin, 0.05% grape fruit seed extracts+0.04% rosemary oleoresin, 0.5% propolis, 0.25% propolis, seasoned squid ; dextrin, sorbitol, 0.5% green-tea extracts, 0.5% propolis, Antimold pad, dried oyster ; 0.1% grape fruit seed extracts, 0.08% rosemary oleoresin, 0.05% grape fruit seed extracts+0.04% rosemary oleoresin, 0.25% propolis) and effect of this appraised by analysing water activity, moisture content, color change, degree of browning, lipid oxidation and microbial cell count. After precise estimation about antimicrobial treatment, 3 treatment(0.25% propolis, 0.08% rosemary oleoresin, 0.5% green-tea extracts) was selected and quality changes according to packaging method was analysed. In dried squid, 0.25% propolis treatment was most effective in antibrowning and antioxidation. White film was most effective in protecting UV penetration. Between MAP(modified atmospheric packaging) with N₂ and CO₂ gas, N₂-MAP is superior than CO₂-MAP and vacuum packaging.

Green tea water extract(0.5%) was better than 0.25% propolis, 0.08% rosemary oleoresin in color maintenance. In air-MAP, white and red film showed detectable effect, and N₂-MAP using white film is effective than CO₂-MAP and vacuum packaging.

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3)

5g 100ml 가 20
3000rpm 4 420nm
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4)

Toyomizu Chung 2g 50ml
 flask n-hexane 30ml 가 24
 (Whatman No. 41) . Chloroform- methanol(2:1)
 30ml 가 30 , 460nm

5)

(Color & Color difference meter, YASUDA SEIKI
 SEISAKUSHO) L (明度), a (赤色度), b
 (黄色度)

6) TBA(Thiobarbituric acid)가

Tarladgis et al 水蒸氣蒸溜法 .
 2g 500ml kjeldahl flask 97.5ml,
 (conc.HCl:H2O=1:2 v/v)2.5ml, silicone oil 가 . Kjeldahl flask
 50ml ,
 5ml 0.02M TBA 90% 5ml 가
 , 30 가 . 20
 531nm , TBA가 .

7)

1g 9ml 가 35
 incubator 30 10
 Poured method plate count agar 37 48
 colony counter .

8)

5

가 가
 (, ,)
 가 (N₂가 , CO₂가) 가
 가 .
 film Nylon 12μm/LDPE 80μm
 Polypropylene tape , 가
 tape가 가
 (N₂가 , CO₂가) .

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Samples	W1(cm)	H2(cm)	Wt3(g)	T4(cm)	Force for tension(g)
A	13.5	24.9	59.7	0.2	3250.12 ± 647.78
B	12.9	21.1	46.3	0.2	4369.69 ± 202.17
C	12.2	22.1	49.8	0.2	2991.17 ± 782.43
D	12.4	21.0	41.6	0.2	4391.32 ± 356.41

A : B : C : D :

1) W : width 2) H : height 3) Wt : weight 4) T : thickness

2.

Samples	(%)	(aW)
A	14.6	0.40
B	19.9	0.47
C	16.3	0.47
D	17.3	0.48

A : B : C : D :

3.

Samples	L	a	b	E
A	37.93	4.96	7.88	51.87
B	44.40	2.58	9.23	45.6
C	45.03	2.62	0.97	44.1
D	46.50	4.28	8.64	43.5

A : **B :** **C :** **D :**

4.

		(%)	(aW)		
		24.7	32.9	0.64	0.79
		23.3	25.2	0.77	0.78

2.

1995			1994	30.3%	가	1,251	
	32.1%	가	1,351		가	100	
		4.6%	가	1,722	16.1%	가	
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	가			,	,		
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			가				
			가	.			
가				,	,		
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	1994	1993	10%	가	1995	4.6%	가
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6.

(: , %)

	1993	1994	1995	95/94
	295,203	319,445	281,854	88,2
	86,016	99,782	86,199	86,4
	69,543	105,571	110,178	104,4
	62,836	69,221	89,314	129,0
	62,511	78,478	94,820	120,8
()	59,696	59,329	76,901	129,6
	56,355	33,454	38,243	114,3
	54,007	54,991	49,553	90,1
	42,346	39,256	39,105	99,6
	33,223	30,200	24,464	81,0
	24,472	71,909	87,889	122,2
	22,469	25,776	33,248	129,0
가	23,590	19,890	20,037	100,7
	18,340	11,309	12,208	107,9
	17,949	14,231	9,996	70,2
	17,462	22,209	23,814	107,2
	16,677	11,615	20,489	176,4
	14,233	5,212	9,481	181,9
	13,736	14,227	17,212	121,0
	13,446	25,995	15,244	58,6
()	12,938	17,873	65,120	364,3
	10,566	13,118	14,723	112,2
	8,092	5,079	3,049	60,0
	7,900	9,522	12,970	136,2
	6,629	3,454	2,248	65,1
	4,144	149	237	159,1

:

1989 10 GATT

1992 2

1991 3 1992 1994

63

1994

4

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1995

1997

46

1995 1 1

391

341

(87%)

1997 7 1

가

가

가

가

19

14

1995 1 16

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가

351

, 1982 20% 가
 1988 1989
 1995 1,722 1,647
 4.5% 가 .
 1995 , ,
 , 가 256 .
 가 '95 가
 80% , '96 .
 가 가 .

7.

	()					
	15,088(537)	263.271	621.832	330	4.317	9.995
	1.949(32)	10.382	32.250	42	1.011	1.231
	5.566(50)	6.429	36.695	20	11	57
	6.568(409)	235.296	518.124	242	3.041	8.219
	345(24)	1.205	10.713	11	37	209
	621(15)	9.424	22.625	15	217	279
	25(6)	503	929	-	-	-
	14(1)	32	496	-	-	-

1995

374,261 95% 355,380
 18,906 8,259
 90% 7,420 839
 가 가 가
 89%
 1993 4
 1994 10 2 가
 13 (; , , , , 가 , , ,)
 ; , . EU ; ,)
 가

(단위 : kg)

표 10. 주요 수산건제품의 대미 수출실적

분류	생산 제품명	88	89	90	91	92	93	94	95	96	97.9
소건품	오징어	147,133	102,379	176,080	112,536	59,049	226,591	86,951	69,915	81,302	59,601
	명태	50,461	62,133	61,722	35,717	107,527	182,671	85,053	60,659	65,973	67,869
	새우	2,040	2,668	963	765	255	340	536	1,168	-	222
염건품	조기류	116,470	112,611	43,352	23,390	-	13,029	2,176	-	5,771	-
	멸치	105,493	97,563	46,293	48,908	58,463	116,531	28,827	51,171	34,123	13,578
자건품	굴	16,526	7,430	6,599	9,880	13,256	-	-	13,390	-	286,470
	조미 오징어	165,134	120,190	181,633	120,494	148,368	211,055	114,723	192,278	184,712	91,466
조미 가공품	조미 취치포	313,908	117,191	150,914	53,218	30,880	44,435	11,783	11,491	2,839	3,029
	기타	108,436	61,470	95,639	83,237	36,594	103,782	58,955	112,080	30,996	30,401

표 11. 주요 수산건제품의 매일 수출실적

(단위 : kg)

분류	생산 제품명	88	89	90	91	92	93	94	95	96	97.9
소건품	오징어	58,890	52,414	5	8,996	431,685	143,556	22,550	21,404	1,650	5,595
	명태	-	10,508	50	85	77,802	1,000	-	400	37,328	1,900
	새우	1,785	1,783	13,367	15,000	40	40	-	-	-	525
염건품	조기류	-	30	35	1,435	-	-	3	-	-	-
자건품	멸치	706,924	543,279	459,449	53,464	124,269	213,034	113,285	133,809	8,500	51,252
	갈	105,846	54,399	3,680	-	-	-	-	-	-	-
조미 가공품	조미 오징어	9,873,436	4,814,840	5,787,635	4,958,887	3,123,554	1,963,340	498,778	890,862	321,659	386,555
	조미 취치포	11,699,113	5,963,657	7,036,103	2,324,681	1,296,110	632,992	317,830	245,881	73,180	114,920
	기타	881,157	1,481,133	3,100,020	4,595,345	3,670,969	4,963,827	6,066,140	6,033,077	5,193,789	3,460,608

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 1995 , ()
 87 89,661 , 25 26,471
 46.8% 가 ()
 7 5,998 9 11,804
 39.5% .

가
 가 .

(단위 : 톤, 천\$)

표 8. 주요 수산건제품의 국가별 수출실적

건제품종류	수출대상 국	'94		'95		'96		'97.9	
		물량	금액	물량	금액	물량	금액	물량	금액
건골	소계	267	4,530	500	9,913	306	5,179	286	4,270
	대만	11	148	39	467	40	691	52	675
	홍콩	84	1,592	228	5,004	17	332	38	513
	싱가포르	78	1,236	111	1,979	166	2,781	151	2,396
	말레이시아	93	1,572	99	1,977	83	1,375	45	686
	기타	-	-	23	486	-	1,472	-	-
마른오징어	소계	114	1,012	208	2,012	189	15	69	593
	일본	23	164	21	188	2	289	5	39
	말레이시아	-	-	66	756	26	912	-	-
	미국	87	806	70	814	81	52	60	509
	리비아	4	34	32	127	4	204	4	45
	기타	0.5	8	19	127	76	3,105	-	-
조미오징어	소계	618	5,212	1,147	9,481	565	1,588	500	3,202
	일본	499	3,591	891	7,612	322	1,322	387	2,144
	미국	115	1,546	178	1,592	185	74	91	950
	홍콩	-	-	40	166	20	-	-	-
	중국	-	-	18	15	-	40	-	-
	멕시코	-	-	18	44	30	81	20	32
	기타	5	75	2	52	8	-	2	76

(단위 : kg)

표 9. 주요수산물건제품의 연도별 총수출실적

분류	생산 제품명	88	89	90	91	92	93	94	95	96	97.9
소건품	오징어	539,697	621,356	506,362	130,992	504,784	376,667	113,998	208,553	189,170	69,456
	명태	92,260	126,659	81,721	116,951	220,814	204,811	91,862	92,979	121,388	101,528
	새우	8,865	5,404	14,926	15,920	12,222	404	19,863	1,488	3,910	747
염건품	조기류	-	-	-	-	-	-	-	-	-	-
자건품	멸치	928,061	727,894	543,715	156,457	302,840	374,627	169,209	248,874	68,766	94,738
	갈	782,730	373,559	232,864	492,076	162,293	447,390	266,854	500,275	305,517	286,470
조미 가공품	조미 오징어	10,046,213	4,939,080	5,975,306	5,082,541	3,335,706	2,283,569	618,406	1,161,504	565,269	500,398
	조미 취치포	12,071,064	6,112,987	7,240,498	2,386,227	1,331,505	688,931	329,900	257,788	83,559	118,514
	기타	994,550	1,549,912	3,263,969	4,701,812	3,722,482	5,085,205	6,138,891	6,162,804	5,274,634	3,522,840

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, , , 가 . ,
 70% 가
 15% . 15% 가
 15% . 가
 , , , , 가
 . 가 ,
 가 가 가 ,
 Q.C 가 ,
 가 가 .
 maillard reaction , , ,
 가 ()
 가 .
 ,
 nuclear magnetic resonance(NMR,) 4
 가 betaine taurine
 . 1. Spectrum .

maillard reaction 가

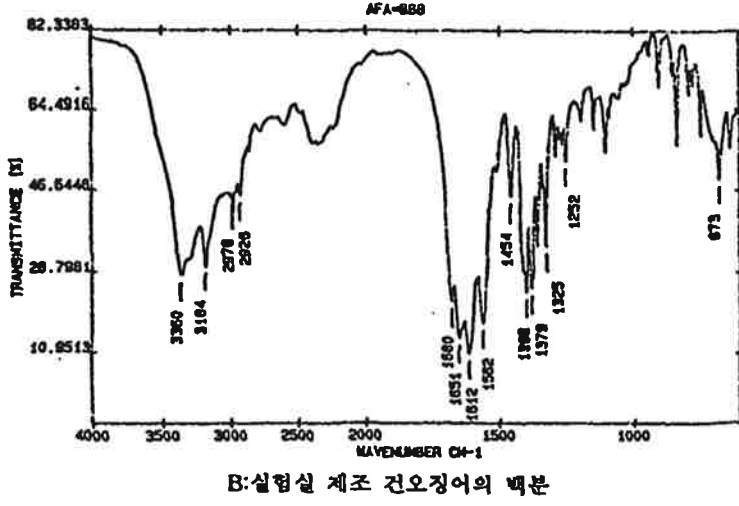
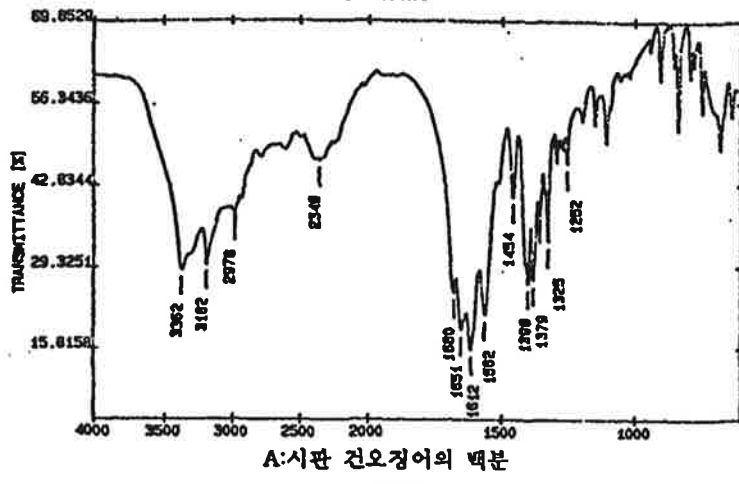
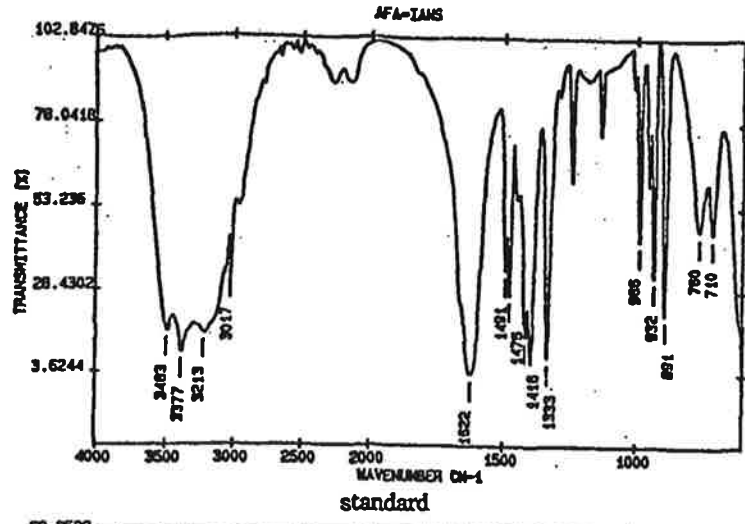


그림 1. 백분성분의 NMR Spectrum조사

1) 가

가) . 가

BL-7	, :BL-7P, : BL-7	(Na,)
	,	

가	가 .	(Na) Mg
	, ,	(Na)

		pH ()
Kanikan	0.5% - 0.1%	()

) 가

		(V.C,V.E) (),
		(V.C,V.E) (),

		(V.C,V.E) (),
		(V.C,V.E) (),

) Protamin

: , . ,

: 60%

: , pH gram

, , , , ,

) Spice Extracts

: (), ()
() .

: Carbonic acid,
가 .

: , , . Thukemono .

) Pectin Hydrolysates

:
: 가 .
: , ,
가 , , 가 ,
가 .

) Chitosan

: ,
:
: , , , . 가
, 가 가 .

) Polylysine

: Streptomyces가 Poly- amino acid

: Lysine 25-30 .

가

: 가

가 . , ,

가 . 가 ,

가 . .

) melanoidin

: 가

: 가

: , ,

No.	품명	구분	첨가제	취급시 주의사항	포장 단위	가격	관능적 특성				수분 함량(%)	수분 활성도 (aW)
							조직감	외관	맛	기호도		
1	Atarine	어패류 건제품	소금,물엿,조미료(아미노산 등)솔비톨,산미료	상미기한 ; 90일	180g	₩550	딱딱하다	색깔이 진하다	그치지 않는다	나쁘다	15.84	0.5
2	혼제sak i 오징어	오징어 혼제품	설탕, 식염, 양조식초, 조미료(아미노산등)솔비톨, 감미료(스테비아, 감초), pH조절제, 인산염(Na), 그리세린, 주정, 보존제(솔빈산 k)	상미기한 ; 90일	165g	₩380	부드럽다	색택이 좋다	향, 맛이 좋다	좋다	29.34	0.68
3	진짜오징어 혼제	오징어 혼제품	조미료(스테비아, 감초), pH 조절제, 인산염(Na), 보존제(솔빈산 k)	상미기한 ; 90일	180g	₩520	부드럽다	갈끔해보인다	단맛	매우 좋다	47.64	0.79
4	크리스탈 오징어 버터구이	어패류 건제품	탄원 맥아당물엿, 식염, 버터, 솔비톨, 조미료(아미노산등), 감미료(스테비아, 감초), 보존제(솔빈산 k), pH 조절제	상미기한 ; 6개월	170g	₩550	매우부드럽다	모양이 독특	짠맛	좋다	33.55	0.74

2) 오징어 가공제품의 관능적·물리적 특성

2015/09/07 14:33 - 운영자 로그인 / 비밀번호 / 비밀번호

No.	품명	구분	첨가제	취급시 주의사항	포장 단위	가격	관능적 성상				수분함량(%)	수분활성도(a _w)
							조직감	외관	맛	기호도		
5	yume(오징어훈제)	오징어 건조훈제품	설탕, 식염, 조미료(아미노산등)솔비톨, 감미료(스테비아, 감초), 인산염(Na), 보존제(솔빈산 k)	-	70g	₩350	부드럽다	3번과 비슷	3번과 유사, 신맛	좋다	42.34	0.79
6	그물기행	오징어 훈제품		직사일광빛고온다습의장소 피할것, 개봉후 빨리먹을것	60g	₩380	부드럽다	노란편	flavor가 좋다	좋다	41.52	0.77
7	안주(수루메saki 오징어)	어패류 훈제품		상동 상미기한 ; 90일	150g	₩420	적당	그적그렇다(껍질)	고소하고 담백, 조미하지않을듯한 맛	좋다	23.13	0.62
8	안주(황금saki오징어)	어패류 훈제품	설탕, 식염, 된장, 조미료(아미노산등)솔비톨, 감미료(스테비아, 감초), 인산염(Na), 보존제(솔빈산 k)	상미기한 ; 96.5.29	150g	₩350	보통	보통	짭짤	보통	24.77	0.62

No.	품명	구분	첨가제	취급시 주의사항	포장 단위	가격	관능적 성상				수분함량(%)	수분활성도(aW)
							조직감	외관	맛	기호도		
9	오징어된장 醬小利	어패류 건제품	단원액아당물엿,포도당과당 액당,식염,원장,고추가루,조 미료(아미노산등)솔비톨,감 미료(스테비아,감초),보존제(솔빈산 k),pH조절제	상미기 한 ; 6개월	170g	₩480	질기 다	색택 이 르 지 않 다	չ 찰	보 통	31.26	0.69
10	Yume(된장 大利 오징어)	어패류 건제품	원장,설탕,식염,조미료(아미 노산등)솔비톨,감미료(스테 비아,감초),인산염(Na),보존 제(솔빈산 k)		55g	₩350	보 통	չ 음	չ 찰, չ 감 이 չ 음	չ 음	25.54	0.66
11	낙지의 지팡이	어패류 혼제품	설탕,식염,양조식초,미림,조 미료(아미노산등),pH조절제	상미기 한 ; 6개월	95g	₩380	부 드 럼 다	매 우 չ 음	ჰ 연 취 가 너 무 강 함	나 쁠	34.93	0.77
12	부드러워 당연	어패류 건제품	설탕,식염,솔비톨,조미료(아 미노산등),보존료(솔빈산k), 산미료,인산염(Na),감미료(감초,스테비아)	상미기 한 ; 96.6.29	230g	₩680	질기 다	չ 음 색 (չ 질)	무 미	보 통	17.87	0.55

가 가

.

