

Seluang (*Rasbora agrotyenia*) Fish Oil Increases Vitamin D in Autoimmune Patients (Systemic Lupus Erythematosus)

by Radiyati Umi Partan

Submission date: 25-Mar-2022 11:58AM (UTC+0700)

Submission ID: 1792451337

File name: tamin_D_in_Autoimmune_Patients_Systemic_Lupus_Erythematosus.pdf (381.92K)

Word count: 2289

Character count: 12033

PAPER · OPEN ACCESS

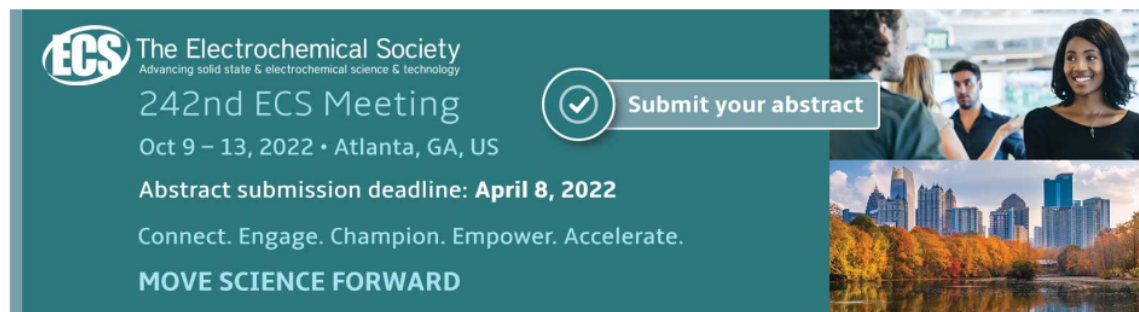
Seluang (*Rasbora agrottyenia*) Fish Oil Increases Vitamin D in Autoimmune Patients (Systemic Lupus Erythematosus)

To cite this article: Ester Gonzales Pensergera *et al* 2019 *J. Phys.: Conf. Ser.* **1246** 012036

View the [article online](#) for updates and enhancements.

You may also like

- 1 - [CCQM-K132: low-polarity analytes in a biological matrix: vitamin D metabolites in human serum](#)
Stephen A Wise, Susan S -C Tai, David L Dwyer et al.
- 5 - [Serum ferritin and vitamin D levels in premature hair graying of college student at the Universitas Sumatera Utara area](#)
D R Anggraini, L Feriyawati and Hidayat
- [Vitamin D and plain type: a study of male patients with schizophrenia](#)
N L Akbar, E Effendy and MM Amin





The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting
Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

MOVE SCIENCE FORWARD



Seluang (*Rasbora agrotynia*) Fish Oil Increases Vitamin D in Autoimmune Patients (Systemic Lupus Erythematosus)

Ester Gonzales Penserger¹, Radiyah Umi Partan², Rachmat Hidayat³, Nurwan Saputra⁴, Hari Pranto⁵, Febri Rahmayani⁶

¹ College of Medicine, University of the Philippines/Philippine General Hospital, Philippines

² Internal Medicine Department, Faculty of Medicine, Universitas Sriwijaya/Mohammad Hoesin General Hospital, Palembang, Indonesia

³ Biology Department, Faculty of Medicine, Universitas Sriwijaya, Palembang, Indonesia

E-mail : radiyati.u.p@fk.unsri.ac.id

Abstract. Systemic lupus erythematosus (SLE) is a chronic inflammatory autoimmune disease which usually affects multiple organ systems. Its patients are prone to hypovitaminosis D along with its complications such as osteoporosis. The improvement of vitamin D status in SLE patients is associated with better immune modulation, proinflammatory cytokine suppression, calcium absorption improvement, as well as better severity and lower osteoclastogenesis. This double-blind, randomized clinical trial was conducted in the Allergology-Immunology Polyclinic in the Internal Medicine Department of Mohammad Hoesin General Hospital, Palembang, Indonesia, over the period April 2017 – February 2018. Samples were given either seluang (*Rasbora agrotynia*) fish oil or placebo for 12 weeks. On the start and the end of the study, vitamin D levels were examined. 32 patients, all female, were divided evenly into the two groups. On the end of the study, the seluang oil group had significant vitamin D increase compared to placebo ($p = 0.000$). We concluded that the administration of seluang fish oil was able to increase vitamin D levels in SLE patients.

1. Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disease which causes chronic inflammation as well as damage to most organs and tissues [1]. Genetic and environmental factors contribute to the pathogenesis of this ailment. SLE affects approximately 30 – 50 out of every 10,000 people worldwide, with young women in productive ages being the most common victims. Females are 12x more likely to get SLE compared to men [2,3].

The initiation of autoimmune disorders, including SLE, is thought to arise from several factors, such as vitamin D deficiency [4]. Vitamin D has a crucial role in mineral metabolism, maintaining cardiovascular functions, and immune regulation. The prevalence of Vitamin D deficiency is relatively high, moreover, it could predict mortality from several chronic diseases, among which SLE. Consequently, vitamin D supplementation should be considered the first and foremost nutritional intervention in these patients. It is also recognised that vitamin D deficiency is not only a risk factor for developing autoimmune disorders (such as multiple sclerosis and type 1 DM), but also plays a role in worsening the created conditions, especially in SLE patients [5-7].

Generally, SLE patients will attempt to avoid direct sunlight exposure, unless they seek to develop photosensitive rashes. Most of the vitamin D in our body is synthesised on the skin after ultraviolet light exposure, but thanks to their sunlight avoidance, many SLE patients will not synthesise enough vitamin D [8]. Furthermore, dietary vitamin D sources are so rare that it is only found in fatty fishes. Salmon and mackerel, to name a few, are costly and thus inaccessible to the Indonesian public.



