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ภาคผนวก 1
สารเคมีและอุปกรณ์

สารเคมี

- brewer's yeast : ภาควิชาจุลชีววิทยา จุฬาลงกรณ์
- lactoalbumen hydrolysate : GibcoBRL, USA
- Ether : Merck, Germany
- NaHCO₃ : Merck, Germany
- NaOH : Merck, Germany
- HCl : Merck, Germany
- Silica gel : Merck, Germany
- Hexane : Merck, Germany
- Acetone : Merck, Germany
- Na₂SO₄ : BDHLaboratory Supplies, England
- Standard Reagents
 - Phenol : Fluka, Switzerland
 - 4-methylphenol : Merck, Germany
 - 4-ethylphenol : Fluka, Switzerland
 - Indole : Fluka, Switzerland
 - 3-methylindole : Merck, Germany

อุปกรณ์

- pH Pocket Tester (TIPH-PAL) : Trans Instruments, Singapore
- Conductivity Pocket Tester (TI TDS-4) : Trans Instruments, Singapore
- DO meter : YSI model 51B, YSI Incorporated, USA
- Thermometer : Brannan, England
- Rotary Vacuum Evaporator : BUCHI Rotavapor, Switzerland
- Filter papers : Whatman, England
- ตู้อุ่น : Whirlpool,
- Pipette : Brand, Germany

ภาคผนวก 2

**ตารางสรุปรายงานการศึกษาการใช้สารสกัดจากพืชวงศ์ต่างๆ ในการควบคุมยุงชนิดต่างๆ
(1991-2001)**

ภาคผนวก 2 ตารางสรุปรายงานการศึกษาการใช้สารสกัดจากพืชวงศ์ต่างๆ ในการควบคุมยุงชนิดต่างๆ (1991-2001)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
ACANTHACEAE				
<i>Rhinacanthus nasutus</i>	Seed, Leaves	<i>Ae. aegypti</i> <i>An. stephensi</i> <i>Cx. quinquefasciatus</i>	Larvicidal, Growth inhibition	Pushpalatha and Muthukrishnan (1999)
AIZOACEAE				
<i>Mesembryanthemum nodiflorum</i>		<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
ALLIACEAE				
<i>Allium sativa</i>	Corm	<i>Cx. pipiens</i>	Larvicidal	Thomas and Callaghan (1999)
APIACEAE				
<i>Cryptotaenia canadensis</i>	Root, Fruits, Fresh foliage	<i>Cx. pipiens</i>	Larvicidal	Eckenbach (1999)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
ASCLEPIADACEAE				
<i>Asclepias syriaca</i>	Flowers	<i>Cx. pipiens pipiens</i>	Attraction	Mauer and Rowley (1999)
<i>Pergularia extensa</i>	Whole plant	<i>Cx. quinquefasciatus</i>	Larvicidal	Karmegam et al. (1997)
<i>Calotropis procera</i>	Whole plant	<i>An. labranchiae</i>	Larvicidal	Markouk et al. 2000
ASTERACEAE				
<i>Catula cinerea</i>	Whole plant	<i>An. labranchiae</i>	Larvicidal	Markouk et al. 2000.
<i>Melantheria albinervia</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Slimestad et al. (1995)
CANNABACEAE				
<i>Cannabis sativa</i>	Whole plant	<i>Ae. aegypti</i> <i>An. stephensi</i> <i>Cx. quinquefasciatus</i>	Larvicidal	Jalee et al. (1993)
CAPPARIDACEAE				
<i>Cleome chelidonii</i>	Leaves	Mosquito larvae	Larvicidal	ชาญชัย และสุภิญญา (2542)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
CARYOPHYLLACEAE				
<i>Gypsophila arabica</i>	Whole plants	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
CHENOPODIACEAE				
<i>Anabasis articulata</i>	Whole plants	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
		<i>Cx. pipiens pallens</i>	Insecticidal,	
<i>Atriplex canescens</i>	Whole plants	<i>Cx. quinquefasciatus</i>	Ovicidal,	Ouda et al. (1998).
<i>Hammada scoparia</i>	Whole plants	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
COMPOSITAE				
<i>Achillea fragrantissima</i>	Whole plants	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
<i>Eclipta paniculata</i>	Whole plants	<i>Ae. fluviatilis</i>	Larvicidal	Macedo et al. (1997)
<i>Vernonia ammobila</i>	Whole plants	<i>Ae. fluviatilis</i>	Larvicidal	Macedo et al. (1997)
<i>Tagetes miunta</i>	Whole plants	<i>Ae. aegypti</i>	Larvicidal	Macedo et al. (1997)
		<i>Ae. fluviatilis</i>		Perich et al. (1995)
		<i>An. stephensi</i>		

