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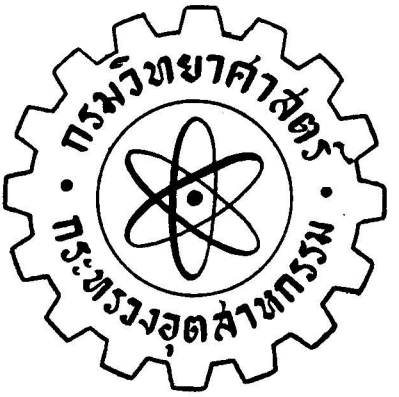

DEPARTMENT OF SCIENCE

MINISTRY OF INDUSTRY

BANGKOK, THAILAND

With the Compliments

of

Department of Science

Ministry of Industry

Bangkok, Thailand

Vol. 9 No. 2 December 1958

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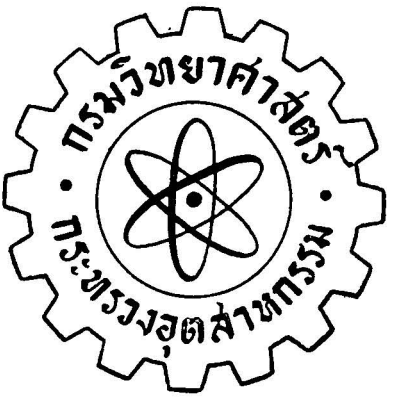

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ABSTRACTS

DEPARTMENT OF SCIENCE

Ministry of Industry, Bangkok, Thailand

Director–General : Dr. Charng Ratanarat

The Thai Science Bulletin is edited by the Department of Science, Ministry of Industry, Bangkok, Thailand.

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For each paper, 25 reprints are supplied free of cost. Additional reprints may be arranged provided the Editors have been notified in time.

CHINESE PRESERVED EGGS, OR PIDAN

Mrs. Virada Thisyamondhol
Department of Science

Summary

Pidan could be made from almost every kind of fresh hard shelled eggs by coating with a mixture of lime, wood ash, sodium carbonate, common salt, and water. Lime was found to be the most essential ingredient. Results of experiments carried out by using various formulae recommended in literatures are given. It has been found also that Salmonella cannot survive in properly prepared pidan.

Chinese preserved eggs, or 'pidan,' known in this country as 'Kai Yeo Ma,' have been used in China for more than eighty years. The Chinese consider these eggs as one of their delicacies. They are presumably rich in food values and especially rich in vitamins. The origin of these preserved eggs is not yet known, but it is thought to be in the southern part of China, where there was an abundance of duck eggs. The attempts to preserve the surplus eggs in that region led to the discovery of pidan.

The aim of making pidan is not merely to preserve the eggs, but to make a new product. The purpose is analogous to that of cheese producing from milk. In this case, the eggs are changed both chemically and bacteriologically.

J. Hanzawa[2] isolated five kinds of bacteria from pidan and inocculated fresh eggs with these bacteria and placed them in water-glass solution for some time. The resulting eggs were similar to pidan, both in colour and hardness.

The method of preparation of pidan is generally as follows:

The selected duck eggs are washed, and coated about a quarter of an inch thick with a mixture of lime, wood ash, table salt, and strong tea water. They are further covered with rice

husks to prevent their being stuck together. They are then packed in jars, which, inturn, are sealed, and stored away in a cool place for 4 or 5 months. During this time, the eggs acquire a different appearance; the shell becomes dark or greenish in colour, with numerous dark green dots on the inner membrane; the white turns brown and jelly-like; and the yolk coagulates and becomes greenish-grey in colour with concentric rings of different shades of grey. When freshly opened, the eggs have a lime-like taste and ammoniacal odour, but these gradually disappear after exposure. Pidan are generally eaten without being cooked.

In contrast with rotten eggs, pidan give no odour of hydrogen sulphide, and do not blacken lead acetate paper.