, , ,

가 , protamin , spice extracts, pectin hydrolysates,
chitosan,poly lysine melanoidine 가

0.2%

가

가

0.15%

0.05%

.

.

2

1.

가.

가

() (,)

() ()



(,)

1

(: 15 25 , 45)

1

(: 30% 가)

2

(1 , 50%)

2

(, ,)

3

(가 . 23%)

20%)

(. 2 3)

Scheme 1.

. 가 가 가

,

(: 1)

1

2

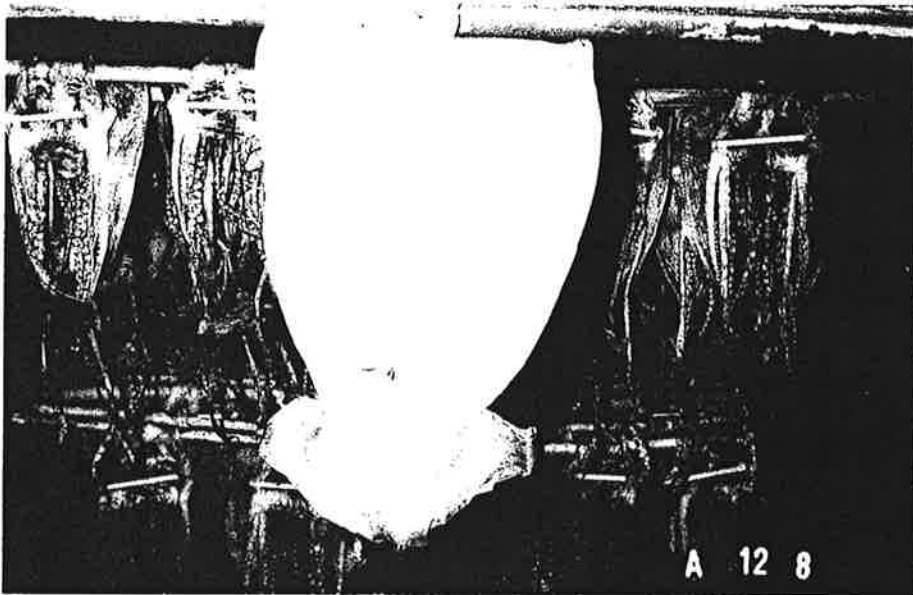
()

2

Scheme 2.

가 가 가 ,
가

,
가 .



Picture 1. 가공과정중 연육화(tenderization)과정을 거친 마른오징어

2. (,)

1 가

2 가

Scheme 3.

3.

가 , (110 , 20)

() : 8g 10g

()

(45 ,)

(25%)

Scheme 4.

Conveyor belt type

가 가 .

가

.

가

(large type

가

)

가

.

3

1.

가.

. 14. () (:%)

()		77.8(0.41)	16.93(0.23)	0.48(0.13)	2.41(0.1)
		77.89(0.54)	18.69(0.21)	1.10(0.04)	1.45(0.03)
		78.84(0.56)	15.97(0.20)	1.92(0.21)	1.64(0.07)

():

, , ,
 ,
 1 2% ,

, ,

가 , ,

, , , ,
 , , , ,
 , , , ,

(,)

, 가 가 가 ,

가 . Glycine, alanine, proline

가 ,
glycine, alanine, proline, arginine, histidine, taurine

4 TMAO(trimethylamine oxide)

1% ,
0.5 1.0% 가

(K), (Na) (P) .
(hemocyanine)

.(

)

2.

가.

가

4

, 1 2

, 3

. 4

가

가

. 14

가

EPA,

DHA

가

15.

(mg/100g 가)

	EPA	DHA			
	164	551	445	370	565
	85	248	136	82	361
	140	412	93	34	317

lysine

lysine

가 가

lysine

(methionine, cystine)

1

가 ,

가

가

2

가

(EPA, DHA)

(S)

(P)

(P/S)

가

P/S

가

3.

가
 . 16 80.4%, 10.5%,
 2.4%, 1.6% 5% 가

16.

(%)

	80.4
	10.5
	2.4
	1.6

20%

10 20%

가

palmitic acid가 가

EPA(eicosapeptaenoic acid) DHA((docosahexaenoic acid)가

5%

1%

, . 100g
84mg, 150mg, 280mg, 230mg, 20mg
, .

, propolis가 Escherichia coli, Bac. leuconostoc, Bac. subtilis, Bac. difterico, Bac. aero cereous, Bac. aerogenes 24

. propolis

19가

cinnamic acid, cinnamic alcohol, chrysin, methyl procatechnic aldehyde, isovanilin, acacetyn, pinostrobin, 5- oxy- 7,4- dimethoxy - flavonone, 5, 7- dioxy- 3,4- dimethoxy- flavone . caffeic acid galangin, chisyne, testocisys, isophinyne, pinocombryne

Propolis 가

(resin)

, propolis balsam 70%

Herbalox()

(rosemary)

2 가

가

(dispersible)

coating

. Rosemary oleolesin

Glazing Process

(Green- tea)

(Catechin)

polyphenol

epigallocatechin gallate(EGCG),

epicatechin gallate(ECG),

epigallocatechin(EGC) epicatechin(EC)

17.

0.1% grape fruit seed extracts	NG	-	NG
0.08% rosemary oleolesin	NG	NG	NG
0.5% green-tea extracts	NG	-	G
0.05% green-tea extracts	-	G	-
0.05% grape fruit seed extracts + 0.04% rosemary oleoresin	NG	-	NG
5%	NG	-	-
5%	NG	-	-
10%	NG	-	-

G ; good, NG ; Not Good

18.

0.1% grape fruit seed extracts	NG	-	NG
0.08% rosemary oleoresin	NG	-	NG
0.05% grape fruit seed extracts + 0.04% rosemary oleoresin	NG	-	NG
0.5% green tea extracts	NG	G	G
0.5% propolis (water soluble)	G	G	G
0.25% propolis (water soluble)	G	G	-
10% alcohol	NG	-	-
20% alcohol	G	-	-
(antimold- pad)	-	-	-

G ; good, NG ; Not Good

1)

가)

가



|
()

|
()

|
(1 : , 2 :)

|

|

1 (, 23 24)

| tenderization, _____

|

2 ()

|

_____ :

|

3 (, 30%)

|

(2 3)

|

()

Scheme 5.

)

- C : control
- 1 : 0.1% grape fruit seed extracts
- 2 : 0.08% rosemary oleoresin
- 3 : 0.05% grape fruit seed extracts
+0.04% rosemary oleoresin
- 4 : 0.5% propolis(water soluble)
- 5 : 0.25% propolis(water soluble)
- : (tenderization) , (spray)
- : , RH 80%

Fig. 1

25

S

60 70%

25 30%

,

0.6

0.7

Fig. 2, 3

.

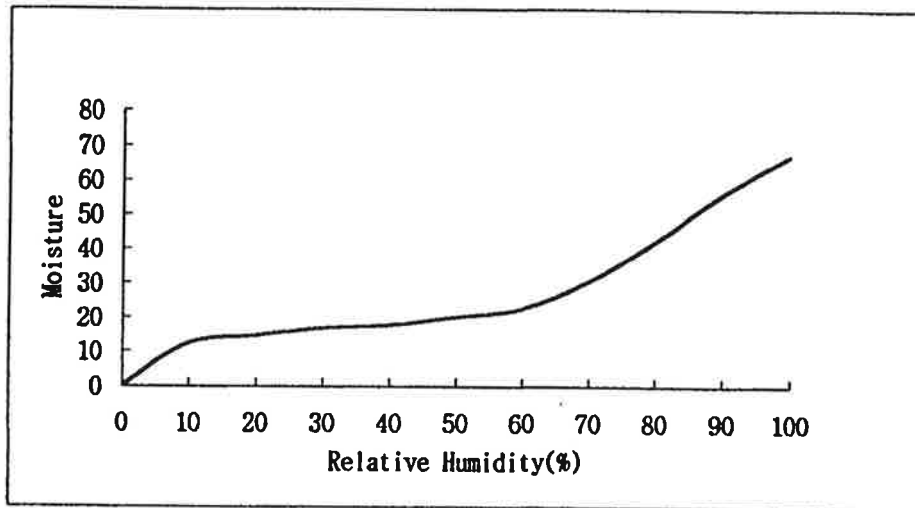


Fig. 1. Moisture sorption isotherm of dried squid.

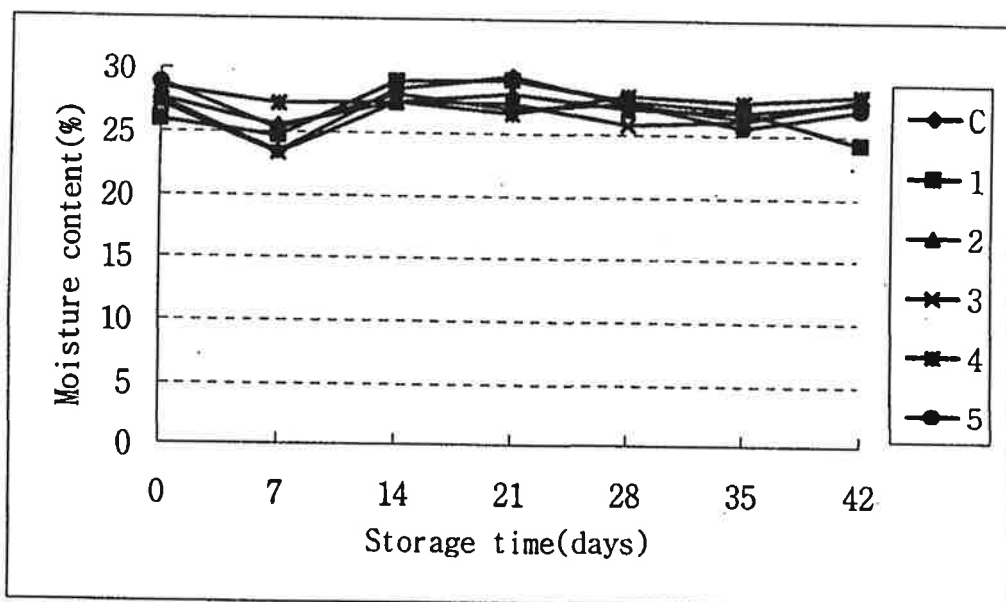


Fig. 2. Changes of moisture content on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

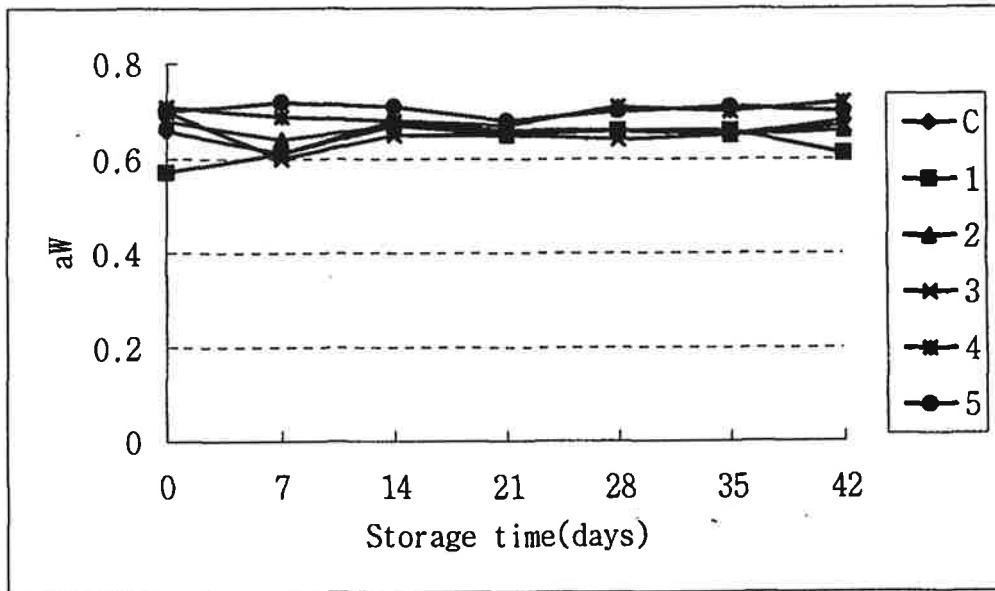


Fig. 3. Changes of water activity on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

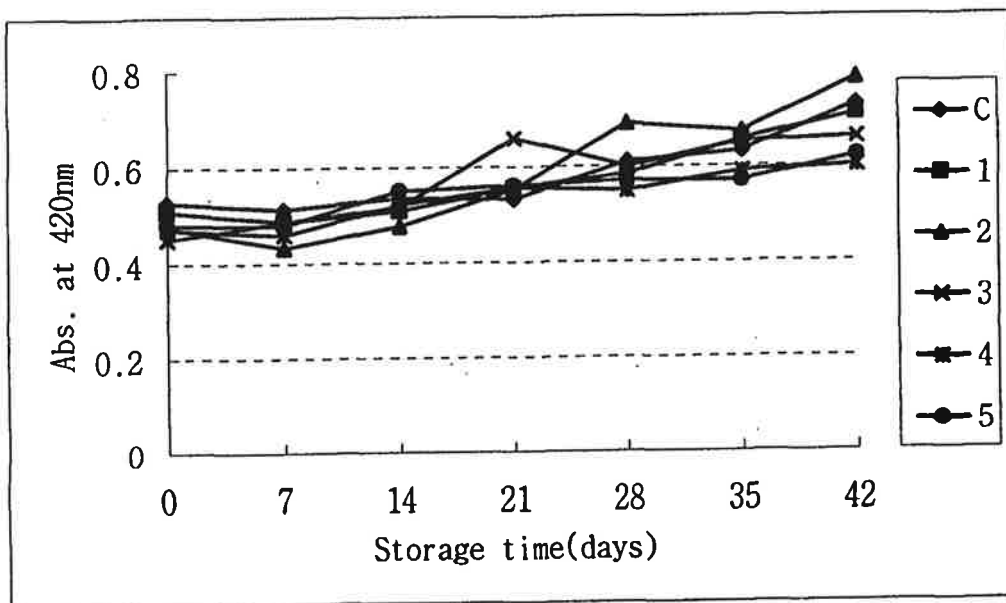


Fig. 4. Changes of water solubilized color on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

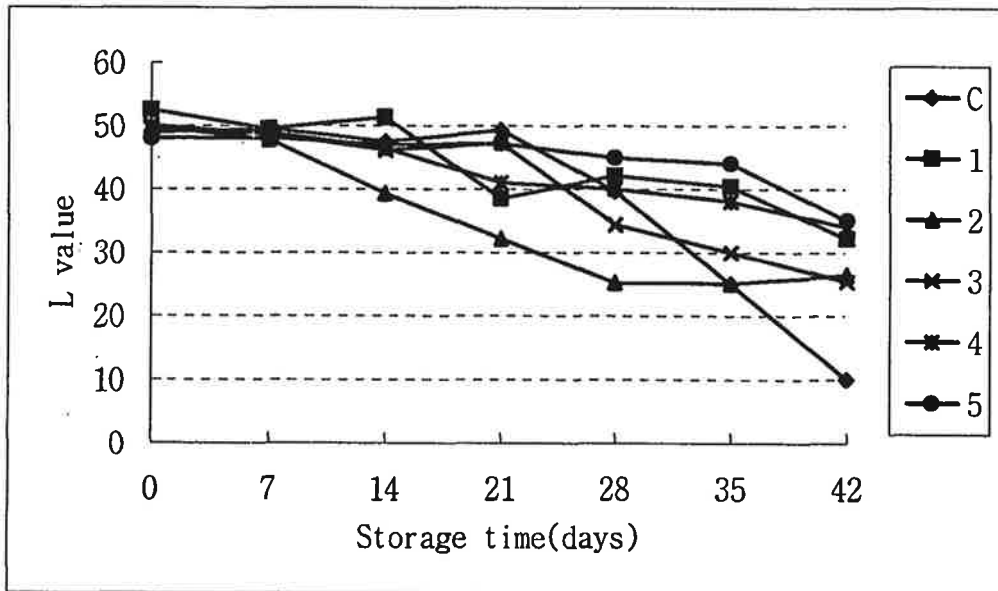


Fig. 5. Changes of lightness on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

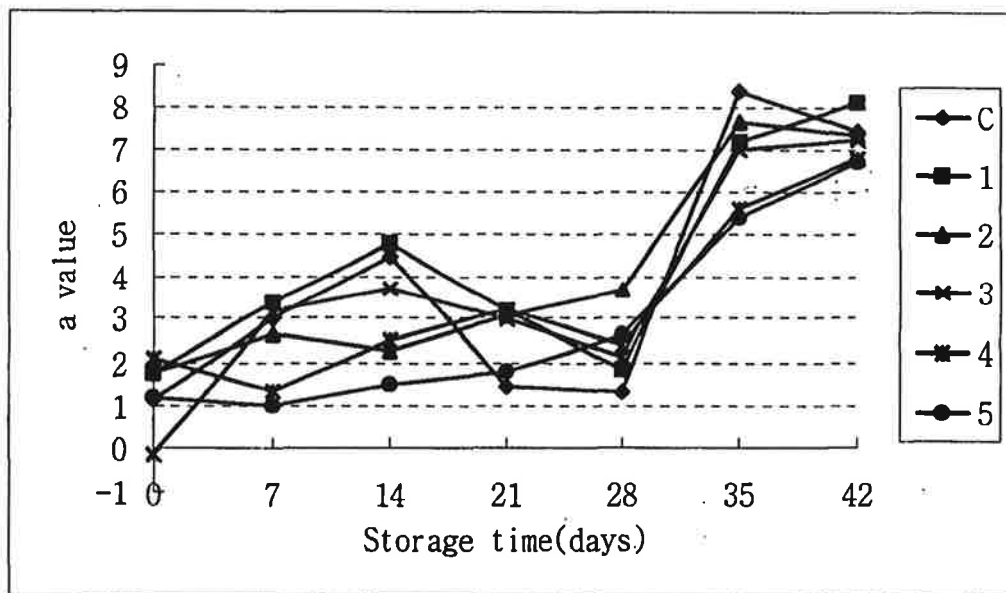


Fig. 6. Changes of redness on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