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
CYPERACEAE				
<i>Cyperus iria</i>	Leaves	<i>Ae. aegypti</i>	Growth inhibition	Schwartz et al. (1998)
<i>Schoenoplectus acutus</i>	Whole plants	<i>Cx. quinquefasciatus</i>	Oviposition	Du and Millar (1999)
		<i>Cx. tarsalis</i>	attractant	Reisen et al. (1999)
		<i>Cx. stigmatosoma</i>		
		<i>Culiseta incidens</i>		
EPHEDRACEAE				
<i>Ephedra aphylla</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
EUPHORBIACEAE				
<i>Excoecaria indica</i>	Seed	<i>Cx. quinquefasciatus</i>	Larvicidal	Hasan, Rahman and Mosaddik (1999)
<i>Jatropha curcus</i>	Whole plant	<i>Cx. quinquefasciatus</i>	Larvicidal	Karmegam et al. (1997).
<i>Ricinus communis</i>	Seed	<i>Aedes Larvae</i>	Larvicidal	Edillo, Largo and Plateros (1996)
<i>Securinega Virosa</i>	Leaves	<i>Aedes Larvae</i>	Larvicidal	Edillo, Largo and Plateros (1996)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
FAGACEAE				
<i>Quercus albu</i>	Leaves	<i>Ae. albopictus</i>	Attraction	Trexler, Apperson and Schal (1998)
		<i>Ae. triseriatus</i>	Exhibit oviposition.	
GERANIACEAE				
<i>Pelargonium citrosum</i>	Whole plant	Culicidae	Repellent	Jensen et al. (2000)
GRAMINEAE				
<i>Cynodon dactylon</i>	Whole plants	<i>Cx. tarsalis</i>	Oviposition	Beehler, Millar and Mulla (1992)
		<i>Cx. quinquefasciatus</i>	attractant	Isoe, Millar and Beehler (1995) Pickett and Woodcock (1996) Du and Millar (1999)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
GUTTIFERAE				
<i>Calophyllum inophyllum</i>	Seed, Leaves	<i>Ae. aegypti</i>	Larvicidal	Pushpalatha and Muthukrishnan (1999)
		<i>An. stephensi</i>	Growth	
		<i>Cx. quinquefasciatus</i>	inhibition	
LABIATAE				
<i>Teucrium marum</i>	Leaves	Monomorium pharaonis	Repellest	Eisner et al. (2000)
<i>Thymus capitatus</i>	Whole plants	Cx. pipiens	Larvicidal	Mansour, Messeha and El-Gengaihi(2000)
LAMIACEAE				
<i>Minthostachys serosa</i>	Whole plant	<i>Ae. ageypti</i>	Larvicidal	Ciccia, Coussio and Mongelli (2000)
LAVRACEAE				
<i>Cinnamomum camphora</i>	Seeds	<i>Helicoverpa armigera</i>	Larvicidal	Zhou et al. (2000)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
MELIACEAE				
<i>Melia Volkensii</i>	Fruit	<i>Cx. tarsalis</i>	Reproductive	Awala, Mwangi and Trungu (1998)
		<i>Cx. quinquefasciatus</i>	inhibition	
<i>Azadiracht indica</i>	Seed	<i>Ae. aegypti</i>	Larvicidal	Su and Mulla (1998)
				Su and Mulla (1999)
MENISPERMACEAE				
<i>Abuta grandifolia</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Ciccia, Coussio and Mongelli (2000)
PAPAVERACEAE				
<i>Argemone mexicana</i>	Whole plant	<i>Cx. quinquefasciatus</i>	Larvicidal	Karmegam et al. (1997)
<i>Glaucium arabicum</i>		<i>Ae. aegypti</i>	Insecticidal	Sathiyamoorthy et al. (1997)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
PAPILIONACEAE				
<i>Abrus precatorius</i>	Seed	<i>Cx. quinquefasciatus</i>	Larvicidal	Muthukrishnan et al. (1997)
<i>Gliricidia sepium</i>	Leaves, petioles	<i>Ae. aegypti</i>	Larvicidal	Sharma et al. (1998)
	bark	<i>An. stephansi</i> <i>Cx. quinquefasciatus</i>		
<i>Pachyrhizus erosus</i>	Seed	<i>Ae. aegypti</i>	Larvicidal	Tuntaprasart and Rogsriyam (1999)
PIPERACEAE				
<i>Piper longum</i>	Fruit	<i>Cx. pipiens</i>	Repellent, Larvicidal	Lee (2000).
RHIZOPHORACEAE				
<i>Rhizophora apiculata</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Thangam and Kathiresan (1997).
RUTACEAE				
<i>Citrus aurantifolia</i>	Peel	<i>Cx. pipiens</i>	Larvicidal	Thomas and Callaghan (1999).
		<i>Cx. quinquefasciatus</i>		Mwaiko and Savaeli (1994).
<i>Glycosmis pentaphylla</i>	Leaves	<i>Cx. quinquefasciatus</i>	Larvicidal	Muthukrishnan et al. (1999).