It was given by K. Blunt and C.C. Wang [1] in their review that there were decreases in the moisture content, the ether extract, lecithin phosphorus as well as the non-coagulable and ammoniacal nitrogens during the formation of pidan from fresh eggs. Increases in the ash content and the alkalinity of the ash were also reported. These led to the conclusion that in the formation of pidan the decomposition of egg proteins and phospholipids took place probably through the agencies of alkalies, bacteria, and enzymes.

A study by E. Tso [5] shows that the original vitamin B was destroyed in pidan forming, but the potency of vitamin A and the antirachitic food factor was little or not at all affected.

The purposes of these experiments are to find the best way of preparing pidan and to find out whether the eggs so prepared are safe for consumption, as pidan are eaten without being cooked and some raw duck eggs are known to be contaminated with Salmonella.

Experimental

PART I *THE PREPARATION OF PIDAN*

Pidan were prepared by using various formulae, the ingredients of which are given below:

1. Lee's Formula [3]

Mixture for 100 eggs

Salt	375	g
Calcium oxide or lime	375	„
Wood ash	1,600	„
Sodium carbonate, pure	150	„
Tea water, strong	800	ml

2. Formula according to E. Tso

Mixture for 100 eggs

Sodium carbonate	150	g
Wood ash	730	„
Salt	120	„
Calcium oxide or lime	1,200	„
Tea water	800	ml

3. Formula of K. Blunt and C.C. Wang

Mixture for 1,000 eggs

Lime	4	kg
Salt	2	„
Wood ash	10	„
Tea water	600	g

Two sets of cleaned and air dried eggs were first coated separately with the mixtures the ingredients of which are given above. To prevent sticking, the coated eggs were rolled over rice husk. They were then stored, in jars with thick paper covers, in a cool place. The eggs were taken out and examined periodically.

Experiments were also carried out in order to find out how essential was each ingredient of Lee's mixture and how the purity of sodium carbonate as well as the temperature of tea water would affect the results. In these experiments eggs were coated with the mixtures which were essentially the same as that of Lee's except one ingredient being omitted or substituted. The coated eggs were stored and later examined as usual.

Different kinds of eggs were used in the experiments, namely, unfertilized eggs, fertilized eggs, and eggs of unknown sources. Hen eggs as well as quail eggs were also used. They were all found to be satisfactory for the preparation of pidan.

Results Results obtained are as follows:

1. The eggs which had been coated with Lee's mixture became hardened after the first week of storing. They, however, were not ready for consumption until after $2\frac{1}{2}$ to 3 months had passed. The pidan so prepared were found to be too salty.

2. Using crude sodium carbonate instead of pure sodium carbonate in the Lee's mixture slowed the process of pidan formation. It took at least six months before good pidan could be obtained. The slower process may be due to the low percentage of Na_2CO_3 in the crude sodium carbonate used. This explanation is supported by the results of the other experiment in which sodium carbonate was omitted entirely from the mixture. In the latter experiment, the eggs took much longer time, about 7-8 months, to become pidan.

3. Lime was also found to be essential in the preparation. Pidan could not be obtained without lime.

4. Omitting salt in the Lee's mixture resulted in a longer period for the eggs to become firm and jelly-like.

5. Pidan were not formed when the eggs were first immersed overnight in lime water and then coated with the Lee's mixture, in which lime was substituted by ammonium carbonate at the percentages of 5, 10 and 15. Up to the 4th month the white was still liquid but dark in colour; the yolk was not coagulated but formed a gel-like mass and its colour varied from red to black; the shell was relatively harder. These eggs became rotten after a period of about 3 to 4 months.

6. Eggs prepared by applying the mixture of Blunt and Wang were similar to those pickled in ordinary salt solution.

PART II

Experiments were carried out by having Salmonella injected into fresh eggs and the eggs were then made into pidan according to Tso's formula. The eggs were examined fortnightly for the survival of Salmonella. It was found that Salmonella did not survive after the sixth week. The pH of the eggs at that period was about 10, which was too high for the survival of this organism.