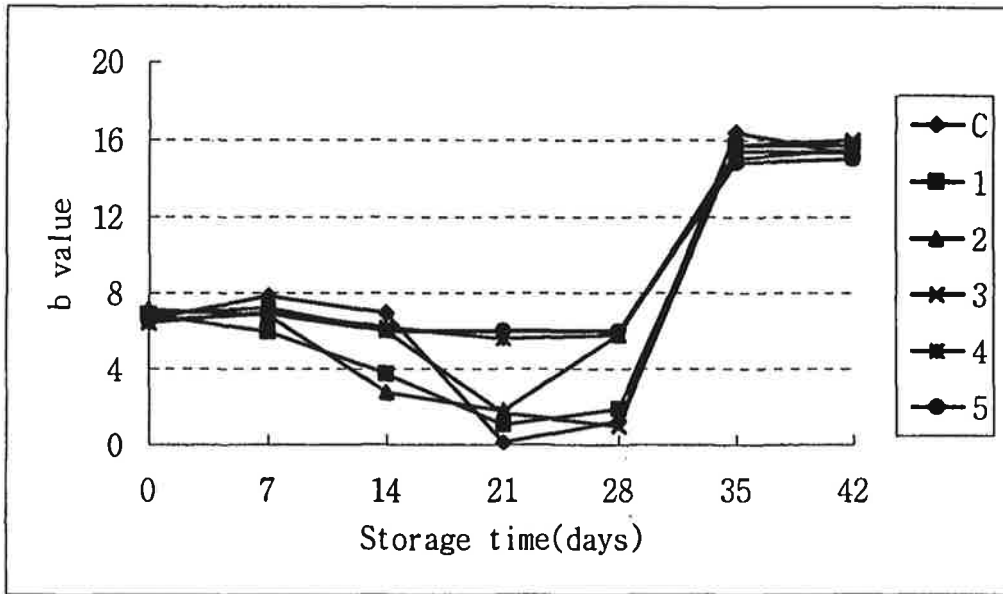


Fig. 7. Changes of yellowness on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

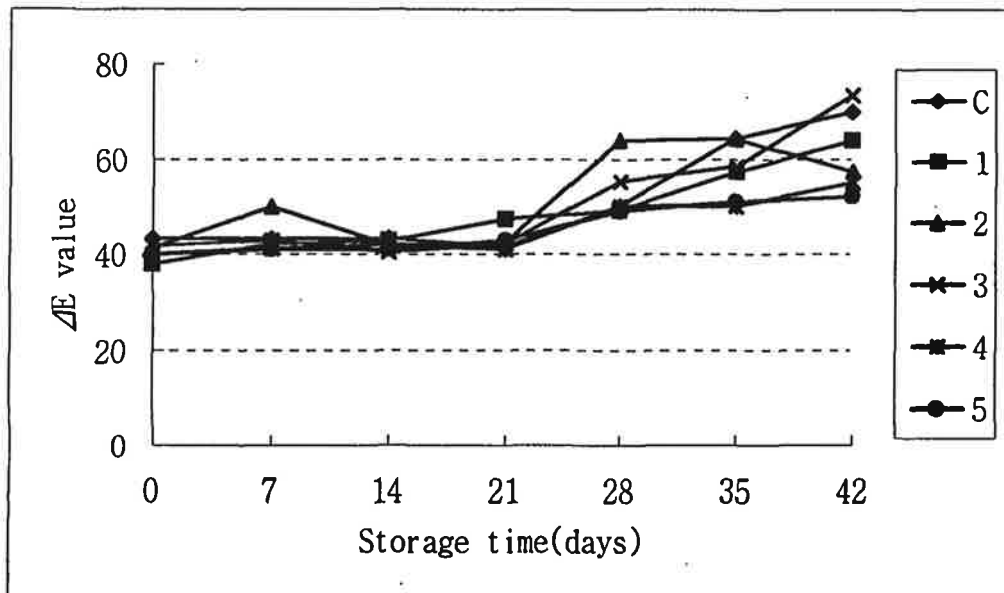


Fig. 8. Changes of browning degree using color difference meter on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis

pH, glycine, proline, arginine, alanine,
taurine, methionine, lysine taurine proline

. Tsai

25

80%, 7

가

가

grape fruit seed

extracts, rosemary oleoresin, propolis(water soluble)

가

가 . Fig. 9

7

가

가

가

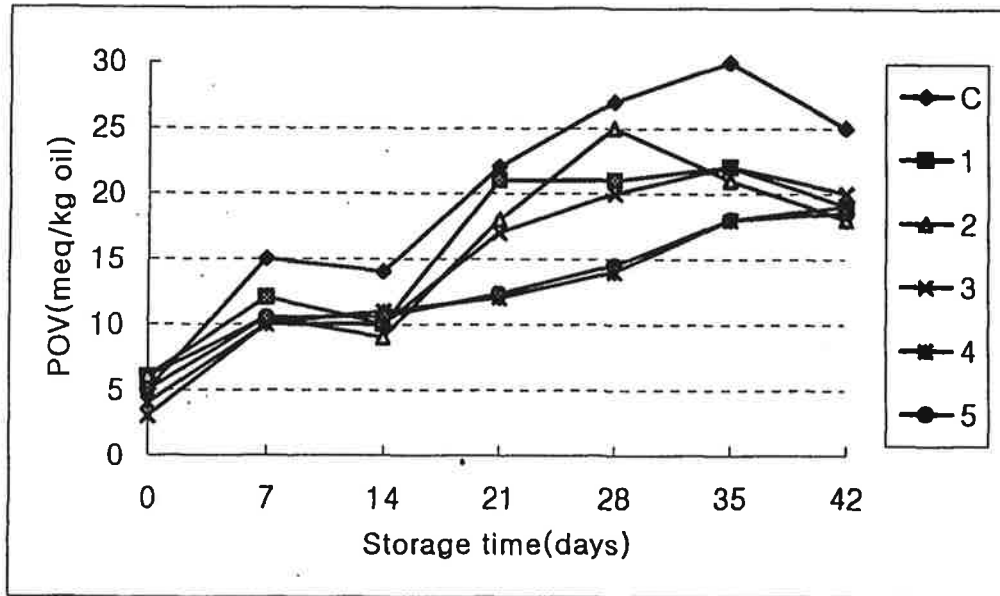
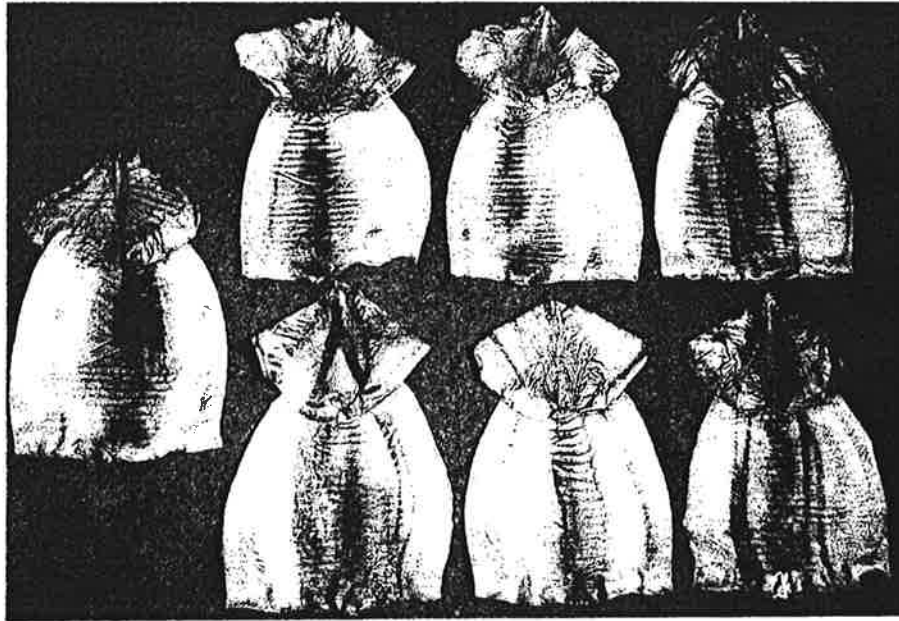
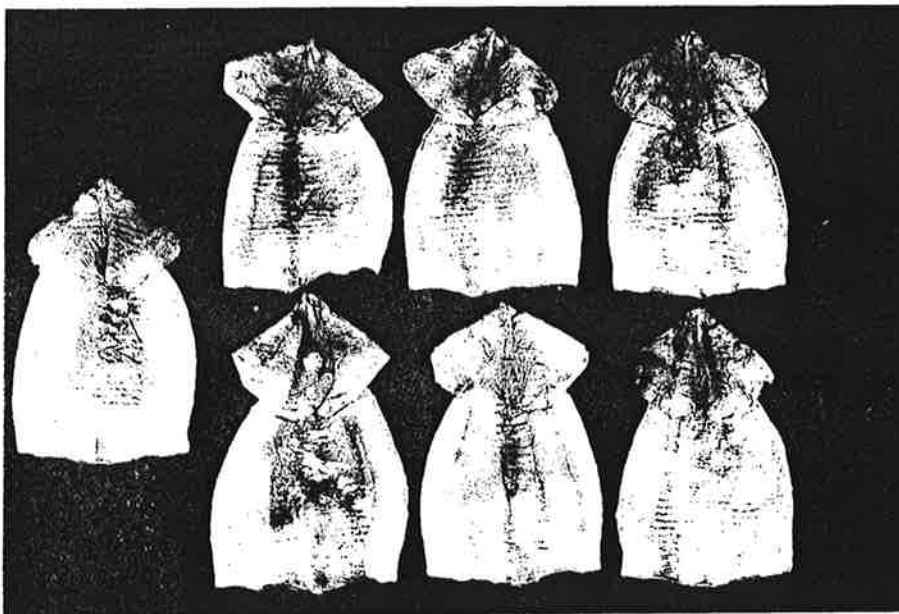


Fig. 9. Changes of peroxide value on dried squid during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.5% propolis 5 : 0.25% propolis



C	D+R	0.5%P	10% alcohol
	G	0.25%P	20% alcohol



C:control, P:propolis

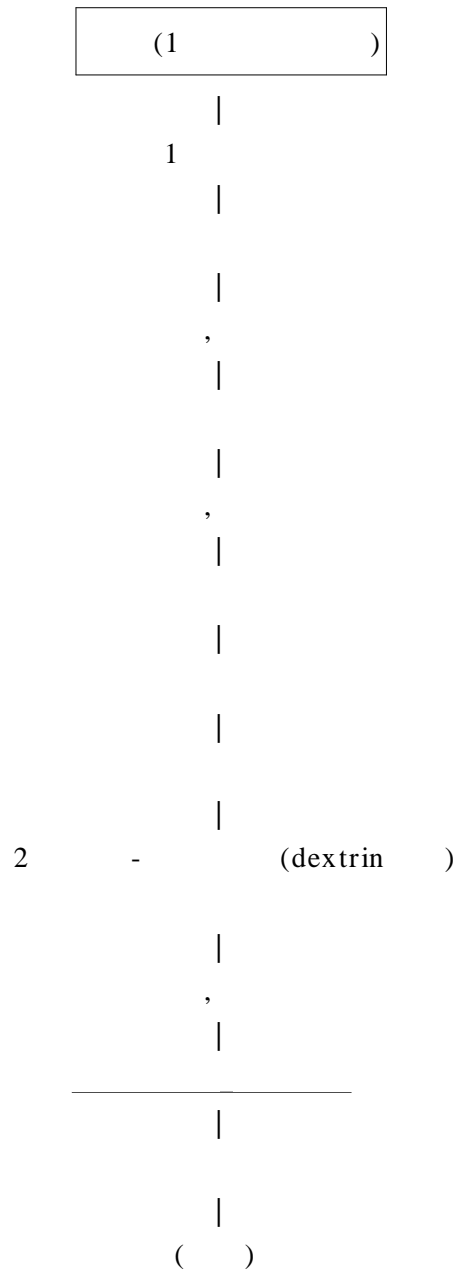
D+R:0.05%grape fruit seed extracts + 0.04% rosemary oleoresin

Picture 2. 천연첨가제를 처리한 마른오징어의 저장중 외형변화

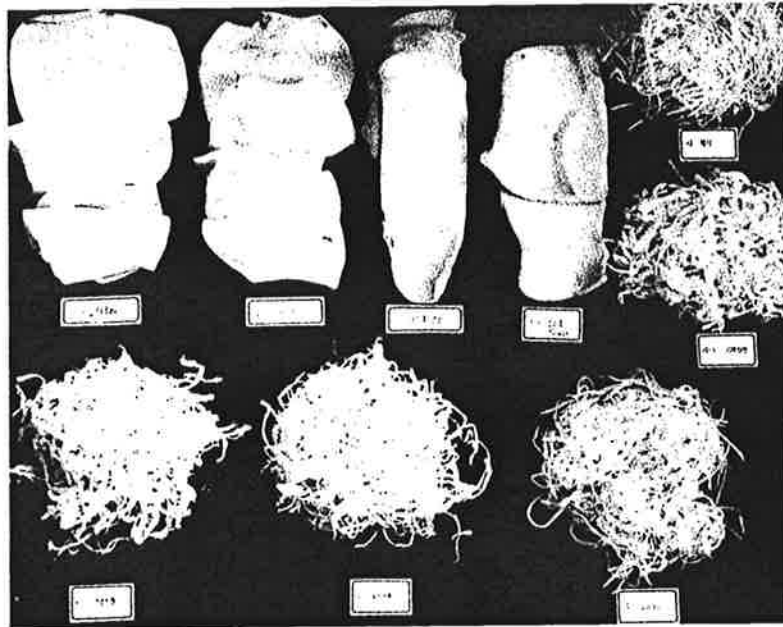
2)

가)

가

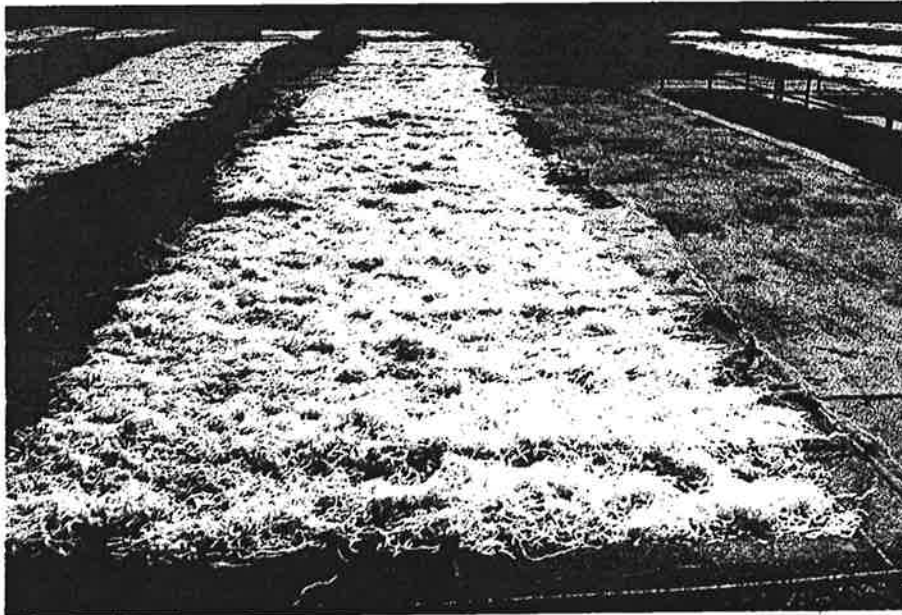


Scheme 6.



Picture 3. 조미오징어 제조과정중의 가공원료

1: 원료다루마 2: 1차조미 3: 조미후 건조 3-1: 조미후 roast 4 : 찢기 4-1: 기계신전 5: 2차조미
6: 최종제품 6-1: 최종제품



Picture 4. 천연첨가제를 첨가한 조미오징어의 천일건조과정

19.