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
SAPINDACEAE				
<i>Spindus rarak</i>	Seed	<i>Ae. aegypti</i>	Larvicidal	Trongtokit et al. (1999)
		<i>Ae. albopitus</i>	Growth inhibition	
		<i>Cx. quinquefasciatus</i>		
SOLANACEAE				
<i>Nicotiana rustica</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
<i>Solanum suratens</i>	Leaves	<i>Cx. quinquefasciatus</i>	Larvicidal	Muthukrishnan, Pushpalatha and Kasthuribhai (1997)
<i>Solanum elaeagnifolium</i>	Leaves, Whole plant	<i>Ae. aegypti</i>	Insecticidal,	Sathiyamoorthy et al. (1997), Markouk et al. (2000)
		<i>An. labranchiae</i>	Larvicidal	
<i>Solanum sodomacum</i>	Whole plant	<i>An. labranchiae</i>	Larvicidal	Markouk et al. (2000)
<i>Withania somnifera</i>	Whole plant	<i>Cx. quinquefasciatus</i>	Larvicidal	Karmegam et al. (1997)
TARGIONIACEAE				
<i>Targinia lorbecriana</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Neves et al. 1999.

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
UMBELLIFERAE				
<i>Foeniculum vulgare</i>	Whole plant	<i>Ae. aegypti</i>	Larvicidal	Sathiyamoorthy et al. (1997)
VERBENACEAE				
<i>Lantana camara</i>	Flowers	<i>Ae. aegypti</i> <i>Ae. albopitus</i>	Repellent	Dua et al. (1996)
<i>Sclerica bracteaeda</i>	Whole plants	<i>Ae. aegypti</i>	Oviposition attractant	Chadee et al. (1993)
ZINGIBERACEAE				
<i>Curcuma raktakada</i>	Leaves, tuber	<i>Ae. aegypti</i> <i>An. stephensi</i> <i>Cx. quinquefasciatus</i> <i>Cx. sitiens</i>	Larvicidal	Latha and Ammini (2000)
Zingiber zerumbet	Rhizomes	Mosquito larvae	Larvicidal	Tewtrakul, Itchayapruk and Chaitongruk (1998)