Conclusions

Both formulae of Tso and Lee were satisfactory, except that Lee's resulted in too salty pidan. (In the author's opinion, Mr. Tso's formula has a higher preference).

Calcium oxide or lime was found to be the most important ingredient. However, every other ingredient has its own contribution in the formation of pidan.

Pidan could be prepared successfully from hard shelled eggs.

Pidan can be eaten uncooked as Salmonella cannot survive under highly alkaline conditions.

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November, 1958.

Preparation of Fish Sauces by a Quick Process

Mrs. Phannipha Varavej, B. Sc. (C.U.)
Department of Science

Fish sauce is widely used in Thailand and in many other countries in Southeast Asia as well. It is known as 'nam pla' in Thailand, 'nuoc-mam' in Indo-China and 'patis' in the Philippines. It is used as a condiment for improving the flavour of several dishes.

In Thailand fish sauce is made from various kinds of small shrimps or fish which are not being used directly as food. The chub mackerel, known in Thailand as 'pla-tu,' is also used to a great extent when this fish is overflowing the local markets at a certain time of the year.

The manufacture of fish sauce requires simple equipment, the essential piece of which is a wooden vat in which the fish and salt are mixed and left to be reduced to a liquid state by bacteria and by its own digestive ferments. The fish is usually mixed with salt without being cleaned or scaled. The mixture is left in the vat untouched for several months, normally 6 months or more, before the sauce is ready for consumption.

It is of interest to know whether it would be possible to manufacture fish sauces by a quicker process similar to that used in the manufacture of protein hydrolysate from vegetable proteins.

Experimental

Experiments were conducted using whole chub mackerel, which were digested with hydrochloric acid of various concentrations. The time and temperature of digestion were also varied. After digestion, the mixture was divided into several portions and then neutralized with sodium carbonate to different pH values. The whole process can be completed in about a week.

Results The results obtained may be summarized as follows:

1. Chub mackerel is too rich in fat which easily forms soap with sodium carbonate, and gives to the resulting product an unpleasant soapy flavour.

2. A 20% hydrochloric acid is found to be the most suitable concentration. Hydrochloric acid of lower concentration than 20% requires a longer digestion period and the aroma of the resulting product is not as good. This is probably due to the incomplete digestion of proteins.

3. The optimum condition for digesting the fish is 80°C for 15 hours.

4. The most suitable pH of the neutralised hydrolysate is 5.5. Lower pH causes an acid taste to the sauce, while a higher pH causes an unpleasant flavour. Moreover, a heavy precipitation is found in the product of higher pH.

5. Tables I and II show that when proper conditions are maintained, the resulting sauces are comparable in qualities to the good grade fish sauces manufactured by the traditional method. They lack, however, the natural aroma of the traditional fish sauces. This is an important problem to be further investigated.

Table I

Comparison of Physical Properties of Fish Sauces

Property	Fish Sauce prepared by the Quick Process	Good grade Fish Sauces manufactured by the traditional method
Odour	Fish-sauce like, but not as good as that of the traditional fish sauces	Pleasant
Colour	Dark brown	Brown
Turbidity	None	None
Precipitate	None	None

Table II

Comparison of Compositions of Fish Sauces

Acidity and Composition	Fish Sauce prepared by the Quick Process	Good grade Fish Sauces manufactured by the traditional method		
		No. 1	No. 2	No. 3
pH	5.4	5.8	5.8	5.8
NaCl . . . . . g/l	200	278.5	278.5	277.3
Total solids . . . . „	310.2	422.2	422.4	425.7
Total nitrogen . . . . „	17.5	17.9	19.4	18.6
Ammoniacal nitrogen . . „	1.5	2.9	3.3	3.3
Organic nitrogen . . „	16.0	15.0	16.0	15.3
Formaldehyde nitrogen „	5.3	7.0	7.8	8.1
Amino acid nitrogen . . „	3.8	4.1	4.5	4.8

Further experiments were conducted

1. Using only the meat of the chub mackerel; head, bones, and guts being removed.
2. Using only the meat of the chub mackerel as in 1, but the fat had been previously extracted.
3. Using beheaded chub mackerel.
4. Using steamed whole chub mackerel.
5. Using whole chub mackerel, but ground before mixing with the acid.
6. Using *Stolephorus*, a small fish known in Thailand as 'pla-katuk.'