가

1			2		
			M.S.G		
M.S.G					
	-				
	-			-	
	-				
	-				

)

· C : control

1 : dextrin

2 : sorbitol

3 : 0.5% green tea extracts(- 25%)

4 : 0.5% green tea extracts(- 30%)

5 : 0.5% propolis(water soluble)(- 25%)

6 : 0.25% propolis(water solubl(- 30%)

7 : Antimold pad

· : 2 , (spray)

· : ,

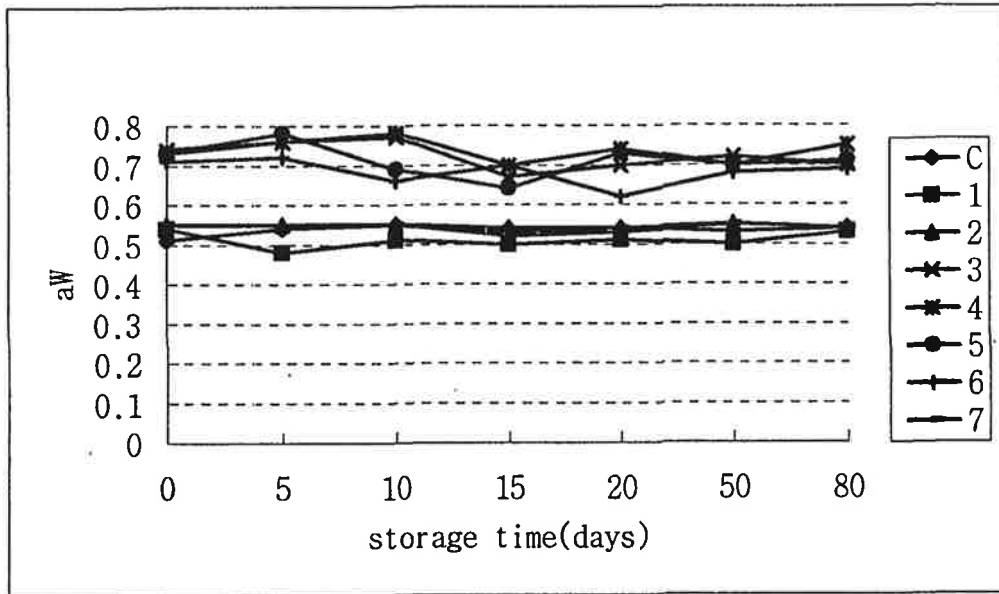


Fig. 10. Changes of water activity on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
 5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

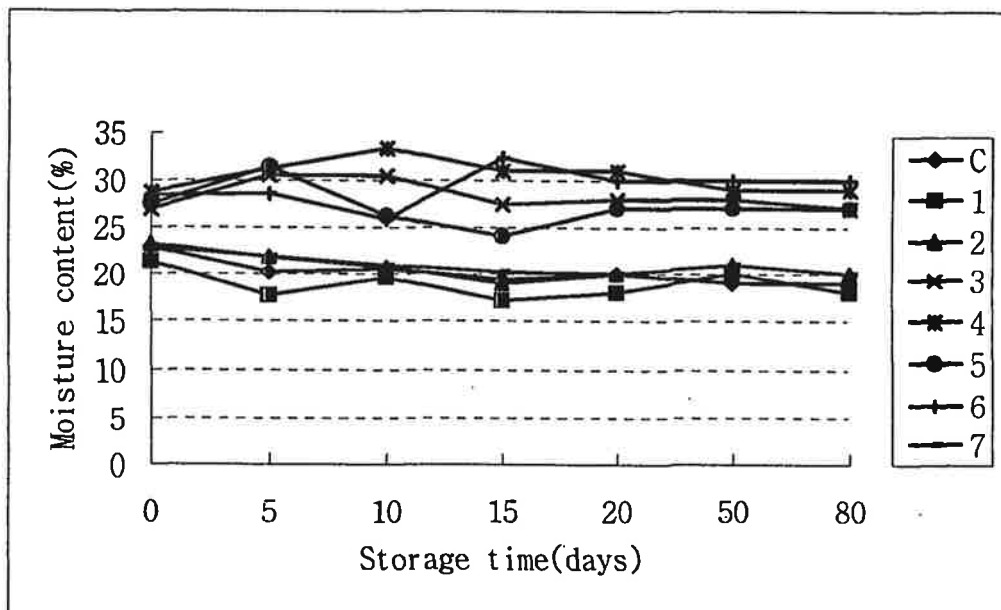


Fig. 11. Changes of moisture content on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
 5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

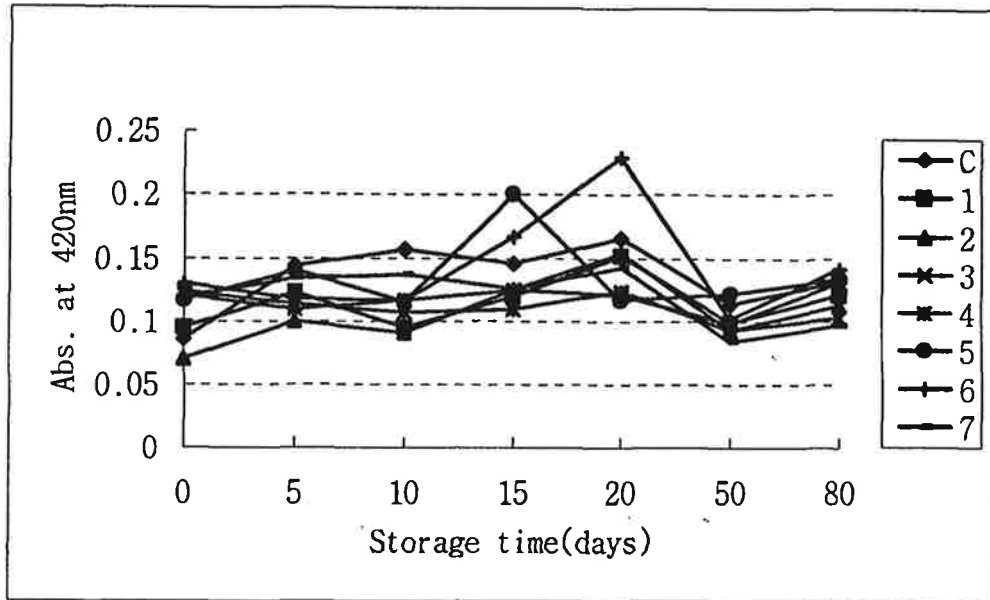


Fig. 12. Change of water solubilized color on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

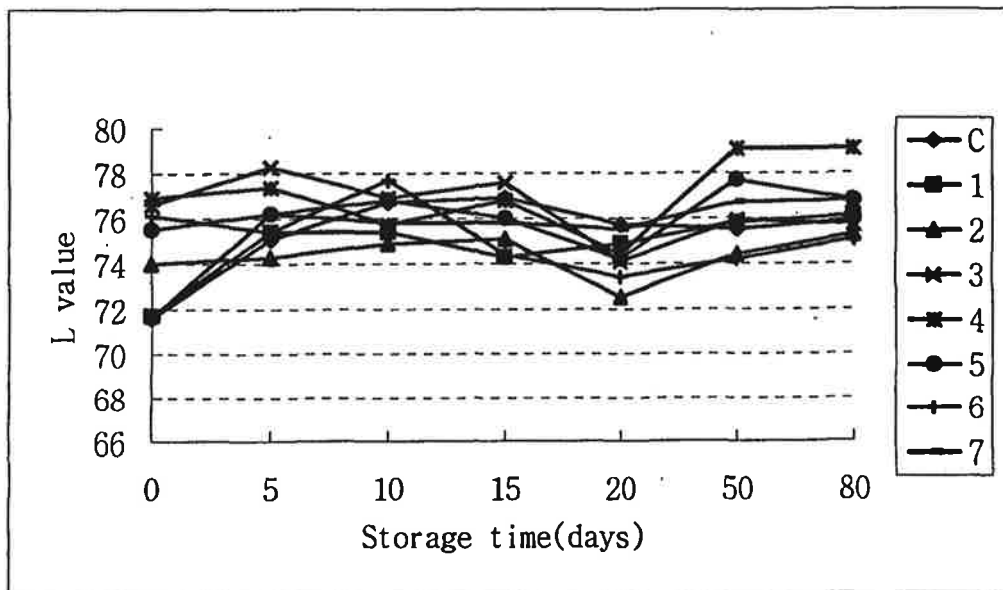


Fig. 13. Changes of lightness on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

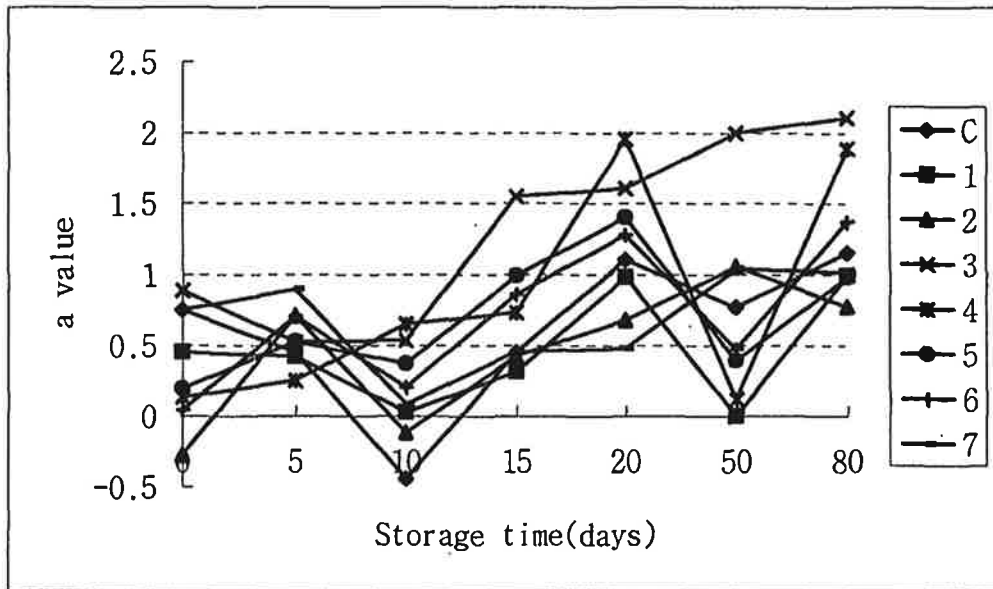


Fig. 14. Changes of redness on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

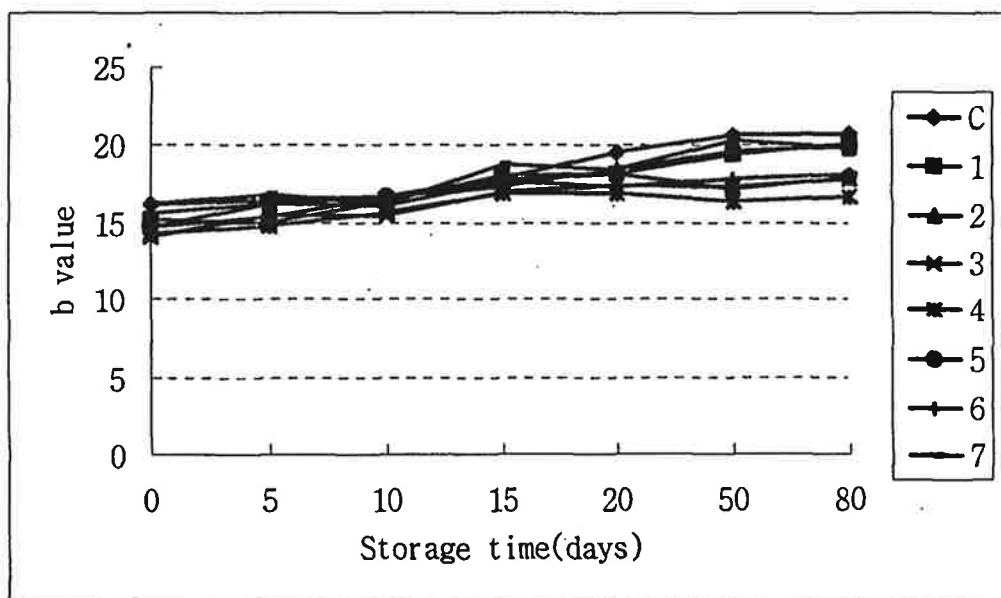


Fig. 15. Changes of yellowness on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

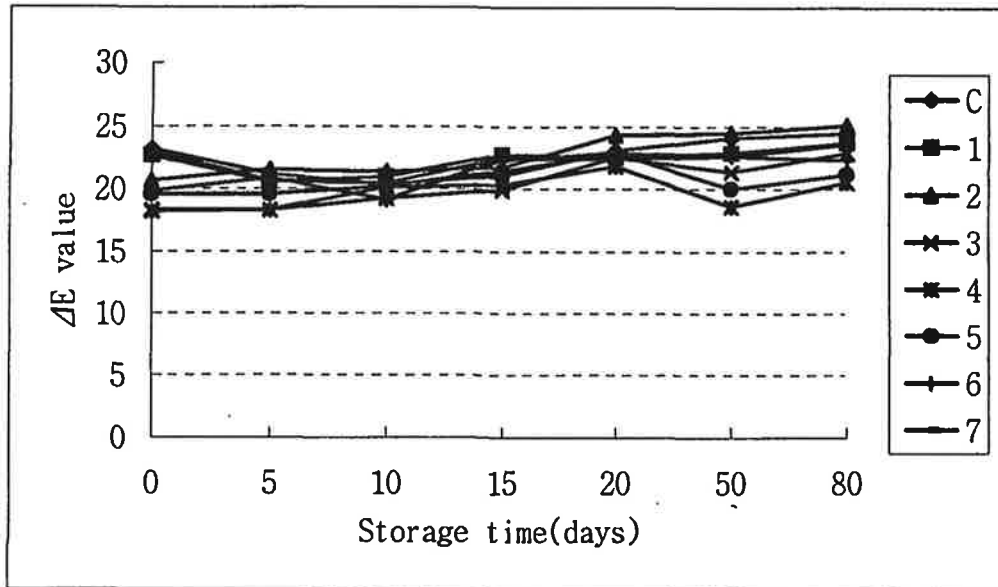


Fig. 16. Change of browning degree using color difference meter on seasoned squid during storage.

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
 5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad

Table 19. Changes of totalcolony count on seasoned squid during storage.

	storage time(days)				
	0	5	10	15	20
C	1.5×10^2	5.5×10^1	6×10^2	6×10^2	6×10^2
1	2.9×10^1	8.0×10^1	1×10^2	6×10^1	7×10^1
2	ND	1.5×10^1	8×10^1	1.1×10^2	2×10^2
3	ND	ND	ND	ND	ND
4	ND	ND	ND	2×10^1	ND
5	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND
7	1.4×10^2	ND	1×10^1	1.4×10^1	2×10^2

c: control 1: dextrin 2: sorbitol 3: 0.5% green-tea extracts 4: 0.5% green-tea extracts(M.C. 30%)
 5: 0.25% propolis 6: 0.25% propolis(M.C. 30%) 7: antimold pad
 ND : not detected

3)

taurine 가

glutamic acid, alanine, glycine, proline

.EPA(eicosapentaenoic acid) DHA(docosahexaenoic acid)가

EPA

가 , DHA

가

가

chlorophyll, carotenoid

sodium bisulfate

hydroxylamide, phenol

(BHT, BHA)

가

가

가

가) 가

30

가

25

28%

, 가 Scheme 7

()

가 , (110 , 20)
|

|
()
|

|
_____ - (30)
|

|
:
|

|
(25 28%)

Scheme 7.

2)

- tyrosine

가

.

, 0

grape fruit seed extracts, rosemary

oleoesin, propolis(water soluble)

가

가

.

)

· C : control

1 : 0.1% grape fruit seed extracts

2 : 0.08% rosemary oleoesin

3 : 0.05% grape fruit seed extracts

+0.04% rosemary oleoesin

4 : 0.25% propolis(water soluble)

· : + (spray)

· : 0

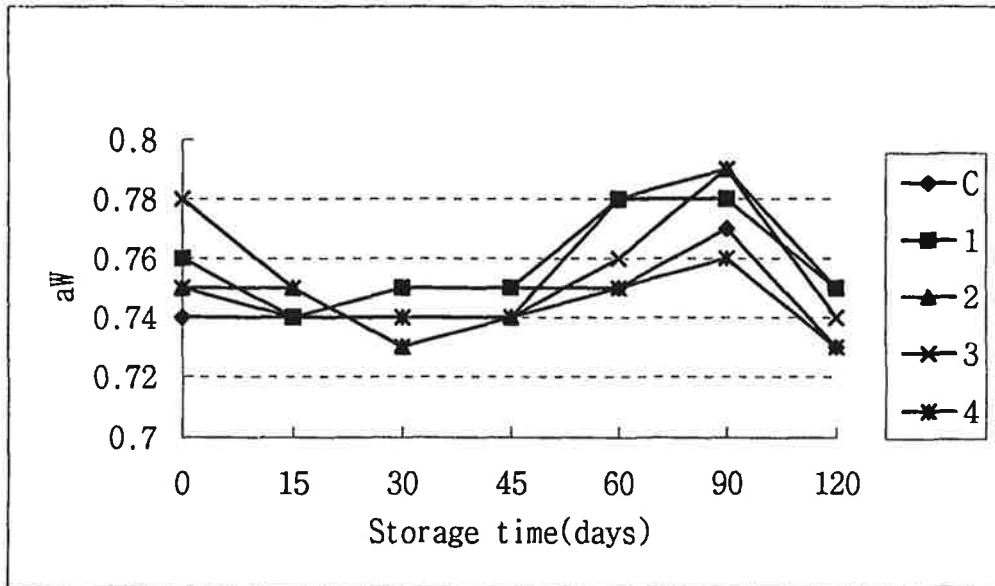


Fig. 17 Changes of water activity on dried oyster during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

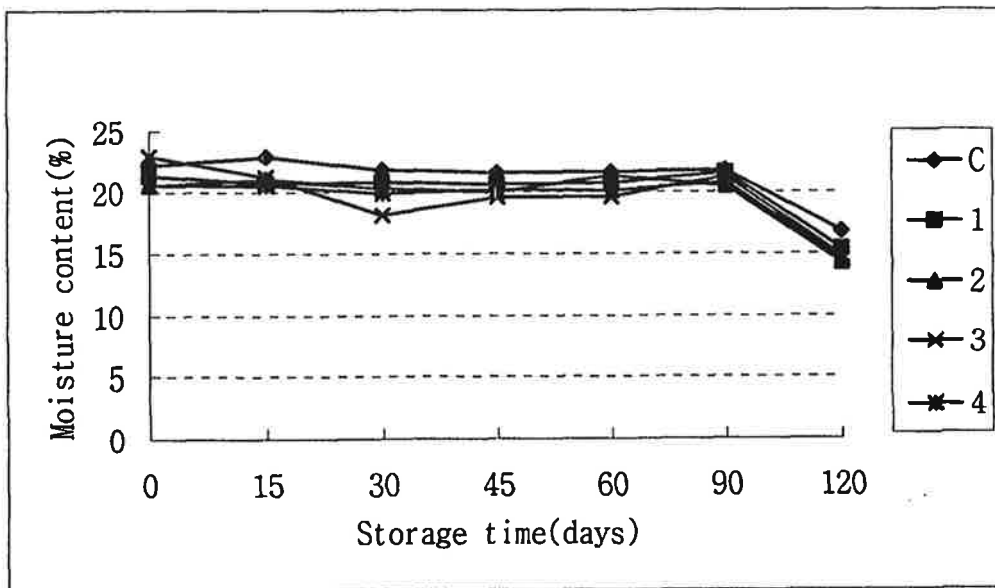


Fig. 18 Changes of moisture content on dried oyster during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

0.75 ± 0.02

Fig. 17

23.0 ± 2.0

Fig. 18

L, a, b, E

Fig. 19 22

L

0.1% green-tea extract

가

가

a

가

b

가

0

60

가

, 60

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가

Fig. 23

가

Fig. 24

90

가

가 90

가

90

Table

20

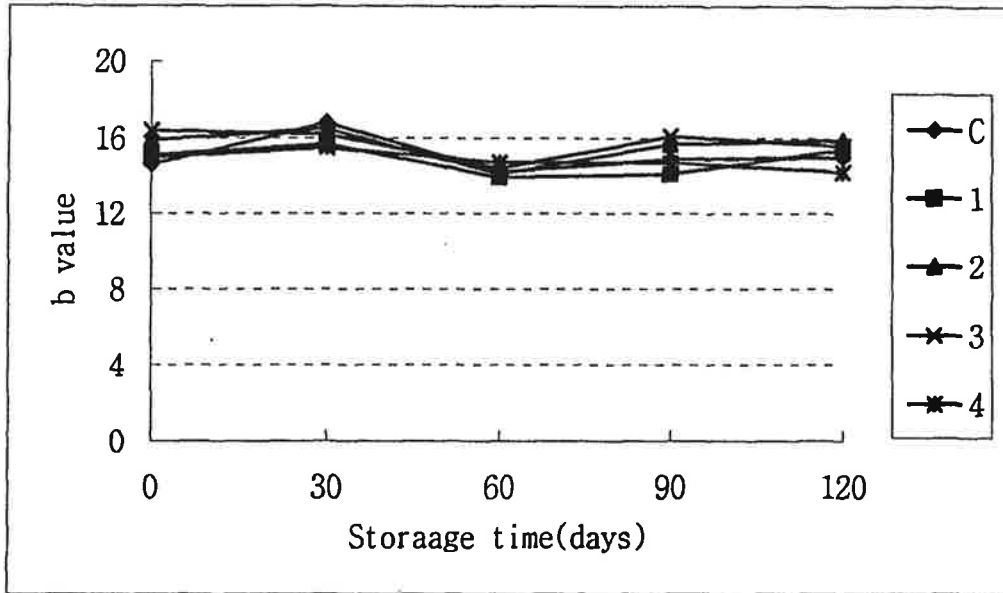


Fig. 21 Changes of yellowness on dried oyster during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