ภาคผนวก 2 (ต่อ)

Family and species	Parts used	Mosquito species	Bioactivity	Reference
ZYGOPHYLLACEAE				
<i>Peganum harmala</i>	Whole plant	<i>Ae. aegypti</i>	Insecticidal	Sathiyamoorthy et al. (1997)

ภาคผนวก 3
การวิเคราะห์ทางสถิติ

สารละลายน้ำหมักหญ้าขน

Oneway ANOVA of Number of egg rafts

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	15189.907	3	5063.302	291.888	.000
Within Groups	346.935	20	17.347		
Total	15536.842	23			

Post Hoc Tests

Homogeneous Subsets

Tukey HSD

	N	Subset for alpha = .05		
		1	2	3
น้ำกลั่น	6	.0000		
LH+BY	6	2.5433		
แห้ง	6		36.9750	
สด	6			60.4817
Sig.		.718	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 6.000.

สารละลายน้ำหมักหญาร้างนก

Oneway ANOVA of Number of egg rafts

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11821.538	3	3940.513	242.794	.000
Within Groups	324.597	20	16.230		
Total	12146.135	23			

Post Hoc Tests

Homogeneous Subsets

Tukey HSD

	N	Subset for alpha = .05		
		1	2	3
น้ำกลั่น	6	.9267		
LH+BY	6	6.0583		
แห้ง	6		39.2000	
สด	6			53.8150
Sig.		.156	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 6.000.

สารละลายน้ำหมักหญ้าแพรง

Oneway ANOVA of Number of egg rafts

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12803.413	3	4267.804	181.200	.000
Within Groups	471.061	20	23.553		
Total	13274.474	23			

Post Hoc Tests

Homogeneous Subsets

Tukey HSD

	N	Subset for alpha = .05		
		1	2	3
น้ำกลั่น	6	.0000		
LH+BY	6	5.9683		
แห้ง	6		37.6700	
สด	6			56.4033
Sig.		.178	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 6.000.

สารละลายน้ำหนักหญ้าปากควาย

Oneway ANOVA of Number of egg rafts

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12557.044	3	4185.681	436.385	.000
Within Groups	191.834	20	9.592		
Total	12748.878	23			

Post Hoc Tests

Homogeneous Subsets

Tukey HSD

	N	Subset for alpha = .05	
		1	2
น้ำกลั่น	6	.0000	
LH+BY	6	4.3917	
แห้ง	6		46.5800
สด	6		49.0300
Sig.		.098	.531

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 6.000.

สารละลายน้ำหมักเห็ดชั้นอากาศ

Oneway ANOVA of Number of egg rafts

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12499.643	3	4166.548	505.608	.000
Within Groups	164.813	20	8.241		
Total	12664.456	23			

Post Hoc Tests

Homogeneous Subsets

Tukey HSD

	N	Subset for alpha = .05		
		1	2	3
น้ำกลั่น	6	.0000		
LH+BY	6	4.3033		
แห้ง	6		43.9867	
สด	6			50.8767
Sig.		.075	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 6.000.

สารละลายน้ำหมักหญ้าเนเปีย

Oneway ANOVA of Number of egg rafts

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12401.011	3	4133.670	296.138	.000
Within Groups	279.172	20	13.959		
Total	12680.183	23			

Post Hoc Tests

Homogeneous Subsets

Tukey HSD

	N	Subset for alpha = .05		
		1	2	3
น้ำกลั่น	6	.0000		
LH+BY	6	5.1733		
แห้ง	6		42.7217	
สด	6			52.1050
Sig.		.110	1.000	1.000

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 6.000.