In all experiments optimum conditions as afore-mentioned were maintained. The following table shows the results of analyses of the prepared sauces.

Table III

Acidity and Composition	Fish Sauces obtained from the previous experiments					
	1*	2*	3*	4*	5*	6*
pH	5.9	6.0	5.4	5 3	5.4	5.4
NaCl . . . . . g/l	200.0	200.0	220.0	220.0	220.0	196.7
Total solids. . . . „	368.2	415.8	341.8	413.8	441.0	359.5
Total nitrogen . . „	19.0	19.6	16.7	20.5	18.8	18.5
Ammoniacal nitrogen „	1.5	1.8	2.3	1.7	2.1	1.2
Organic nitrogen . . „	17.5	17.8	14.4	18.8	16.7	17.3
Formaldehyde nitrogen „	6.7	7.0	5.9	6.0	6.9	5.9
Amino acid nitrogen „	5.2	5.2	3.6	4.3	4.8	4.7

* The numbers are corresponding to those assigned to the experiments given previously.

The products obtained were similar in general appearances, and the use of fish containing less fat or no fat at all resulted in a better product. The aroma of the prepared sauces was not comparable with those of the sauces manufactured by the traditional method.

What remains to be studied is how to improve the aroma of the sauces prepared by this quick process and ascertain if their nutritive value is still comparable with that of the sauces manufactured by the traditional method.

RICE BRAN OIL

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Department of Science

Introduction

Thailand is an agricultural country, and the most important agricultural enterprise is rice production. It is essential, therefore, to develop profitable uses and market outlets for all of the by-products of the rice milling industry.

Rice Bran is one of the most important by-products of the rice-milling industry, because it has a high nutritive value, being rich in lipids, proteins and vitamins. It is, therefore, in great demand as feed for livestock and poultry. In addition to its value as a feed-stuff, rice bran constitutes a potential source of edible oil, which occurs to the extent of 14-18 per cent in the bran.

The content of free fatty acids in rice bran oil is invariably high. While the amount of free fatty acids in crude vegetable oils generally depends upon the care excercised in handling the oil-bearing materials prior to extraction of the oil, a rather high acidity is probably inherent in this oil, since rice bran contains an unusually active lipase.[1] A free fatty acid content as high as 4-7 per cent was found even in oil which had been promptly extracted from fresh rice bran. Upon storage of the bran at 25°C the acidity of the oil increased at the rate of 1 per cent per hour. The oil contains a large quantity of wax which can be reduced by special extraction methods, and quite a high content of unsaponifiable material. The colour of the crude or refined oil varies considerably in intensity; poor oils of high acidity can be refined and bleached to a colour acceptable for edible products

with difficulty. Rice bran oils which carry more than 50 per cent of free fatty acids can be used only for preparing soap. On the other hand oil which contains about 4-7 per cent of free fatty acids can be refined to produce edible oils. Extraction of fresh bran with commercial hexane or petroleum ether yields an oil of quality that can be refined for edible purposes.[3]

Removal of the oil from fresh bran increases its value as a stockfeed since the extracted bran contains a higher percentage of proteins and certain B-vitamins and becomes more stable with respect to oxidative rancidity, which is often a serious problem in the storage of the bran.

Since the success of livestock industry depends largely on the low cost of feeding, the development of an economic method for stabilizing rice bran is most desirable.