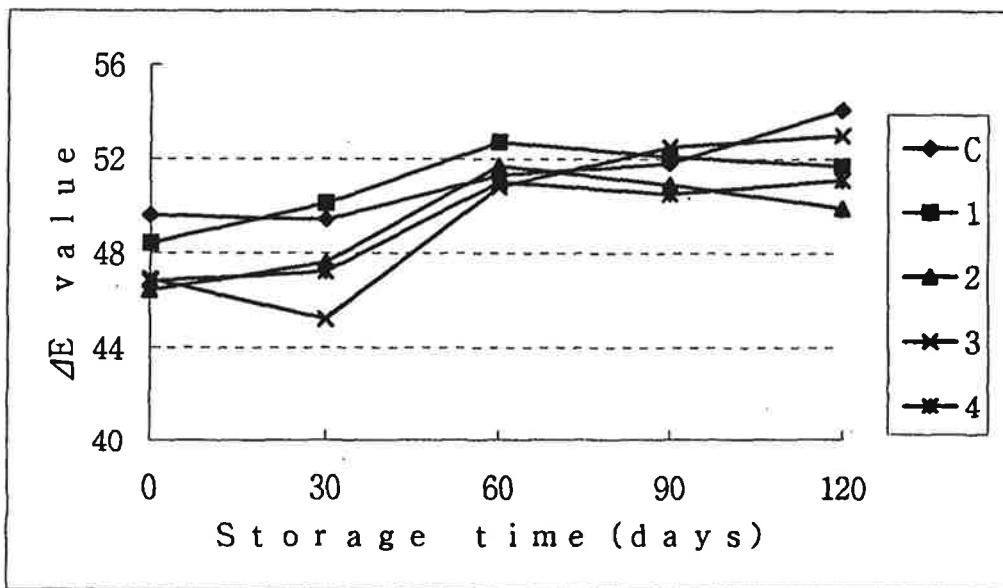


Fig. 22 Changes of Browning degree on dried oyster during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

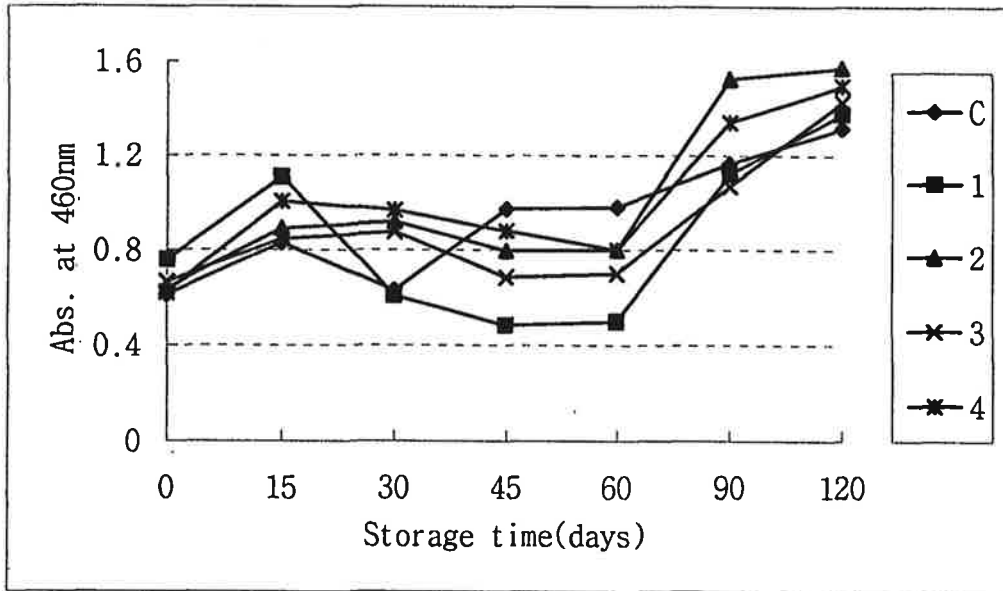


Fig. 23 Changes of lipid extractable color on dried oyster during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

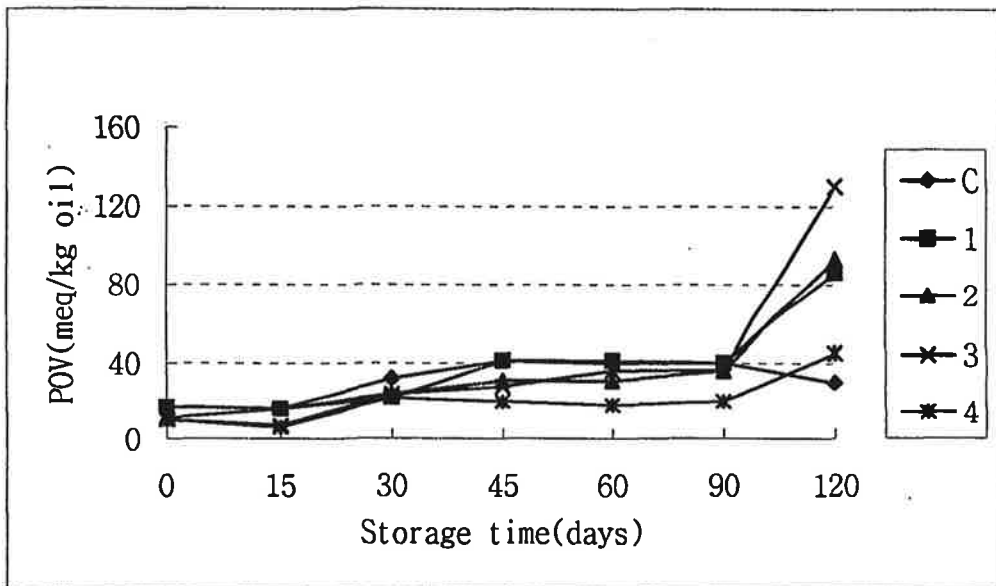


Fig. 24 Changes of peroxide value on dried oyster during storage.

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

Table 21. Change of total colony count on dried oyster during storage.

	storage time(days)						
	0	15	30	45	60	90	120
C	37	61	20	84	80	49	85
1	27	25	30	48	40	81	90
2	48	30	35	75	87	82	87
3	36	28	50	78	19	87	67
4	50	28	40	29	35	45	56

C : control 1 : 0.1% grape fruit seed extracts 2 : 0.08% rosemary oleoresin 3 : 0.05% grape fruit seed extracts+0.04% rosemary oleoresin 4 : 0.25% propolis

2. 유통기술 개발을 위한 포장재질의 특성조사

수분차단기능을 갖도록 하는 것이 건조식품 포장에서는 최대의 관건이 된다. 즉 수분 차단성이 우수한 폴리 에틸렌(Poly ethylene, PE)계, 나일론, 폴리에스터, PVDC, EVOH등을 사용할수 있으며, 산소차단성이 부여된 포장재로는 나일론, 폴리에스터, PVDC, EVOH이며 이 중에서 PVDC와 EVOH가 차단성이 우수하다.

산소, 수분차단성은 금속, 유리 AL. foil등이 가장 좋지만 적정 포장법이 구상된 다음 이런 포장재를 선택하여야 한다.

다음으로는 광차단성이 고려되어야 하는데 빛에 의해 건조식품의 산패가 촉진되기 때문이다. 광차단성은 최근 자외선 차단용 여러 가지 필름 첨가물이 개발되어 있으며 이를 용도에 따라 적절히 배합 필름을 생산하여 사용한다.

포장기술로는 질소치환, CO₂치환 포장을 통해 유통시킬 경우 내용물의 파괴를 막을 수 있으며 가스에 의해 산화·산패를 억제 시키는 이중효과를 얻을 수 있다.

따라서 본 연구에서는 NYLON 12 μ m/LDPE 80 μ m 포장재를 선택하여, 무색포장

, HAZE,

가.

22.

sample		control				
	μm	92	-	-	-	-
HAZE*	%	10	78	90	57	65
	%	94	1	49	36	65
	g/25mm	125	250	-	-	-
		130	2700	-	-	-
		135	4000	-	-	-
	cc/m ² /day	70	-	-	-	-
	gm/m ² /day	6.35	-	-	-	-

*HAZE :

가

가

Fig. 25

() 300nm 80%
 5%
 300nm 40% , 400nm 60%
 360nm 40%

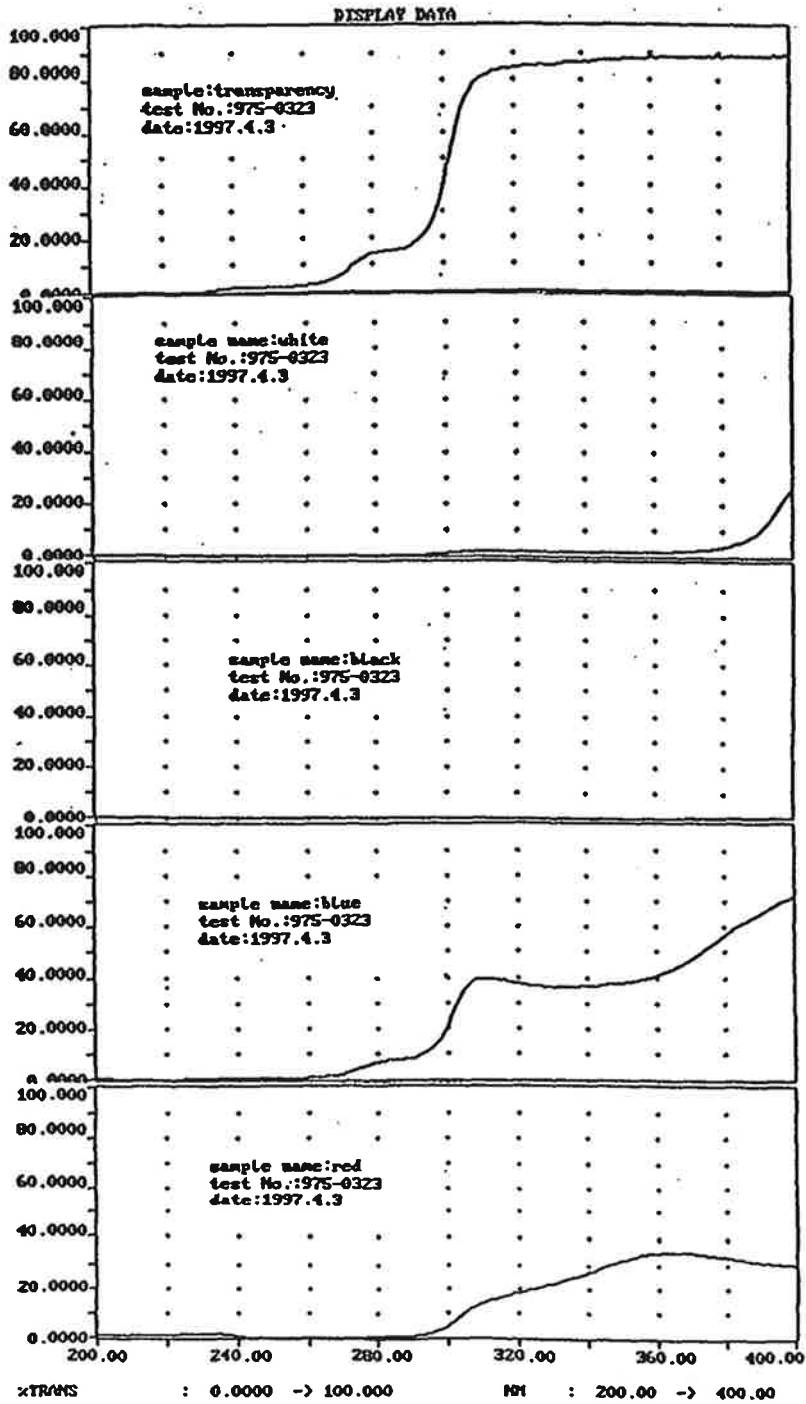


Fig. 25. Transmitted light of ultraviolet rays of each packaging films



Picture 5. 마른 오징어의 유색포장 및 가스치환 포장 과정



Picture 6. 유색 및 가스치환 포장된 마른오징어의 저장시험



Picture 7. 유색 및 가스치환 포장된 조미오징어의 저장시험

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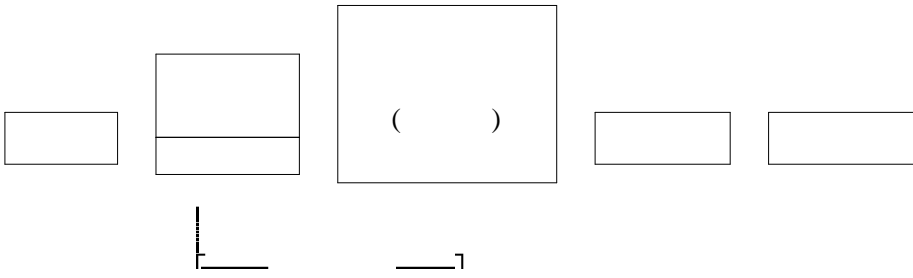
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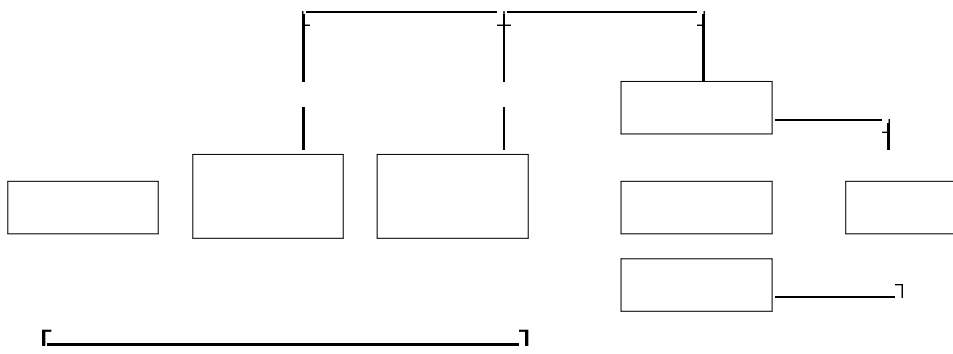
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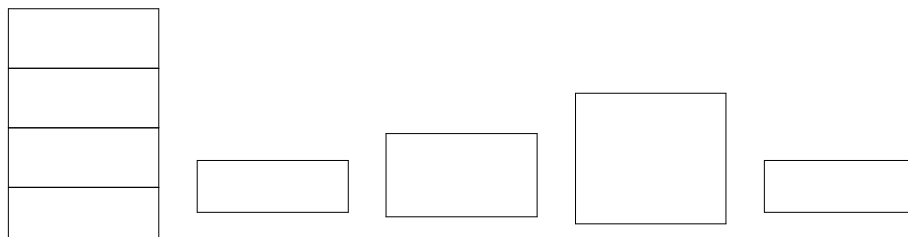
1)



2)



3)



Scheme 8.

shelf- life

NYLON 12 μ m/LDPE 80 μ m

, CO₂ 가

가 가

(, , ,)