ภาคผนวก 4

ตารางบันทึกผลการเปลี่ยนแปลงคุณสมบัติทางกายภาพของน้ำหมักหญ้า

ตารางที่ 5 : บันทึกผลค่า Conductivity ของน้ำหมักหญ้า

	หญ้าชน.	หญ้าชน*	หญ้ารังนก	หญ้ารังนก*	หญ้าแพรง	หญ้าแพรง*	หญ้าปากควาย	หญ้าปากควาย*	หญ้าชันอากาศ	หญ้าชันอากาศ*	หญ้าเนเปีย	หญ้าเนเปีย*	BY+LH
11/2/00	325	321	299	294	299	281	306	299	319	287	276	270	320
12/2/00	329	324	324	296	307	290	312	302	320	293	298	281	318
13/2/00	341	331	332	301	319	297	326	309	336	307	305	289	320
14/2/00	349	329	339	309	326	305	334	311	340	326	317	297	321
15/2/00	367	334	342	311	335	312	340	321	347	333	320	302	317
16/2/00	408	351	356	331	357	319	348	333	358	341	328	309	313
17/2/00	421	362	376	349	361	338	359	339	364	349	337	313	307
18/2/00	458	369	392	363	398	349	374	345	379	356	344	325	303
19/2/00	499	372	425	382	411	364	396	357	386	364	354	334	297
20/2/00	523	378	449	396	439	371	402	369	392	371	360	347	296
21/2/00	546	379	473	402	458	396	427	392	416	379	368	352	291
22/2/00	574	382	481	411	483	415	469	411	433	388	379	363	283
23/2/00	597	387	489	419	512	436	496	436	441	397	393	369	285
24/2/00	621	395	490	431	536	447	503	456	469	406	421	374	275
25/2/00	640	398	498	447	568	452	519	483	502	437	436	391	273
26/2/00	632	407	512	463	597	472	525	497	546	457	467	415	271
27/2/00	619	420	526	484	626	491	547	512	578	477	479	427	276
28/2/00	628	502	557	495	620	521	592	522	610	492	491	436	274
29/2/00	621	556	572	504	613	542	613	569	623	513	521	457	263

ตารางที่ 5 : บันทึกผลค่า Conductivity ของน้ำหมักหญ้า (ต่อ)

	หญ้าขน	หญ้าขน*	หญ้ารังนก	หญ้ารังนก*	หญ้าแพรง	หญ้าแพรง*	หญ้าปากควาย	หญ้าปากควาย*	หญ้าชั้นอากาศ	หญ้าชั้นอากาศ*	หญ้าเนเปีย	หญ้าเนเปีย*	BY+LH
1/3/00	602	581	593	519	604	561	620	591	619	536	543	488	269
2/3/00	583	563	603	552	610	583	591	609	604	558	574	493	272
3/3/00	570	542	600	536	597	594	572	590	596	593	596	516	280
4/3/00	549	531	591	544	568	619	569	584	584	615	587	529	284
5/3/00	564	508	589	540	547	602	589	572	600	601	580	554	286
6/3/00	593	532	582	521	540	593	621	593	617	596	598	573	288
7/3/00	608	559	574	546	563	582	629	610	625	582	605	546	290
8/3/00	614	571	599	553	579	571	630	521	631	600	627	566	294
9/3/00	631	575	606	566	591	562	639	634	658	634	643	582	297
10/3/00	642	581	615	565	607	589	641	639	664	647	651	594	301
11/3/00	673	590	620	570	615	607	638	641	670	661	664	607	312