Experimental

Thai white rice bran was used in this investigation. One set (A) of samples was extracted more than 4 hours after milling, whereas the other (B) was extracted within 4 hours after milling. The crude oils from both sets were completely refined by the usual processes, namely alkali refining (using sodium hydroxide), bleaching (using a mixture of Fuller's earth and activated charcoal) and deodorization (by steam distillation under reduced pressure of 1 - 2 mm.) to obtain edible oils.

The crude oil of set A was found to contain high free fatty acids (about 15 per cent) and was difficult to refine to obtain edible oils. While the crude oil of set B contained only about 7 per cent free fatty acids and was not difficult to refine. The refined oil of set B was found to be clear, light-coloured product having satisfactory odour and flavour and could be used as cooking oil.

The qualities of the crude and refined rice bran oils were determined and compared with those of the oils produced in the United States[4] as shown in Table I.

Table I
Comparison of the Characteristics of Thai and U.S. Rice Bran Oils

Characteristics	Thai rice bran oil				U.S. rice bran oil		
	Crude from set A	Refined from set A	Crude from set B	Refined from set B	Crude from Blue Bonnet	Crude from Zenith	Refined from Blue Bonnet
Specific gravity at 30°/30	0.9166	0.9202	0.9081	0.9141			
Specific gravity at 25°/25					0.9187	0.9212	0.9166
Refractive index n_D^{30}	1.4696	1.4714	1.4692	1.4692			
Refractive index n_D^{25}					1.4720	1.4700	1.4708
Free fatty acids as % of oleic acid	15.5	0.55	7.4	0.2	4.6	6.1	0.11
Iodine value (Wij's)	98.1	98.3	98.8	98.6	102.0	100.3	102.3
Thiocyanogen value	75.7	75.6	74.8	74.8	75.9	74.4	75.7
Saponification value	185.4	186.1	180.9	189.1	185.4	183.4	187.6
Unsaponifiable matter %	3.86	3.33	4.91	3.23	3.86	4.98	2.70
Titer °C	29.0	29.0	28.5	28.5	25.2	26.5	25.2
Hydroxyl value	16.8	15.5	17.0	11.7	8.7	14.0	5.0
Saturated acids %	—	—	13.9	14.2	16.3	16.5	16.3
Iodine value of mixed acids	—	—	110.1	110.1	105.7	104.2	105.2

The relatively low iodine value of rice bran oil and its fatty acid composition, e.g. high percentage of oleic acid, low of saturated acids, and very low of acids more unsaturated than linoleic acid, favour its use as a salad and cooking oil.

Samples of crude rice bran oil obtained by extraction of fresh bran with petroleum ether were hydrogenated. The products were found to have good flavour and keeping quality. It could be used as shortening of good grade.

Refining Loss of Rice Bran Oil

Although rice bran oil can be refined by means of alkali according to the Official and Tentative method of the American Oil Chemists' Society (A.O.C.S) for cottonseed oil,[6] the losses in the case of rice bran oil are larger than those in cottonseed oil of the same free fatty acid content, probably because the soapstock formed by rice bran oil during the refining process was light and could absorb neutral oil more than those of other oils.

The following experiments were performed while the writer was an International Co-operation Administration trainee to study methods and processes for the utilization of rice by-products at the Southern Regional Research Laboratory, U.S. Department of Agriculture, New Orleans, L.A. in 1954.

1. Two samples of crude rice bran oil were refined under the same condition as described in A.O.C.S. for cottonseed oil. The results are tabulated below:

Table II

Loss in Refining Crude Rice Bran Oil

Rice bran oil	Sample I	Sample II
Free fatty acid content %	5.5	13.0
Concentration of NaOH	20°Bé(0.4% excess)	20°Bé(0.4% excess)
Yield of refined oil without remelting soapstock %	37.7	25.0
Refining loss without remelting soapstock %	62.3	75.0
Additional oil recovered on remelting soapstock %	Incomplete	38.5 (15 remelts)
Refining loss %	—	36.5

2. Rice bran oil containing 6.0 per cent of free fatty acids was steam-stripped at a temperature of 220° - 240°C under a pressure of 2 mm. for 3 hours. The resulting oil which retained only 2.6 per cent of free fatty acids was refined with alkali using the same procedure as that in Experiment 1. The refining loss in the case of steam-stripped rice bran oil was compared with that in cottonseed oil having a free fatty acid content of 2.1 per cent as shown in Table III.