가 (N₂가 , CO₂가) 가

10

, TBA가

Fig. 26

propolis 가

가

가

propolis

rosemary

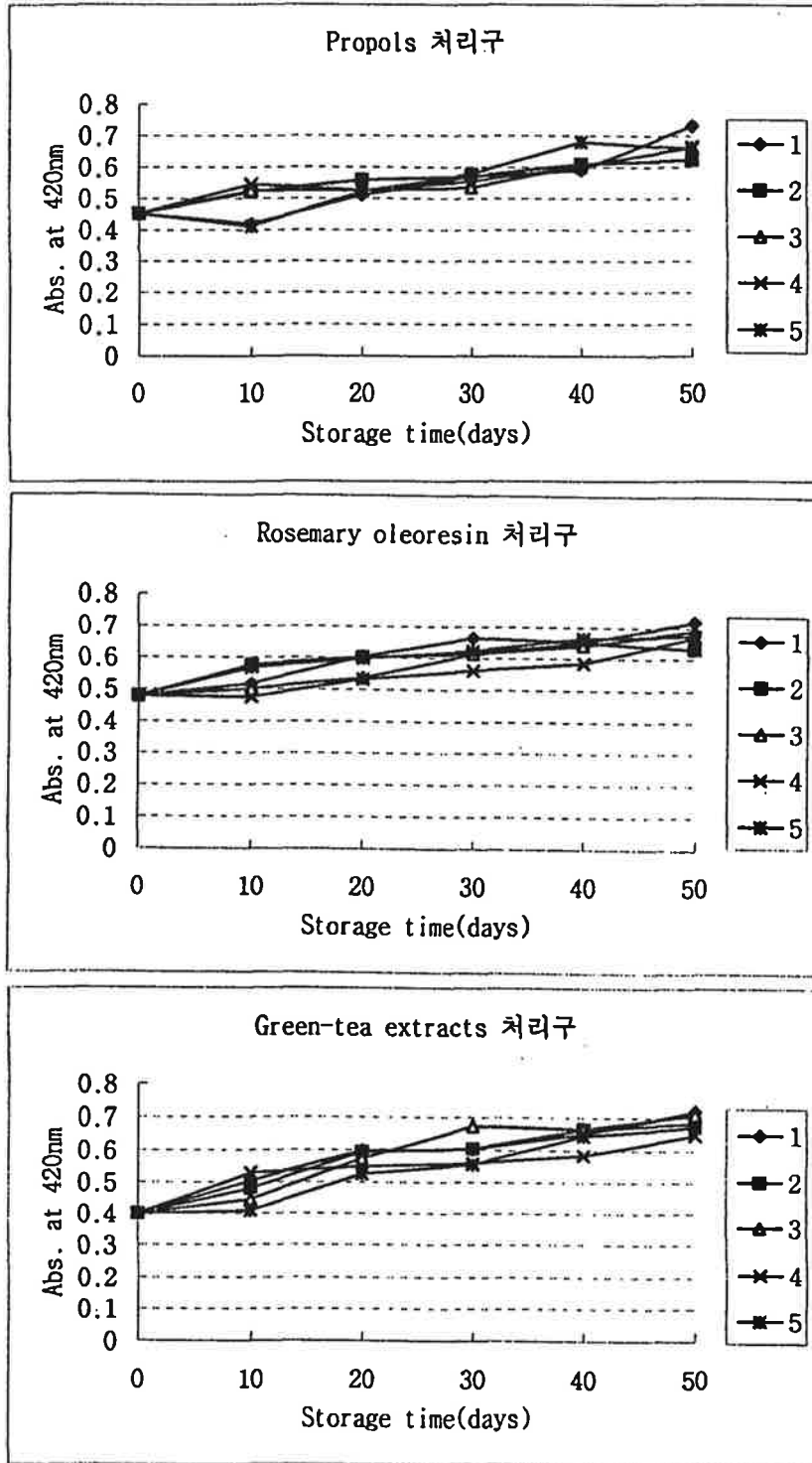


Fig. 26 Changes of water solublized color on dried squid during storage

1: control 2 : white with air 3: blue with air 4: red with air 5: black with air

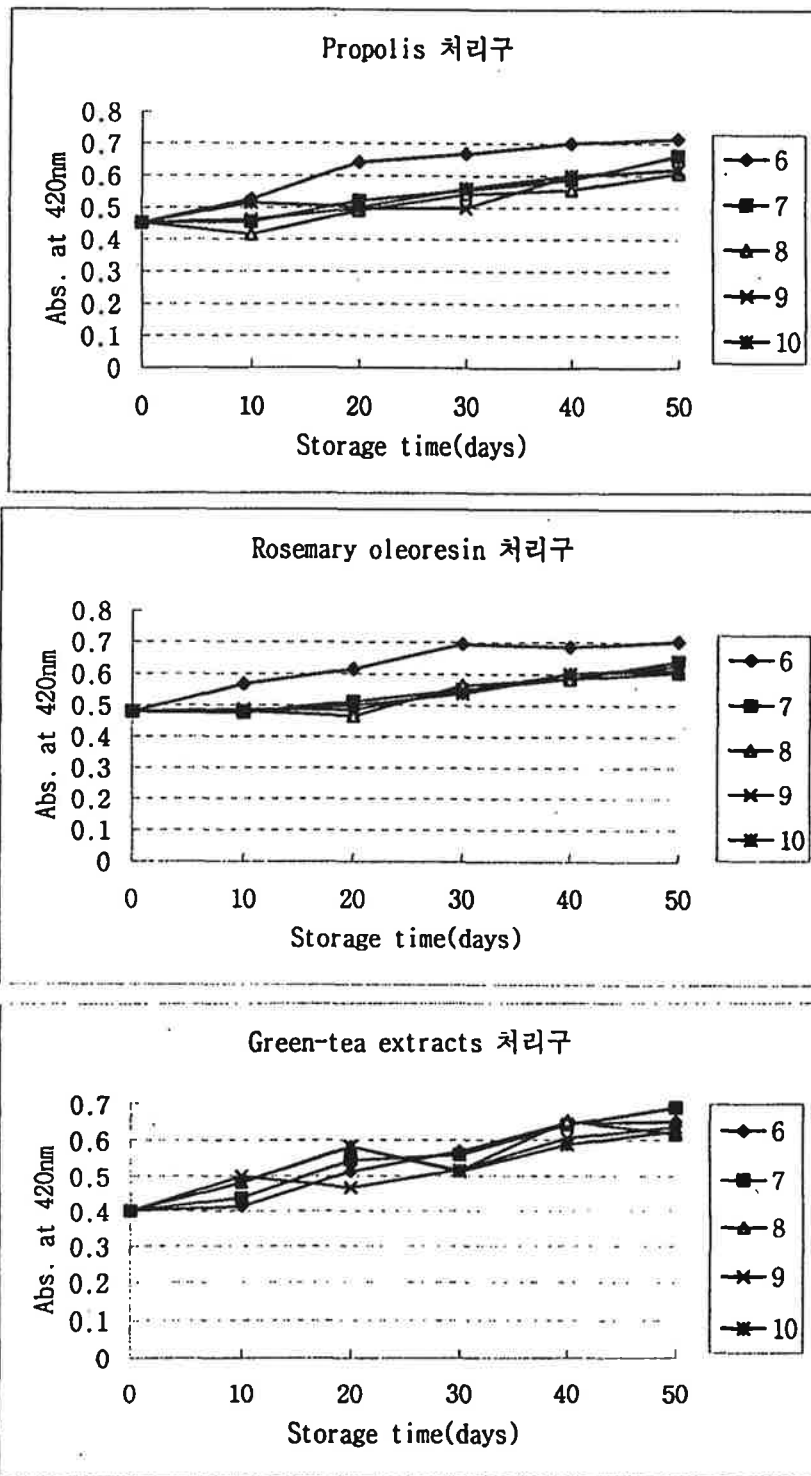


Fig. 27 Changes of water solublized color on dried squid during storage.

6: white without air 7: black without air 8: white with nitrogen 9: black with nitrogen 10: white with CO₂

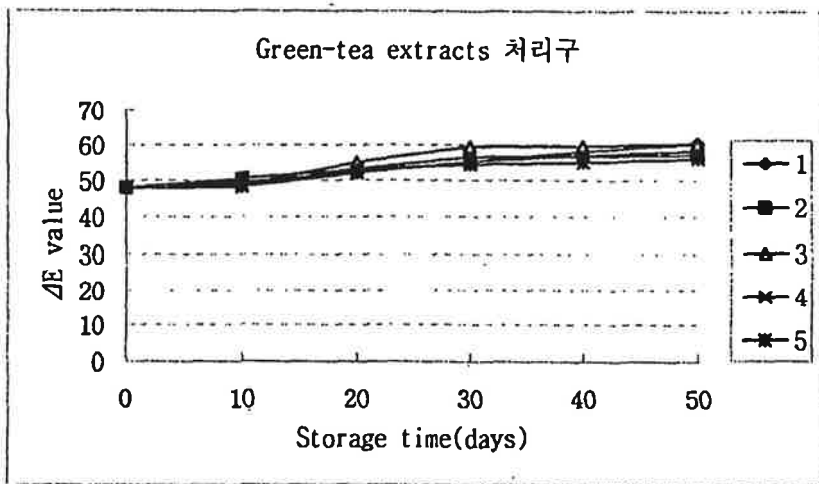
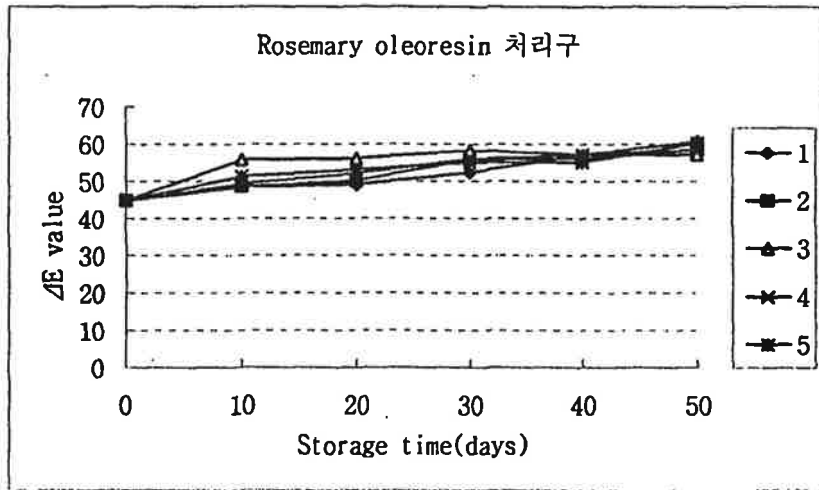
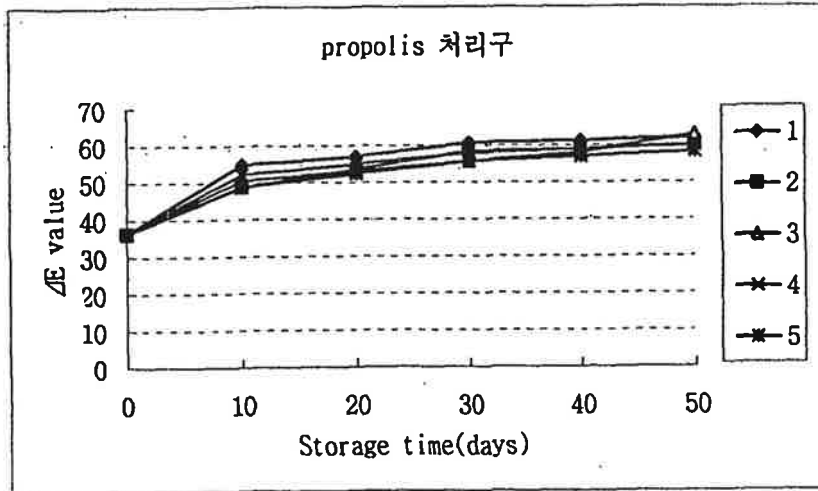


Fig. 28 Change of browning degree using color difference meter on dried squid during storage.

1: control 2 : white with air 3: blue with air 4: red with air 5: black with air

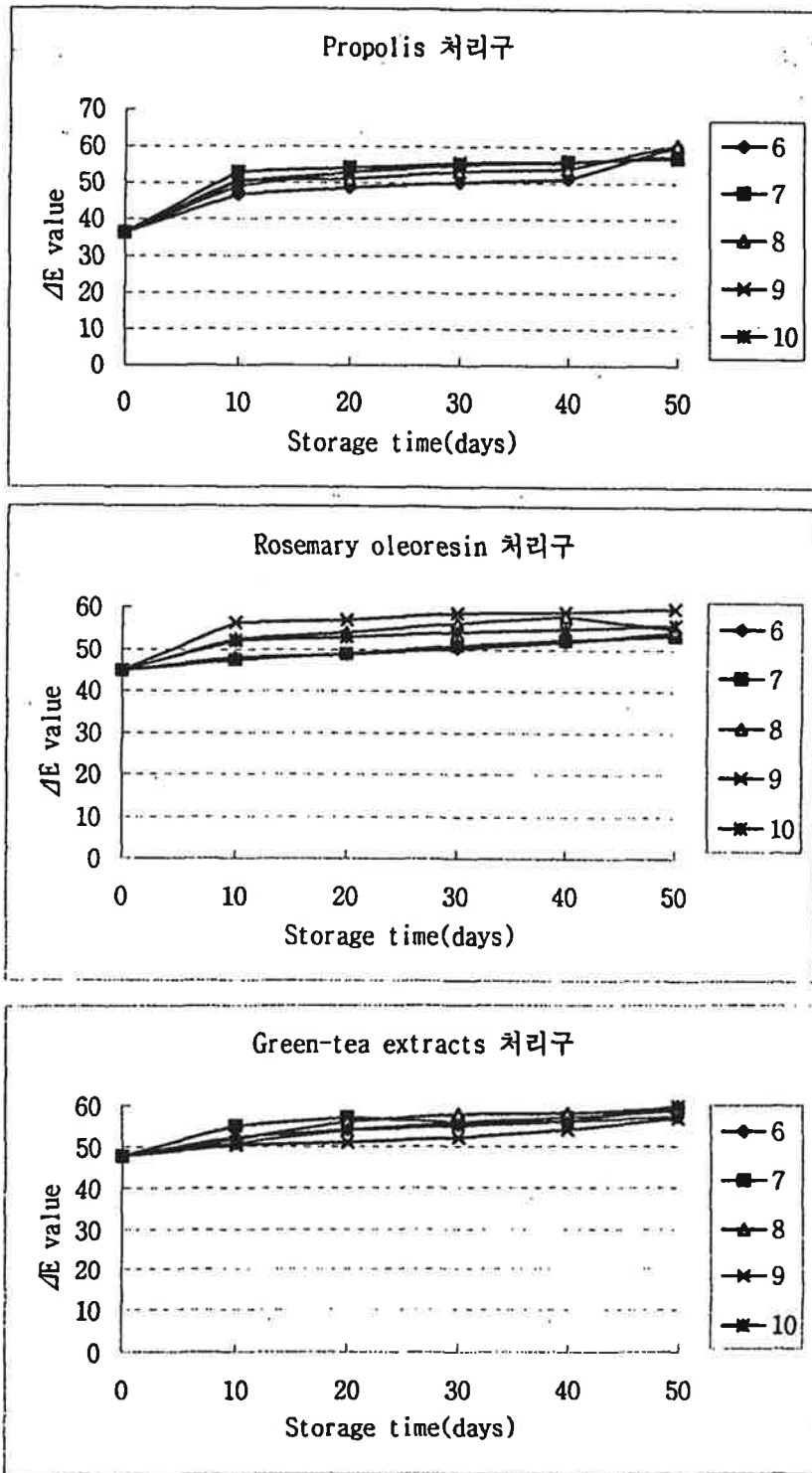


Fig. 29 Change of browning degree using color difference meter on dried squid curing storage.

6: white without air 7: black without air 8: white with nitrogen 9: black with nitrogen 10: white with CO₂

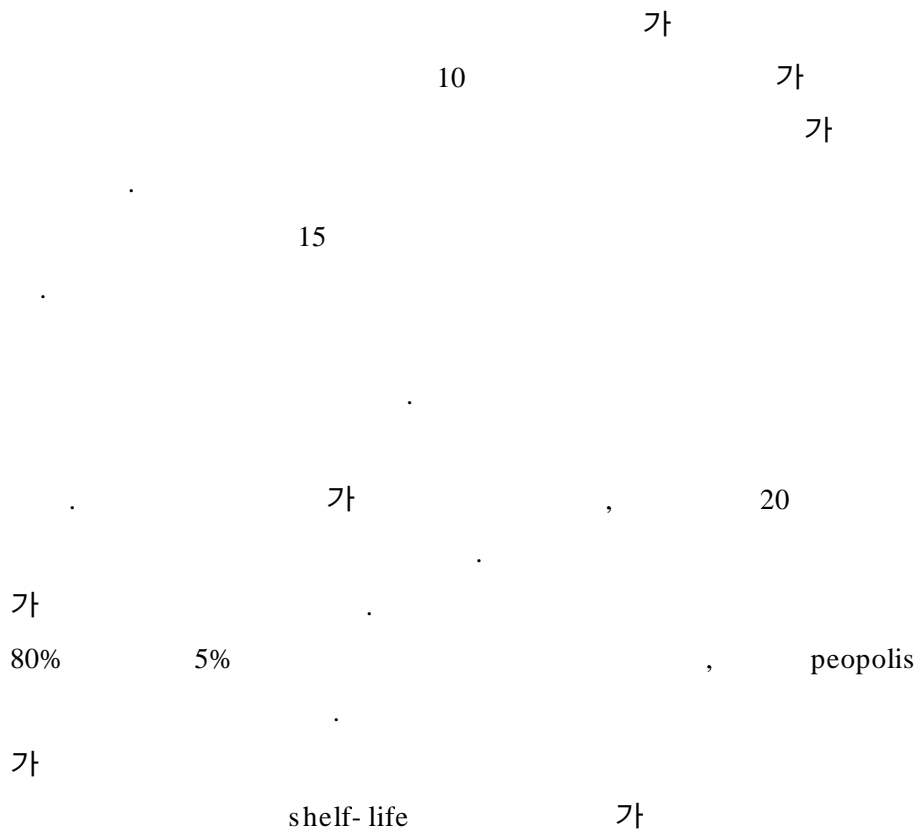


Fig. 30

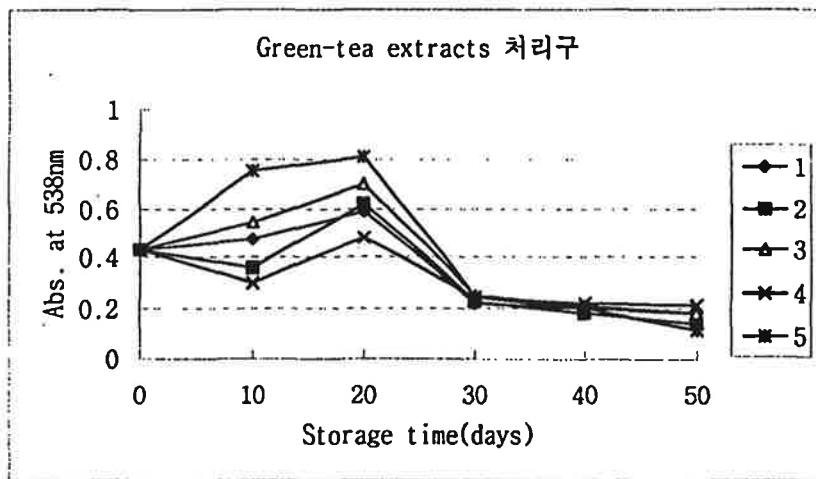
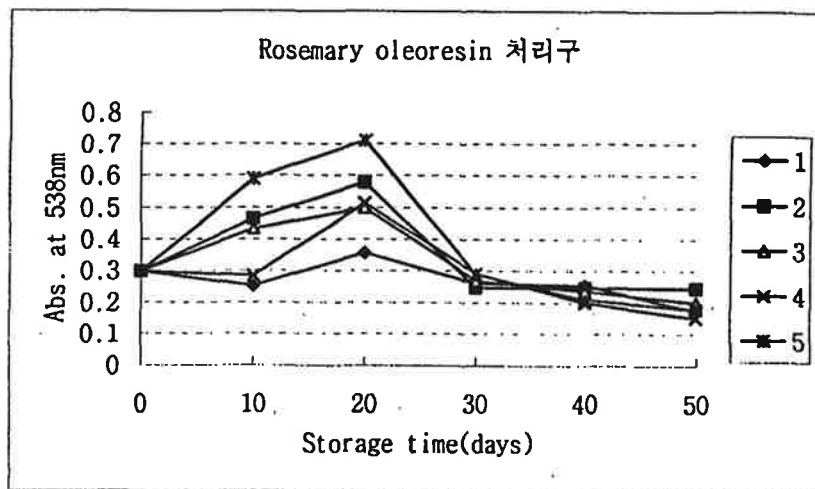
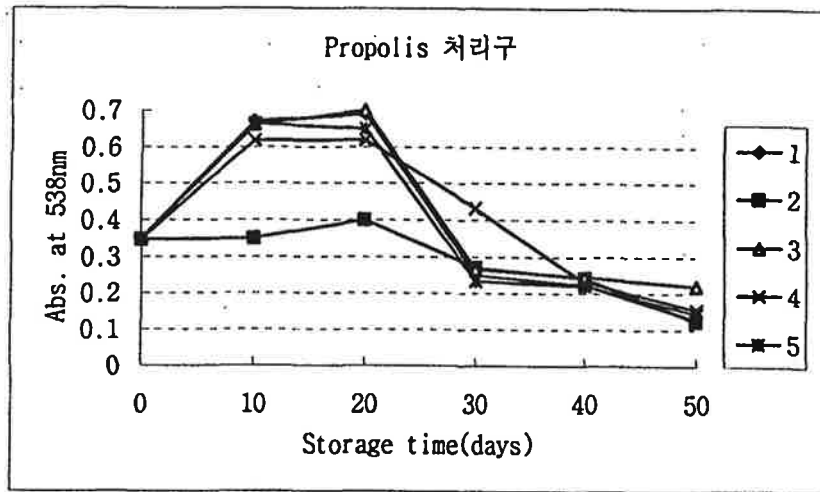