ตารางที่ 6 : บันทึกผลค่า DO ของน้ำหมักหญ้า

	หญ้าขน	หญ้าขน*	หญ้ารังนก	หญ้ารังนก*	หญ้าแพรง	หญ้าแพรง*	หญ้าปากควาย	หญ้าปากควาย*	หญ้าชันอากาศ	หญ้าชันอากาศ*	หญ้าเนเปีย	หญ้าเนเปีย*	BY+LH
11/2/00	1.2	1.4	1.6	1.7	1.3	1.5	1.2	1.4	1.5	1.9	1.7	1.9	1.6
12/2/00	1	1.3	1.2	1.4	1.1	1.5	1.1	1.3	1.3	1.6	1.6	1.8	1.4
13/2/00	1	1.2	1.1	1.4	1.2	1.3	1	1.3	1	1.3	1.2	1.6	1.2
14/2/00	1.1	1.3	1.2	1.3	1	1.4	1.1	1.2	1	1.2	1.1	1.4	1.1
15/2/00	1	1.3	1.2	1.5	0.9	1.2	1	1.3	0.9	1.3	0.9	1.4	0.9
16/2/00	0.9	1.2	1.1	1.4	1	1.1	1.1	1.2	1	1.2	1	1.1	0.8
17/2/00	0.8	1.4	1	1.3	1	1.2	0.8	1.2	0.9	1.2	0.8	1.2	0.8
18/2/00	0.8	1.3	1	1.4	0.8	1.3	0.9	1	0.7	1.1	0.7	1.2	0.9
19/2/00	0.7	1.1	0.9	1.2	0.6	1.1	0.9	0.9	0.8	1.2	0.8	1.1	1.2
20/2/00	0.7	1	0.8	1.2	0.9	1.1	0.8	0.9	0.8	1.1	0.9	1	1.9
21/2/00	0.8	1.2	0.9	1.1	0.8	1	0.7	1	0.9	1	0.9	0.9	2.4
22/2/00	0.8	1	0.7	1	0.9	1.2	0.6	0.9	0.8	1	0.9	0.9	2.9
23/2/00	0.7	1	0.8	1.1	0.8	1	0.7	0.8	0.7	0.8	0.8	1	3.4
24/2/00	0.8	0.9	0.9	1	0.8	0.9	0.9	0.9	0.9	0.9	1	0.9	3.7
25/2/00	0.9	1	0.9	0.9	0.9	0.8	1	0.9	1.2	0.8	1.5	0.9	4.1
26/2/00	1.2	0.9	1.1	0.8	1.3	0.8	1.7	1	1.9	0.8	2	1	4
27/2/00	1.5	0.8	1.3	0.7	1.8	0.8	2	1.1	1.8	1.2	2.7	1.5	4.6
28/2/00	2.4	0.8	1.7	0.9	2.3	0.9	2.6	1	2.1	1.7	2.9	1.8	5
29/2/00	2.9	1	2.1	1.2	2.9	1	3	1.5	2.2	2.2	2.9	2.3	5.4

ตารางที่ 6 : บันทึกผลค่า DO ของน้ำหมักหญ้า (ต่อ)

	หญ้าขน	หญ้าขน*	หญ้ารังนก	หญ้ารังนก*	หญ้าแพรง	หญ้าแพรง*	หญ้าปากควาย	หญ้าปากควาย*	หญ้าชันอากาศ	หญ้าชันอากาศ*	หญ้าเนเปีย	หญ้าเนเปีย*	BY+LH
1/3/00	3.1	1.8	3	1.7	3	1.7	3.7	1.9	2.6	2.9	3.3	2.5	5.8
2/3/00	3.3	2.4	3.5	2.5	2.9	1.9	4	2.4	2.8	3.6	3.7	2.9	6
3/3/00	3.7	3	3.8	3.1	3.4	2.3	4.2	2.7	2.6	3.9	3.9	3.4	6.2
4/3/00	3.9	3.7	3.7	3.9	3.8	2.6	4.6	3.1	3.2	4.3	3.8	3.6	6
5/3/00	4.2	4.5	3.9	4.3	4.1	3	4.9	2.9	4	4.8	4.1	4.5	6.5
6/3/00	3.8	4.9	4.5	4.7	4.3	3.9	4.9	3.4	4.3	4.7	4.6	4.4	6.3
7/3/00	3.9	4.8	4.6	4.9	4.7	4.3	5.1	3.8	4.6	4.9	4.9	4.7	6.4
8/3/00	4.3	5	5.1	4.9	4.8	4.6	5	4.1	4.8	5	5.2	4.7	6.1
9/3/00	4.5	5.1	4.9	5.2	4.9	5	5	4.9	4.9	4.9	5	5	5.9
10/3/00	4.9	4.9	4.8	5	5.3	4.9	5.1	5	5.2	4.8	5.2	4.9	6
11/3/00	5.3	5.1	5.4	4.9	5.2	5.4	5	4.8	5.1	5.3	5.2	4.8	5.8