Table III

Comparison of the Losses
in Refining Steam-stripped Rice Bran Oil and Cottonseed Oil

Kind of oil	Rice bran oil	Cottonseed oil
Free fatty acids %	2.6	2.1
Concentration of NaOH	16°Bé(0.4% excess)	16°Bé(0.4% excess)
Yield of refined oil %	62.8 (one remelt)	81.0 (one remelt)
Refining loss	37.2	19.0

3. Three samples of rice bran oil were refined by using baskets to filter the soapstock according to the procedure of Pominski, Loeb and Dollear.[5]

The following conditions were used in this procedure:

Refinings

Temperature of cold bath	20 - 24°C
R.P.M. in cold bath	250 ± 10
Time in cold bath	45 or 90 min.
Temperature of hot bath	63 - 67°C
R.P.M. in hot bath	70 ± 5
Time in hot bath	20 min.
Final oil temperature	60 - 65°C
Settling time in hot bath	60 min.
Temperature of cooling bath	20 - 24°C
Time in cooling bath	60 min.
Draining time of soapstock in basket	60 min.
Additional draining time of soapstock in basket	12 hrs (minimum)

Remelting

Temperature of bath	73 - 77°C
Time in hot bath	60 min.
Temperature of cooling bath	20 - 24°C
Time in cooling bath	60 min.

Samples

1. Rice bran oil (5.5% free fatty acids) using 16°Bé NaOH (0.4% excess).
2. Rice bran oil (5.5% free fatty acids) using 18°Bé NaOH (0.4% excess).
3. Rice bran oil (13.0% free fatty acids) using 20°Bé NaOH (0.4% excess).

The results are presented in Table IV.

Table IV

Loss in Refining Rice Bran Oil
by Pominski, Loeb and Dollear's method

Rice bran oil, sample No.		1	2	3
Yield of refined oil without remelting soapstock	%	81.0	79.5	64.3
Oil from remelted soapstock		0.1	1.5	3.6
Refining loss	%	18.9	19.0	32.1

4. Rice bran oil containing 6.6 per cent free fatty acids was refined under the same conditions as those in Experiment 1 with the addition of various additives which might improve the yield of refined oil. Each sample of oil weighed 100 g, and sodiumhydroxide solution of 16° Bé concentration was used in every case.

The results are tabulated as follows:

Table V

Loss in Refining Rice Bran Oil in the Presence of Various Additives

Additives	Formulae	Amount added %	Refining loss %
Monoethanolamine	$HOCH_2CH_2NH_2$	1.8	17.4
Tetraethanol ammonium hydroxide	$(HOCH_2CH_2)_4NOH$	5.3	17.5
Ethylene glycol	$OHCH_2CH_2OH$	1.9	19.4
Ethylene diamine	$H_2NCH_2CH_2NH_2$	1.8	19.7
Triethanolamine	$(HOCH_2CH_2)_3N$	3.8	20.5
Glycerine	$HOCH_2CH(OH)CH_2OH$	2.5	20.6
Cellosolve	$HOCH_2CH_2OCH_2CH_3$	2.5	22.4
Propylene glycol	$HOCHCH_2OH$ CH_3	2.2	22.4
Trimethylene glycol	$HOCH_2CH_2CH_2OH$	2.2	23.2
Blackstrap molasses	—	2.5	23.3
Ammonium hydroxide (22 %)	NH_4OH	1.2	23.4
Tetramethyl ammonium hydroxide	$(CH_3)_4NOH$	2.5	29.2
Sucrose	$C_{12}H_{22}O_{11}$	1.5 3.0	30.0 19.4
Triethylamine	$(C_2H_5)_3N$	2.8	52.1
Control	—	—	47.2