Fig. 30 Change of Thiobarbituric acid value on dried squid during storage

1: control 2 : white with air 3: blue with air 4: red with air 5: black with air

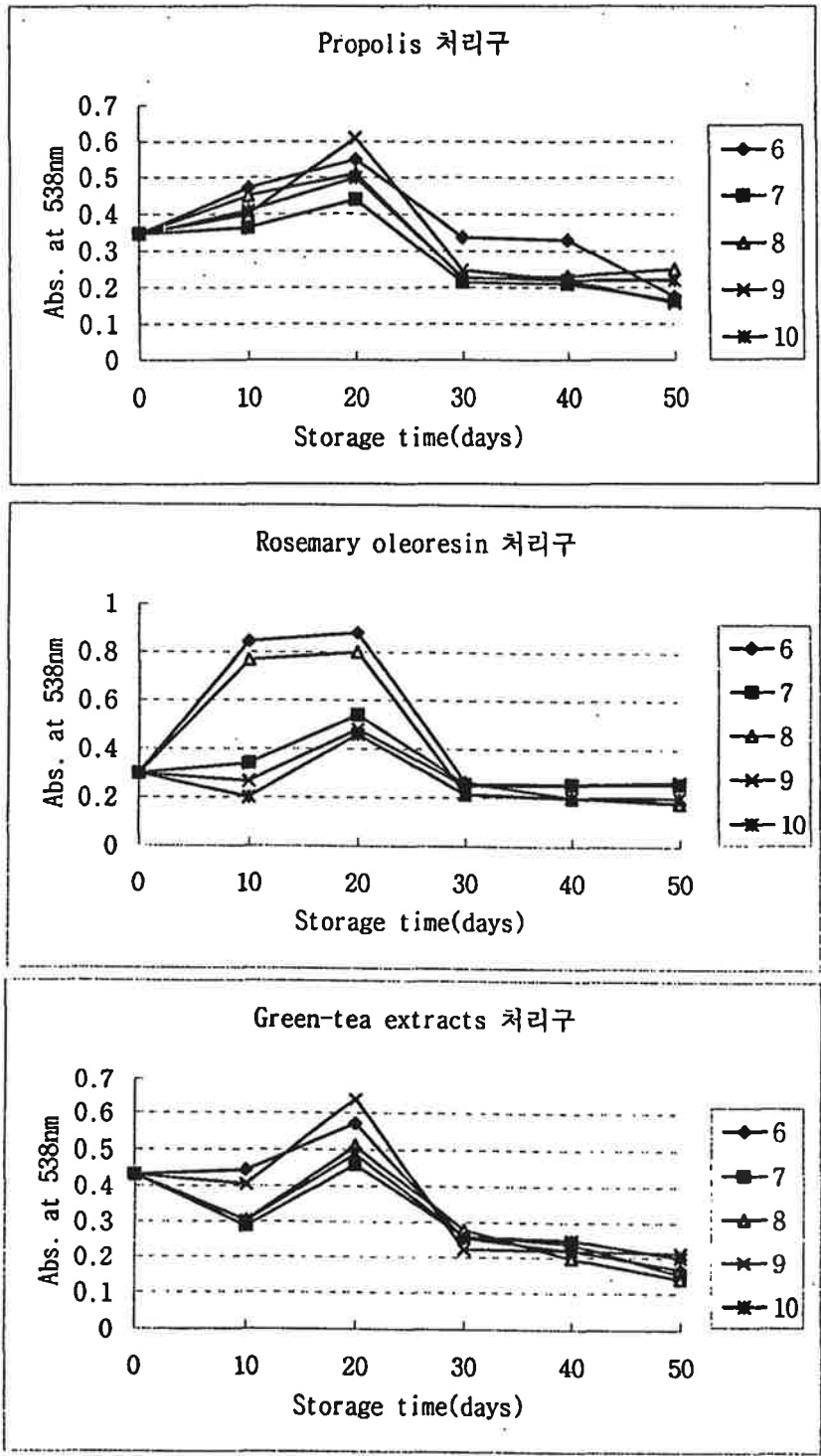


Fig. 31. Change of Thiobarbituric acid value on dried squid during storage.

6: white without air 7: black without air 8: white with nitrogen 9: black with nitrogen 10: white with CO₂

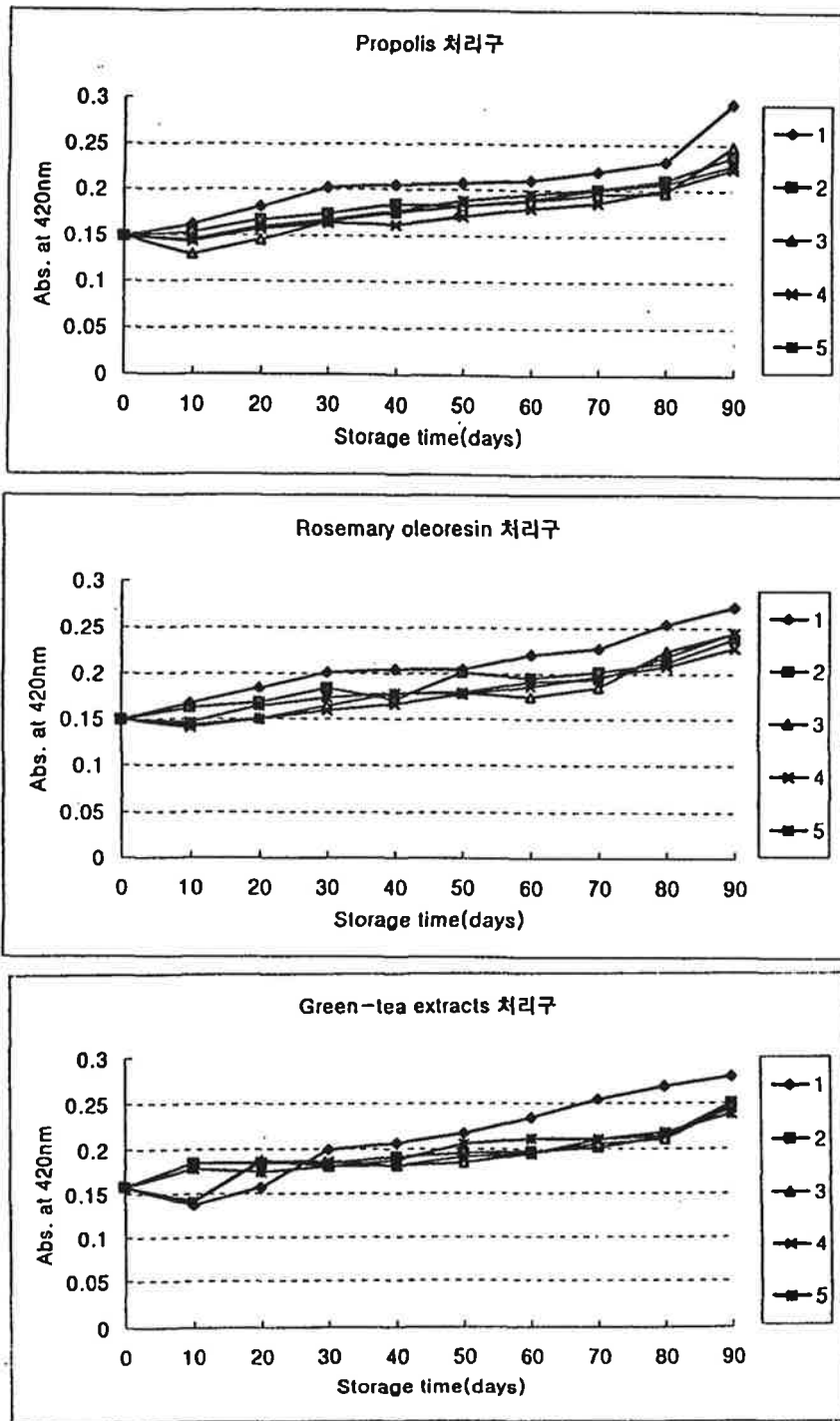


Fig. 32. Changes of water solubilized color on seasoned squid during storage

1: control 2 : white with air 3: blue with air 4: red with air 5: black with air

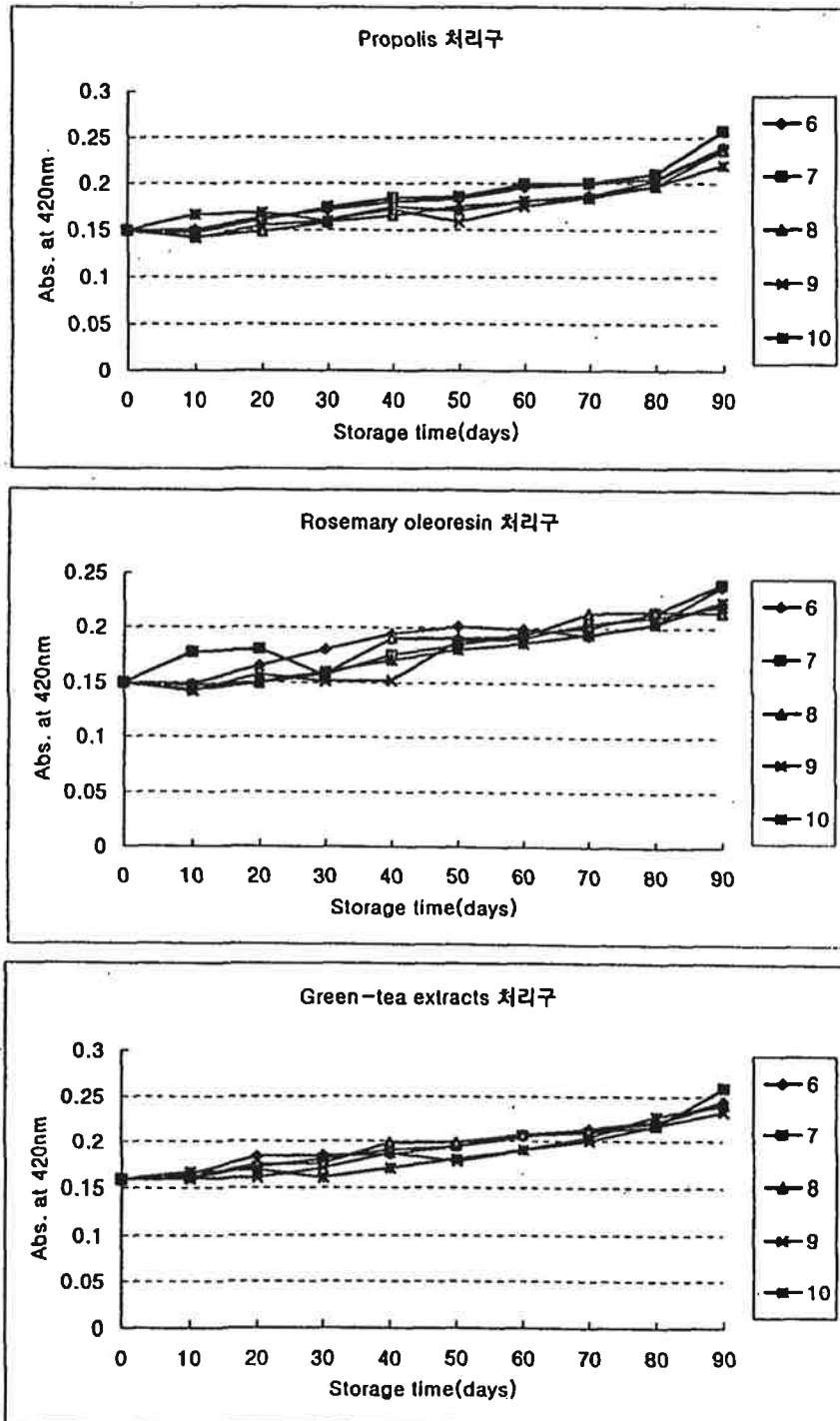


Fig. 33 Changes of water solubilized color on seasoned squid during storage

6: white without air 7: black without air 8: white with nitrogen 9: black with nitrogen 10: white with CO₂

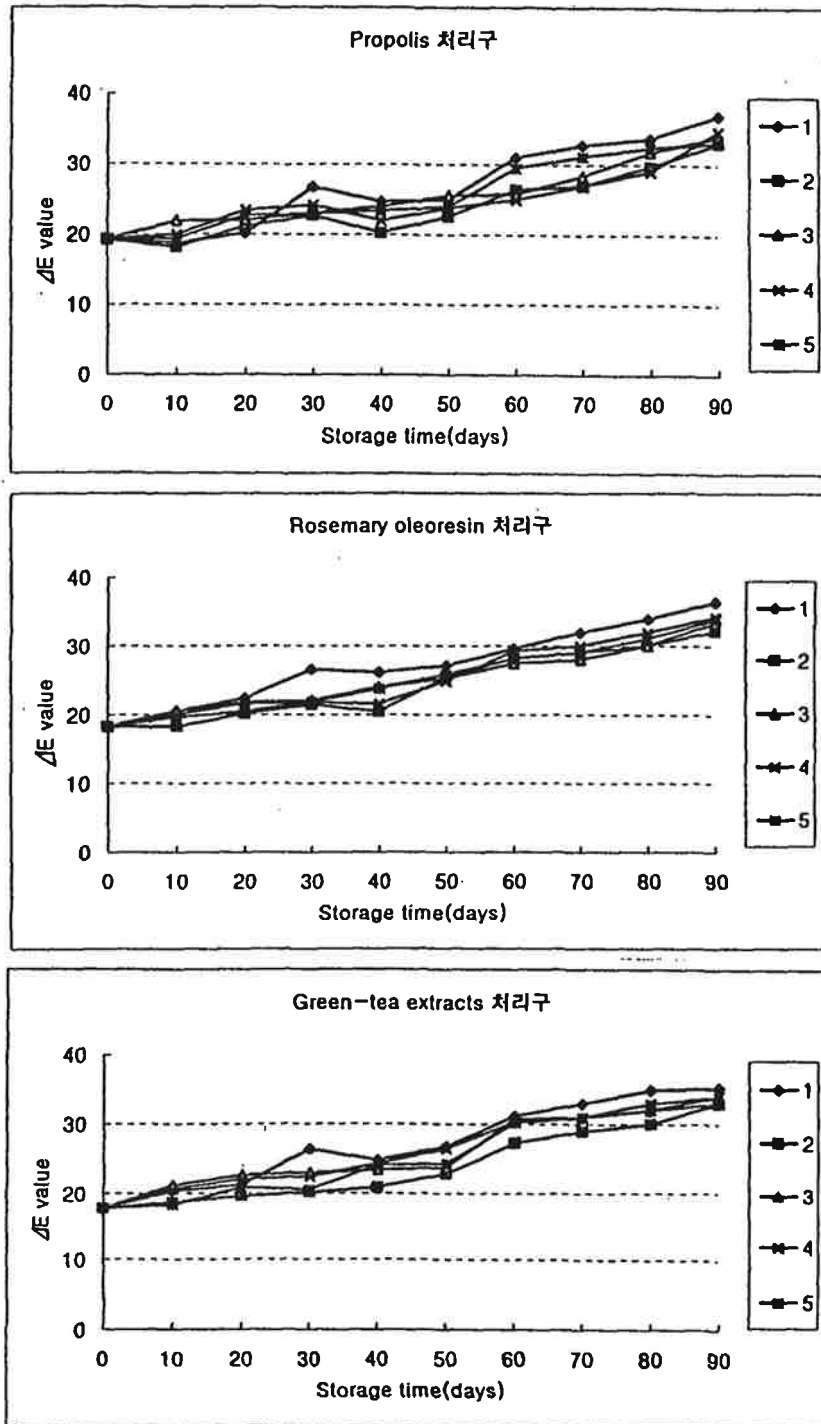


Fig. 34 Changes of browning degree using color difference meter on seasoned squid during storage.

1: control 2 : white with air 3: blue with air 4: red with air 5: black with air

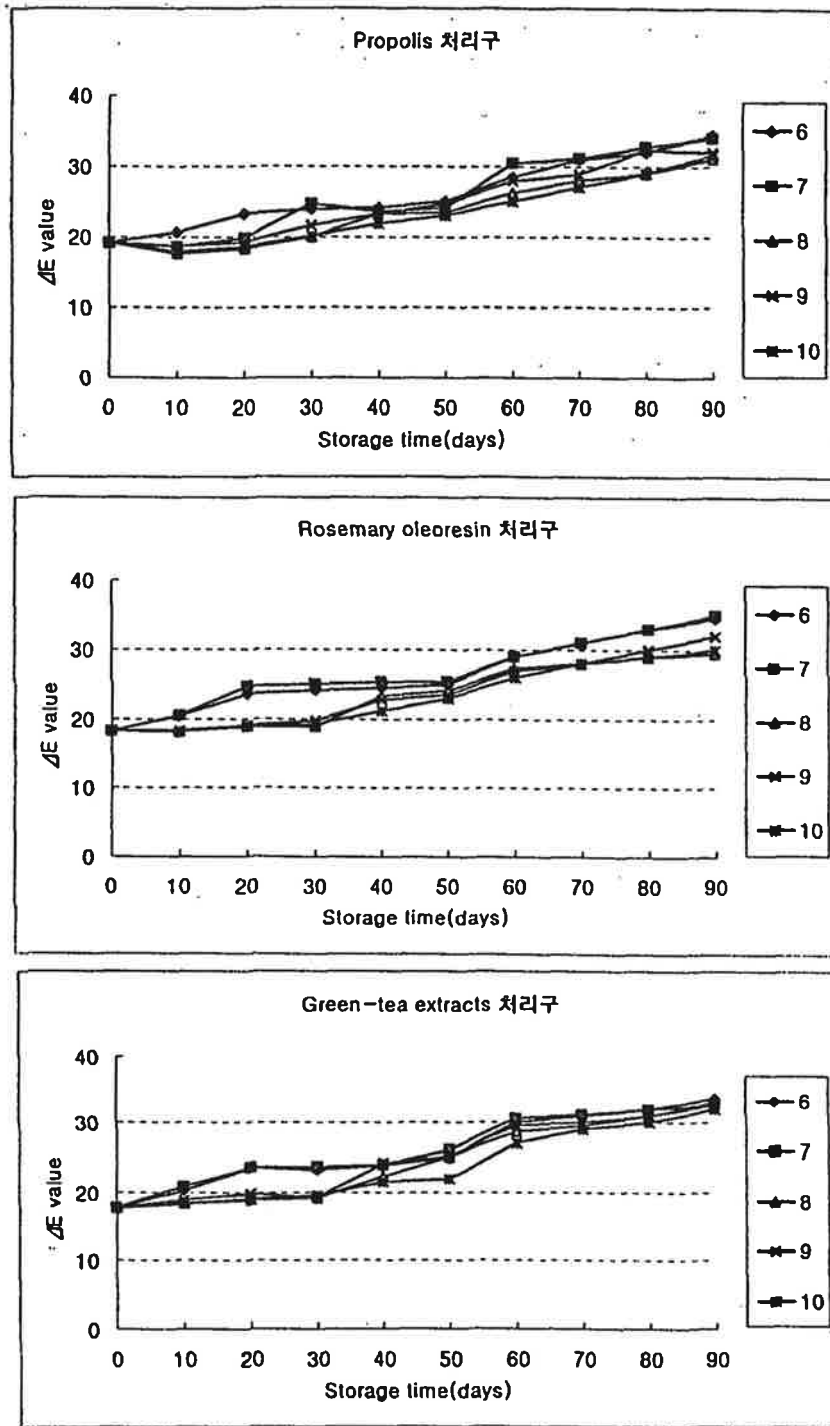


Fig. 35. Changes of browning degree using color difference meter on seasoned squid during storage.