ตารางที่ 7 : บันทึกผลค่า pH ของน้ำหมักหญ้า

	หญ้าขน	หญ้าขน*	หญ้ารังนก	หญ้ารังนก*	หญ้าแพรง	หญ้าแพรง*	หญ้าปากควาย	หญ้าปากควาย*	หญ้าชั้นอากาศ	หญ้าชั้นอากาศ*	หญ้าเนเปีย	หญ้าเนเปีย*	BY+LH
11/2/00	6.5	6.9	6.6	6.8	6.5	6.7	6.7	6.8	6.4	6.6	6.6	6.9	6.9
12/2/00	6.4	6.9	6.6	6.8	6.5	6.7	6.5	6.8	6.4	6.5	6.5	6.8	6.8
13/2/00	6.4	6.8	6.5	6.7	6.4	6.6	6.4	6.7	6.3	6.6	6.4	6.6	6.7
14/2/00	6.3	6.8	6.4	6.6	6.3	6.6	6.5	6.8	6.4	6.4	6.4	6.6	6.8
15/2/00	6.1	6.7	6.3	6.6	6.2	6.5	6.2	6.6	6.1	6.3	6.3	6.7	6.6
16/2/00	6.1	6.7	6.1	6.4	6.2	6.4	6.2	6.5	6.2	6.3	6.2	6.6	6.6
17/2/00	6	6.5	6.2	6.3	6.1	6.4	6.1	6.4	6	6.2	6.1	6.5	6.7
18/2/00	6	6.5	6	6.3	6.2	6.4	6.1	6.3	5.9	6.1	6.2	6.5	6.5
19/2/00	5.9	6.3	5.9	6.1	6	6.2	5.9	6.1	5.8	6	6.1	6.4	6.5
20/2/00	5.9	6.2	5.9	6.1	6	6.1	5.8	6	5.9	5.9	6	6.3	6.6
21/2/00	5.8	6.2	6	6	5.8	6.1	5.8	6	5.8	6	6	6.3	6.5
22/2/00	5.7	6.1	5.8	5.9	5.7	6	5.7	5.9	5.7	5.9	5.9	6.1	6.6
23/2/00	5.7	6	5.8	5.8	5.7	5.9	5.8	6	5.8	5.8	5.8	6.1	6.7
24/2/00	5.9	6	5.8	5.7	5.8	5.9	5.9	5.8	5.7	5.7	5.8	6	6.8
25/2/00	6	5.9	5.9	5.8	5.8	5.9	6	5.8	5.9	5.9	5.9	5.9	6.7
26/2/00	6.3	5.8	6	5.8	5.9	5.8	6.1	5.9	6	5.9	6.1	5.8	6.9
27/2/00	6.4	5.8	6.2	6	6	5.8	6.3	5.9	6.2	6.1	6.1	5.9	6.8
28/2/00	6.5	5.9	6.2	6.1	6.2	5.7	6.4	6	6.4	6.2	6.2	6.1	6.9
29/2/00	6.7	6	6.3	6.2	6.4	5.7	6.4	6.3	6.7	6.1	6.1	6.2	7

ตารางที่ 7 : บันทึกผลค่า pH ของน้ำหมักหญ้า (ต่อ)