Discussion of Results

From the results in Table II it can be seen that excessive losses occur in alkali-refining rice bran oil by the usual procedure employed for cottonseed and similar oils. Rice bran oil containing about 6 per cent of free-fatty acids may lose over 40 per cent, when refined by the cup method. Remelting of the soapstock recovered over 30 per cent of the loss. If the content of free fatty acids was reduced to 2.6 per cent by steam-stripping, the yield in refining improved slightly as shown in Table III. The data in Table IV indicate that refining rice bran oil by using baskets to filter the soapstock cuts down the loss by at least one half. In Table V the results show that addition of certain organic compounds to the crude oil before conducting the usual refining procedure greatly reduces the loss.

In general organic compounds used as additives contain NH_2 or OH groups. Sucrose or blackstrap molass appears to be the most practical additive. However, certain ethanolamines and glycols may be effectively employed.

Conclusions

1. When freshly milled Thai white rice bran is extracted with petroleum ether or hexane, an oil of relatively low free fatty acid content is obtained. This oil possesses satisfactory qualities and can be refined for use as edible oil.

2. A method of reducing the loss in refining rice bran oil in the presence of additives was successfully devised. Three patents applications were filed on the use of ethanolamines, diamines and polyhydroxy compounds, respectively as additives in alkali-refining of crude vegetable oils, particularly of rice oil.[2]

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ABSTRACTS

A STUDY OF DIAGNOSTIC CONSTANTS OF LEAVES OF SOME MEMBERS IN GENUS CASSIA (in English)

Prachote Plengvidhya and Chamlong Suvagondha, School of Pharmacy, Bangkok

Journal of the Pharmaceutical Association of Thailand, Vol X. No. 1, 1957, p. 10. The Pharmaceutical Association of Thailand Silom Road, Bangkok.

Thirteen species of Cassia found in Thailand are identified. Of this total, Cassia glanca., Lamk., Cassia alata, Linn., Cassia tora, Linn., Cassia sophora, Linn., and Cassia siamea, Lamk., widely used as medicine in Thailand, were chosen for studying whether there was a highly significant difference in Vein-Islet Number, Stomatal Number, Stomatal Index, Palisade Ratio and Veinlet Termination Number. Methods of determination of these constants and results are given.

★ ★ ★

EFFECTS OF GROWTH HORMONE ON HYPOPHYSECTOMISED PROTEIN DEFICIENT RATS (in Thai)

Vichien Diloksambhandh, Section of Anatomy, Siriraj Hospital, Bangkok.

Siriraj Hospital Gazette, Vol. 9, No. 5, May 1957, p. 259, University of Medical Sciences, Bangkok.

Female rats were hypophysectomised at the age of 21 days and given free access to protein-free diet. Some developed diarrhea. A few started dying on the sixth day after operation. Therefore,

attempt to study the effects of the growth hormone on the remaining rats was made on the tenth day after operation. Administration of large doses of the hormone did not alter the effects of the protein deficiency plus hypophysectomy, either in terms of body weight changes or of alteration in the pronounced atrophic changes in the tibial epiphyseal cartilage.

(V. D.)

★ ★ ★

KENAF OR 'PAW KAEW', AN IMPORTANT FIBRE CROP (in Thai)

Chalong Kunchara and Klom Sombutsiri, Department of Agriculture, Bangkok.

Kasikorn, Vol. 31, No. 2, March 1958, p. 125, Department of Agriculture, Bangkok.

Kenaf (*Hibiscus cannabinus L.*) is becoming more important to the economy of Thailand, since the fibre is practically used solely for making rice bags at the present time. The crop grows in any kind of soil and climatic conditions which prevail in Thailand. The north-eastern provinces supply practically all of the fibre to the local factories.

The conditions required for its growth are described. The methods of growing, seeding, and spacing are clearly given as well as those employed in other countries. Wetting the fibre in water is imperative for producing good quality of the fibre. Other different methods of decortisation are mentioned. Brief notes are also given on few important pests and diseases.