6: white without air 7: black without air 8: white with nitrogen 9: black with nitrogen 10: white with CO₂

Table 23. Sensory evaluation of dried squid during storage at 25

Item Kinds	taste	flavour	texture	overall acceptability
control	5.02 ± 0.48	4.96 ± 0.52	3.75 ± 2.21	4.58 ± 1.07
Propolis	5.33 ± 0.15	5.42 ± 0.22	5.18 ± 0.27	5.31 ± 0.21
R o s e m a r y oleoresin	5.45 ± 0.20	5.34 ± 0.26	5.29 ± 0.21	5.36 ± 0.22
G r e e n - t e a extracts	5.37 ± 0.20	5.44 ± 0.19	5.38 ± 0.2	5.40 ± 0.20

Values are Means ± S.D during storage time.

Table 24. Sensory evaluation of seasoned squid during storage at 25

No.	taste	flavour	texture	overall acceptability
control	4.91 ± 0.34	5.05 ± 0.42	3.85 ± 1.51	4.94 ± 0.90
Propolis	5.32 ± 0.15	5.47 ± 0.20	5.18 ± 0.17	5.32 ± 0.17
R o s e m a r y oleoresin	5.44 ± 0.21	5.36 ± 0.16	5.29 ± 0.21	5.36 ± 0.19
G r e e n - t e a extracts	5.35 ± 0.20	5.33 ± 0.19	5.28 ± 0.21	5.32 ± 0.20

Values are Means ± S.D during storage time.

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Appendix 1.

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()		1056- 1	0391- 661- 2522	661- 0650
()		12B 1L	0394- 522- 2347	521- 2347
()		120708	0391- 662- 3574	661- 3367
		81- 64	0391- 662- 2994	662- 1888
		265- 1	0391- 662- 2274	43- 2229
		96- 1	0394- 34- 3372	34- 3374
		1207- 26	0391- 661- 6661	661- 6663
		379- 1	0394- 31- 3375	32- 2411
		148- 45	0392- 33- 3060	635- 0189
		1207- 6	0391- 662- 7911	661- 0815
		1207- 20	0391- 661- 3641	661- 2068
()		13207- 3	0391- 661- 3143	661- 3146
		1207- 4	0391- 661- 4040	661- 4040
()		120707	0391- 662- 1123	662- 2860
()		357- 25	0391- 661- 1221	661- 1777
		1053- 3	0391- 661- 2561	661- 3272
()		444- 3	0392- 32- 9366	33- 9369

Appendix 2.

		FAX
()	02- 751- 2114	02- 751- 2246
()	0392- 32- 9366	0392- 33- 9369
()	02- 758- 2015	02- 728- 0080
	0391- 662- 6600	0391- 661- 2208
()	0391- 661- 3762	0391- 661- 3367
	051- 246- 1005	051- 244- 1004
()	02- 563- 7872	02- 563- 0148
()	02- 759- 6057	02- 755- 5817
()	051- 241- 4335	051- 241- 2434
()	051- 263- 4911	051- 261- 4509
()	0662- 651- 9361	0662- 651- 9408
()	0562- 43- 3517	0562- 44- 1637
()	0662- 651- 9161	0662- 651- 9390
	02- 525- 7314	02- 523- 7315
()	02- 968- 5501	02- 961- 5110
()	02- 659- 6211	02- 659- 6213
()	02- 553- 3915	02- 553- 5360
()	02- 409- 8837	02- 443- 3977
()	0391- 661- 2522	0391- 661- 0650

		FAX
()	02- 501- 6741	02- 501- 0623
()	051- 413- 6221	051- 413- 3399
()	02- 702- 0746	02- 702- 0749
()	0394- 522- 2347	521- 2347
()	02- 956- 1232	
()	02- 3270- 1600	02- 701- 7573
()	02- 732- 6500	02- 732- 5300
()	02- 318- 6371	02- 318- 3963
()	02- 746- 1878	02- 746- 1092
()	053- 959- 4340	053- 959- 4342
()	02- 322- 1257	02- 322- 3536
()	02- 876- 2981	02- 876- 2982
()	051- 624- 8938	051- 622- 7331
	02- 795- 8201	02- 798- 7513
()	02- 410- 7114	02- 414- 0025
()	051- 441- 5274	
()	0391- 662- 3574	0391- 661- 3367
()	0394- 34- 3373	0394- 34- 3372
()	02- 3401- 2929	02- 743- 0146
()	02- 585- 2590	02- 522- 4081
()	02- 592- 0871	02- 592- 0875

가 :

		FAX
()	02- 319- 8077	02- 319- 8079
()	02- 592- 0871	02- 592- 0875
()	051- 242- 8588	051- 241- 3117
()	0662- 651- 9161	0662- 651- 9390
()	0562- 85- 3690	0562- 85- 3823
()	0391- 661- 3762	0391- 661- 3367
()	0391- 661- 2522	661- 0650
()	0562- 43- 3517	44- 1637
()	0394- 522- 2347	0394- 521- 2347
()	0562- 47- 0958	0562- 42- 3201
	0391- 662- 6600	0391- 661- 2208
()	02- 759- 6057	02- 755- 5817
()	02- 751- 2114	02- 751- 2246
()	02- 758- 2015	02- 728- 0080
()	02- 3459- 9600	02- 565- 0613
()	051- 246- 1005	051- 244- 1004
()	051- 261- 4441	051- 263- 8666

		FAX
()	02- 410- 7114	02- 414- 0025
()	0654- 43- 0761	0654- 445- 7389
()	0342- 754- 7055	0342- 754- 2788
()	0392- 32- 9366	0392- 33- 9369
()	0394- 32- 3531	0394- 33- 2372
()	0662- 41- 5541	0662- 41- 2123
()	051- 263- 4911	051- 261- 4509
	0391- 662- 3574	661- 3367
()	0394- 34- 3373	34- 3372

가 :

		FAX
()	02- 409- 8837	02- 443- 3977
()	02- 501- 6741	02- 501- 0623
()	02- 585- 2590	02- 522- 4081
()	02- 477- 7326	02- 477- 7329
()	02- 618- 0763	02- 618- 0762
()	02- 743- 5750	02- 745- 6032
()	02- 563- 7872	02- 563- 0148
()	02- 876- 2981	02- 876- 2982
()	02- 751- 2114	02- 751- 2246
()	02- 773- 0451	02- 756- 4218
()	02- 732- 6500	02- 732- 5300
()	051- 413- 6221	051- 413- 3399
()	02- 968- 5501	02- 961- 5110
()	02- 746- 1878	02- 746- 1092
()	02- 3270- 1600	02- 701- 7573
()	02- 410- 7114	02- 414- 0025
()	051- 241- 4335	051- 241- 2434
()	02- 547- 2233	02- 514- 8934
()	02- 553- 2411	02- 553- 2415
()	02- 956- 1232	
()	0392- 32- 9366	0392- 33- 9369
()	02- 659- 6211	02- 659- 6213
()	032- 814- 4600	032- 814- 4604
()	02- 318- 6371	02- 318- 3963

Appendix 3.

		FAX
()	051- 441- 9141	051- 441- 9140
()	02- 3773- 1114	02- 785- 7762
()	0342- 754- 7055	0342- 754- 2788
()	051- 413- 6221	051- 413- 3399
()	02- 746- 1878	02- 746- 1092
()	02- 3709- 2114	02- 776- 9710
	051- 243- 0506	051- 244- 6606
()	051- 241- 4335	051- 241- 2434
()	02- 382- 3497	02- 389- 5057
()	02- 956- 1232	
()	0392- 32- 9366	0392- 33- 9369
()	02- 968- 5501	02- 961- 5110
()	0584- 654- 0810	0584- 654- 0811
	051- 464- 2565	051- 464- 2567
()	02- 270- 8114	02- 270- 0891
()	0662- 41- 5541	0662- 41- 2123
()	02- 3459- 9600	02- 565- 0613
()	02- 409- 8837	02- 443- 3977
()	02- 3270- 1600	02- 701- 7573
()	02- 477- 7326	02- 477- 7329
	02- 795- 8201	02- 798- 7513
	02- 324- 4262	02- 335- 7061
()	051- 462- 1941	051- 463- 1938
()	02- 735- 8951	02- 733- 6180

		FAX
	0551- 41- 3070	0551- 41- 3071
()	02- 618- 0763	02- 618- 0762
()	0662- 43- 5680	0662- 618- 0762
()	02- 458- 0367	02- 458- 0370
()	032- 520- 2725	032- 524- 4362
()	02- 420- 7280	02- 420- 3642
()	02- 712- 8121	02- 719- 2521
()	02- 876- 2981	02- 876- 2982
()	02- 488- 0541	02- 488- 0545
()	02- 501- 6741	02- 501- 0623

가 :

		FAX
()	02- 443- 4141	02- 443- 4144
()	02- 501- 6741	02- 501- 0623
	051- 464- 2565	051- 464- 2567
()	0584- 654- 0810	0584- 654- 0811
()	02- 477- 7326	02- 477- 7329
()	02- 618- 0763	02- 618- 0762
	02- 458- 0367	02- 458- 0370
()	02- 876- 2981	02- 876- 2982
()	02- 968- 5501	02- 961- 5110
()	02- 746- 1878	02- 746- 1092
()	02- 3270- 1600	701- 7573
()	051- 241- 4335	051- 241- 2434
()	02- 956- 1232	
	0392- 32- 9366	0392- 33- 9369
	02- 795- 8201	02- 798- 7513
()	0662- 41- 5541	0662- 41- 2123
()	02- 790- 5387	02- 790- 5389
()	032- 814- 4600	032- 814- 4604
()	02- 488- 0541	02- 488- 0545

가 :

		FAX
()	0662- 43- 5680	0662- 43- 5861
()	02- 759- 6057	02- 755- 5817
()	02- 751- 21144	751- 2246
()	02- 758- 2015	02- 728- 0080
()	051- 246- 1005 9	051- 244- 1004
()	02- 746- 1878	746- 4092
()	0342- 754- 7055	0342- 754- 2788
()	051- 467- 6902	051- 465- 6926
()	0394- 34- 3373	34- 3372

Appendix 4.

		FAX
()	051- 441- 1471	051- 441- 1473
()	02- 3773- 1114	02- 785- 7762
	0525- 42- 2893	0525- 42- 0847
()	0557- 42- 1082	0557- 43- 8546
()	0557- 42- 1093	0557- 42- 5483
()	0341- 232- 5451	0431- 232- 5455
()	051- 441- 9141	051- 441- 9140
()	02- 417- 4758	02- 413- 7670

가 :

		FAX
()	051- 441- 1471	051- 441- 1473
	0525- 42- 2893	0525- 42- 0847
()	0557- 42- 1082	0557- 43- 8546
()	051- 441- 9141	051- 441- 9140
	0556- 72- 7100	0556- 72- 7371
()	02- 3773- 1114	02- 785- 7762

가 :

		FAX
()	051- 441- 1471 2	051- 441- 1473
	0525- 42- 2893	0525- 42- 0847
()	0557- 42- 1082	0557- 43- 8546
()	0557- 42- 1093	0557- 42- 5483
()	0431- 232- 5451 4	0431- 232- 5455 6

가 : 가

		FAX
()	051- 441- 1471	051- 441- 1473
()	02- 3773- 1114	02- 785- 7762
	0525- 42- 2893	0525- 42- 0847
()	02- 417- 4758	02- 413- 7670

가 :

		FAX
()	051- 441- 1471	051- 441- 1473
()	0557- 42- 1093	0557- 42- 5483

Appendix 5.

()	3 40		
()	174- 2		
()	325- 4		
()	358		
()	1056- 1		
()	274- 10		
()	680- 8		
()	47† 78- 21 B/D 402		
	60- 9		
()	523- 29		
	1 470- 5		
	36- 2 B/D 904		
	1 1203- 10 804		
	242- 10 B/D 401		

YS	654- 3 B/D 7	02- 563- 7872	
	456	02- 549- 2233	
	445- 8 B/D 2	02- 488- 0541 4	
	150	0557- 42- 1093	
	239- 1	0557- 42- 1082	
	701	0562- 43- 3517	
	12 1	0394- 522- 2347	
		02- 443- 4141 3	
	628- 8 B/D 301	02- 501- 6741 4	
	448- 1 B/D 201	02- 477- 7326 8	
	1140- 36	0.- 968- 5501 9	
	444- 3	0392- 32- 9366	
	105	0662- 41- 5541 5	
company	4- 6	02- 790- 5387 8	
	1199- 3		
	523- 52		
	2가 191		
	549- 1		
	96- 1		



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		'94		'95		'96		'97.9	
가		267	4,530	500	9,913	306	5,179	286	4,
		11	148	39	467	40	691	52	6
		84	1,592	228	5,004	17	332	38	5
		78	1,236	111	1,979	166	2,781	151	2,
		93	1,572	99	1,977	83	1,375	45	6
		-	-	23	486	-	1,472	-	
		114	1,012	208	2,012	189	15	69	5
		23	164	21	188	2	289	5	3
		-	-	66	756	26	912	-	
		87	806	70	814	81	52	60	5
		4	34	32	127	4	204	4	4
		0.5	8	19	127	76	3,105	-	
		618	5,212	1,147	9,481	565	1,588	500	3,
		499	3,591	891	7,612	322	1,322	387	2,
		115	1,546	178	1,592	185	74	91	9
		-	-	40	166	20	-	-	
		-	-	18	15	-	40	-	
		-	-	18	44	30	81	20	3
		5	75	2	52	8		2	7

9.

(: kg)

		88	89	90	91	92	93	94	95	96	97.9
		539,697	621,356	506,362	130,992	504,784	376,667	113,998	208,553	189,170	69,456
		92,260	126,659	81,721	116,951	220,814	204,811	91,862	92,979	121,388	101,528
		8,865	5,404	14,926	15,920	12,222	404	19,863	1,488	3,910	747
		-	-	-	-	-	-	-	-	-	-
		928,061	727,894	543,715	156,457	302,840	374,627	169,209	248,874	68,766	94,738
		782,730	373,559	232,864	492,076	162,293	447,390	266,854	500,275	305,517	286,470
가		10,046,213	4,939,080	5,975,306	5,082,541	3,335,706	2,283,569	618,406	1,161,504	565,269	500,398
		12,071,064	6,112,987	7,240,498	2,386,227	1,331,505	688,931	329,900	257,788	83,559	118,514
		994,550	1,549,912	3,263,969	4,701,812	3,722,482	5,085,205	6,138,891	6,162,804	5,274,634	3,522,840

10.

(: kg)

		88	89	90	91	92	93	94	95	96	97.9
		147,133	102,379	176,080	112,536	59,049	226,591	86,951	69,915	81,302	59,601
		50,461	62,133	61,722	35,717	107,527	182,671	85,053	60,659	65,973	67,869
		2,040	2,668	963	765	255	340	536	1,168	-	222
		116,470	112,611	43,352	23,390	-	13,029	2,176	-	5,771	-
		105,493	97,563	46,293	48,908	58,463	116,531	28,827	51,171	34,123	13,578
		16,526	7,430	6,599	9,880	13,256	-	-	13,390	-	286,470
가		165,134	120,190	181,633	120,494	148,368	211,055	114,723	192,278	184,712	91,466
		313,908	117,191	150,914	53,218	30,880	44,435	11,783	11,491	2,839	3,029
		108,436	61,470	95,639	83,237	36,594	103,782	58,955	112,080	30,996	30,401

11.

(: kg)

		88	89	90	91	92	93	94	95	96	97.9
		58,890	52,414	5	8,996	431,685	143,556	22,550	21,404	1,650	5,595
		-	10,508	50	85	77,802	1,000	-	400	37,328	1,900
		1,785	1,783	13,367	15,000	40	40	-	-	-	525
		-	30	35	1,435	-	-	3	-	-	-
		706,924	543,279	459,449	53,464	124,269	213,034	113,285	133,809	8,500	51,252
		105,846	54,399	3,680	-	-	-	-	-	-	-
가		9,873,436	4,814,840	5,787,635	4,958,887	3,123,554	1,963,340	498,778	890,862	321,659	386,555
		11,699,113	5,963,657	7,036,103	2,324,681	1,296,110	632,992	317,830	245,881	73,180	114,920
		881,157	1,481,133	3,100,020	4,595,345	3,670,969	4,963,827	6,066,140	6,033,077	5,193,789	3,460,608

13. 가 .

No.			가		가					(%)
1	Atarime		, , () ; 90	180g	¥ 550					15.8
2	i sak		, , , () , () , pH , (Na), , (k) ; 90	165g	¥ 380					29.3
3			, , , , (,)pH , (Na), (k) ; 90	180g	¥ 520					47.6
4			, , , (), (,), (k),pH ; 6	170g	¥ 550					33.5

No.			가		가				
5	yume()		, , () , (,), (Na), (k)	-	70g ¥ 350		3	3	,
6					, 60g ¥ 380				flavor 가
7	(saki)			90 ;	150g ¥ 420			(,)	
8	(saki)		, , , () , (,), (N a), (k)	;96.5.29	150g ¥ 350				

No.			가		가					(%)	W
9	小利		, , , 가 , () , ; (,), (6 k),pH		170g ¥ 480					31.26	0.
10	Yume(大利)		, , , () , (,), (Na), (k)		55g ¥ 350					25.54	0.
11			, ' , ' , (),pH	6 ;	95g ¥ 380			가		34.93	0.
12			, , , (), (k), (Na), (,)	96.6.29 ;	230g ¥ 680			()		17.87	0.