	หญ้าขน	หญ้าขน*	หญ้ารังนก	หญ้ารังนก*	หญ้าแพรง	หญ้าแพรง*	หญ้าปากควาย	หญ้าปากควาย*	หญ้าชั้นอากาศ	หญ้าชั้นอากาศ*	หญ้าเนเปีย	หญ้าเนเปีย*	BY+LH
1/3/00	6.8	6.1	6.4	6.3	6.5	5.8	6.8	6.4	6.7	6.5	6.3	6.1	7.1
2/3/00	6.9	6.1	6.6	6.5	6.5	5.9	6.9	6.6	6.6	6.6	6.5	6.4	6.9
3/3/00	7	6.3	6.6	6.6	6.6	6	6.9	6.7	6.9	6.7	6.8	6.7	7
4/3/00	7	6.4	6.7	6.8	6.8	6.3	7.1	6.9	7	6.9	7.1	6.9	7.2
5/3/00	7.1	6.5	6.8	6.8	6.9	6.3	7.2	7.2	7.2	7.1	7.2	7.2	7.1
6/3/00	7.1	6.7	7	6.9	7	6.5	7.2	7.4	7	7.1	7.5	7.4	7.2
7/3/00	7.3	6.9	7.1	7.1	7.2	6.7	7.1	7.2	7.3	7.4	7.8	7.5	7.1
8/3/00	7.4	6.9	7.5	7.3	7.3	6.7	7.2	7.5	7.6	7.5	7.9	7.5	7.4
9/3/00	7.6	7.1	7.5	7.4	7.3	6.9	7.3	7.6	7.7	7.6	7.9	7.7	7.5
10/3/00	7.7	7.3	7.6	7.7	7.5	7.1	7.4	7.7	7.8	7.8	8	7.9	7.6
11/3/00	7.7	7.5	7.8	7.6	7.6	7.2	7.5	8	7.9	7.9	8.2	8.1	7.5

ตารางที่ 8 : บันทึกผลค่าอุณหภูมิของน้ำหมักหญ้า

	น้ำหมักหญ้า	BY+LH	อากาศ
11/2/00	26.3	26.2	25.1
12/2/00	26.5	26.4	25.2
13/2/00	26.8	26.6	25.1
14/2/00	26.5	26.5	25.3
15/2/00	26.8	26.7	25.4
16/2/00	26.9	26.8	25.3
17/2/00	27	26.6	25.4
18/2/00	26.9	26.5	25.3
19/2/00	27	26.3	25.3
20/2/00	26.9	26.2	25.2
21/2/00	26.9	26.3	25.4
22/2/00	26.8	26	25.4
23/2/00	26.6	25.8	25.5
24/2/00	26.6	25.7	25.1
25/2/00	26.4	25.6	25.2
26/2/00	26.2	25.7	25.3
27/2/00	26	25.5	25.2
28/2/00	25.7	25.4	25.2
29/2/00	25.3	25.2	25.1
1/3/00	25.2	25.1	25.1
2/3/00	25.4	25.2	25.2
3/3/00	25.5	25.1	25.2
4/3/00	25.6	25.3	25.3
5/3/00	25.5	25.1	25.1
6/3/00	25.4	25.3	25.2
7/3/00	25.4	25.1	25.1
8/3/00	25.3	25.2	25.2
9/3/00	25.2	25.4	25.1
10/3/00	25.2	25.3	25.4
11/3/00	25.1	25.2	25.3

ประวัติผู้วิจัย

นายอดุลย์ ฅงน้อย เกิดวันที่ 18 เมษายน พ.ศ. 2517 ที่อำเภอบางปะกง จังหวัดฉะเชิงเทรา สำเร็จการศึกษาปริญญาตรีวิทยาศาสตร์บัณฑิต สาขาวิชาสัตววิทยา ภาควิชาชีววิทยา จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2539 และเข้าศึกษาต่อในหลักสูตรวิทยาศาสตรมหาบัณฑิต ที่จุฬาลงกรณ์มหาวิทยาลัย เมื่อปีการศึกษา 2540