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MAKING FISH SAUCE (in Thai)

Vinyoo Chindaprasert, Department of Fisheries, Bangkok. Kasikorn, Vol. 31. No. 4, July 1958, p. 339, Department of Agriculture, Bangkok.

Fish sauce is most important Thai food. The method of making the sauce in Thailand is described in detail.

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CUTCH (in Thai)

Boonthom Dhamacharee, Royal Forest Department, Bangkok. The Vanasarn, Vol. 16, No. 2, April 1958, p. 31, Royal Forest Department, Bangkok.

Cutch is extracted from the wood of Acacia catechu, a medium sized tree grown practically all over Thailand. In this article the author gives the result of her investigation into the chemical properties of cutch derived from cutch—trees in the northern part of the country.

Various uses of cutch and gum exuded from cutch tree are briefly described.

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CATHETER DUODENOSTOMY (in Thai)

Sern Wongaraya, Lerdsin Hospital, Bangkok. Medical Journal, Vol. 7, No. 4, July 1958, p. 259, Ministry of Public Health, Bangkok.

The history of Catheter duodenostomy and the method of management of hazardous duodenal stump are briefly mentioned. The indications and technical safeguards in connection with catheter duodenostomy, based on 9 cases experiences have been presented, the details of 8 cases treated successfully and one case

was failed by this method are carefully considered. It is believed that catheter duodenostomy is a safe and frequently life saving procedure when properly employed. There is no doubt whatever that catheter duodenostomy is the safeway out when firm closure of the stump cannot be achieved but its complications can occur. It should be reserved for cases in which all reasonable means of attaining safe closure have been considered than a routine in all cases in which at first it appears that the stump will be hard to close.

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THE NORTHEAST AND OIL (in Thai)

Nitipat Jalichan, Royal Department of Mines, Bangkok. Mining Gazette, Vol. 3, No. 9, September 1958, p. 1, Royal Department of Mines Bangkok.

Wallace Lee's Report on the petroleum possibility in the Northeast is reviewed in the light of a more recent geological knowledge, particularly in the stratigraphy, of this region. Discussions on the subject of source rocks, supported by field evidences and technical literatures, are also presented.

After having carefully weighed all the evidences, the writer reaffirms his previous conclusion, as stated in the report on this region which he co-authored in 1953, as follows:

Petroleum possibility prevails in the Poo Parn area where favorable conditions exist in the Poo Kading Formation:

1. Good structural traps.
2. Enormous volume of source materials for petroleum also present in the same formation which consists principally of red shale and silkstone.
3. Very mild metamorphism.

It is suggested that, in order to broaden the petroleum outlook of this region, other rock groups should also be explored in detail. In the writer's opinion, Jurassic rocks should offer another good possibility of petroleum in the Northeast.

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HOW TO GROW DENDROBIUM SEEDLINGS (in Thai)

Rapee Sakarik, Kasetsart University, Bangkhen, Bangkok. Kasikorn, Vol. 31, No. 4, November 1958, p. 483, Department of Agriculture, Bangkok.

Dendrobiums are very popular among the orchid growers in Thailand due to their frequent flowering and attractiveness of the flowers. The culture of dendrobium seedlings may by divided into 3 different stages according to the size of the plants. The tiny dendrobiums growing from seeds in the flasks are very delicate and require careful attention. The plants should be left in the flask from 6 to 8 months or until they are of 2 or 4—leaf stage. The "flask plants" are then transplanted to community pots. A 3—inch community pot should contain not less than 25 plants. The dendrobiums in these community pots should be kept in glass house or glass container in order to maintain high humidity and temperature. When the plants are too crowded in the community pot, they are again transplanted. In general, 1.5—inch pots are used in this second transplanting. The seedlings are taken out of the community pot and planted singly in 1.5—inch pots. During rainy season, these growing plants should be protected from rain. Watering should be done in the morning. Fertilizer application is recommended once a week.

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