However, the seluang fish (*Rasbora agrottyenia*), which is abundant in the South Sumatran rivers, has been known to be beneficial for bone health. A recent study showed that the oil extracted from this particular fish contains an intensely high vitamin D content, with D3 levels of 4,086 IU/mL [9].

This study was aimed to investigate how the administration of seluang fish oil affect serum vitamin D levels, especially in SLE patients.

2. Methods

This double-blind randomised clinical trial was conducted in the Allergy and Immunology Polyclinic at the Internal Medicine Department of Mohammad Hoesin General Hospital Palembang, Indonesia, during the period April 2017 – February 2018. The samples were SLE patients who fulfilled the American College of Rheumatology (ARA) criteria. The 32 samples were divided into the treatment group and the placebo group, whose randomisation was performed by computerised means. Following that, the samples were given seluang fish oil or placebo for 12 weeks, as a nutritional supplement to the routine therapy. In the beginning and at the end of the study, each subject were assessed for the severity of their lupus and their serum vitamin D levels.

The inclusion criteria were SLE patients who were diagnosed according to the ARA criteria, from a diverse age range of 15 – 50. Samples were excluded if they meet at least one of the following: (1) Severe SLE, (2) SLE with chronic comorbid diseases that would affect bone degeneration i.e. thyroid diseases, diabetes mellitus, bone malignancy, (3) Severely osteoporotic SLE, and (4) A completed or on-going biphosphonate therapy. This study has been approved with an ethical clearance certificate from the Ethical Committee of the Mohammad Hoesin General Hospital-Universitas Sriwijaya Medical School.

The SLE severity was assessed using the MEX-SLEDAI score. A score of < 2 means a mild disease activity, 2 – 5 means a moderate disease activity, and > 5 means severe activity. In addition, haemoglobin, leukocyte count, platelet count, reticulocyte count, SGOT, SGPT, ureum, creatine, and vitamin D levels were assessed.

The data then were analysed using SPSS version 22.0 for Windows. We conducted a bivariate analysis using the T-test model with a significance threshold of $p < 0.05$.

3. Results

Table 1 shows the general characteristics of the subjects, which include: age, duration of disease, body mass indices, education, and occupation. Statistically, there were no significant differences between the two subject groups.

It is also evident that there were initially no differences in the serum levels of vitamin D in both groups before treatments were administered ($p = 0.474$). After being given seluang fish oil for 12 weeks, however, there was a significant difference between the two.

A Wilcoxon analysis of the vitamin D levels before vs. after the administration of seluang fish oil showed a significant change in the treatment (SFC group ($p = 0.000$)). On the other hand, using a paired T-test, there were no before-after differences in the placebo group ($p = 0.890$).

4. Discussion

Vitamin D has both preventive and curative properties on SLE. The former is regulated genetically and repairs the immune system by decreasing the production and regulation of NF-kB, thus inhibiting IFN- γ and thereby reducing IL-2; as well as inhibiting the proliferation of cell B and inflammatory cytokines. While the latter is possible through the modulation of the immune system, thereby stopping the inflammation. The activation of vitamin D, primarily by diet, is expected to fix the defects of Treg cells, and also controls the activation of T and B cells. These will lead to a significant drop in pro-inflammatory cytokines, namely: IFN, TNF- α , IL-1, and IL-17 [10, 11].

IL-17 and IL-6 have been implicated in the pathogenesis in SLE, thus making them decent biomarkers. High levels of IL-17 is associated with renal damage (lupus nephritis), which may manifest as proteinuria. It has been demonstrated that cells that produce IL-17 are more present in the circulation in SLE patients [12]. In another study, IL-6 is correlated with signs of active nephritis. Therefore, it should be used as the primary biomarker in active inflammation in SLE [13]. An elevated serum IL-6 in SLE patient can also be linked with anaemia of chronic disease [14].

Table 1. General characteristics of subjects.

Characteristic	Group		P value
	SFO	Placebo	
Age (years)			
• Mean ± SD	30.31 ± 9.32	26.75 ± 8.96	0.227 ^a
• Median (Min-Max)	28 (16-49)	23.5 (17-46)	
Duration of disease (months)			
• Mean ± SD	18.63±13.54	21.09±4.80	0.677 ^a
• Median (Min-Max)	18 (3-36)	16 (3-84)	
Body mass index (kg/m ²)			
• Rerata ± SD	22.44±2.99	22.59±4.35	0.917 ^b
• Median (Min-Max)	22.44 (17.31-28.76)	21.83 (16.83-29.9)	
BMI category (kg/m ²)			
• Underweight : <18,5	2 (12.5%)	3 (18.8%)	0.746 ^c
• Normal : 18,5-22,9	10 (62.5%)	7 (43.8%)	
• Overweight : 23-24,9	1 (6.2%)	1 (6.2%)	
• Obesity : >25	3 (18.8%)	5 (31.2%)	
Education, n(%)			
• Primary school	3 (18.8)	0 (0.0)	0.377 ^c
• Junior secondary school	0 (0.0)	1 (6.2)	
• Senior secondary school	8 (50.0)	10 (62.5)	
• Diploma	1 (6.2)	1 (6.2)	
• Bachelor	4 (25.0)	4 (2.5)	
Occupation			
• Housewife	8 (50.0)	7 (43.8)	0.248 ^c
• Civil servant	1 (6.2)	0 (0.0)	
• Honorary worker	3 (18.8)	2 (12.5)	
• Private company worker	0 (0.0)	4 (25.0)	
• Student (school/university)	4 (25.0)	3 (18.8)	
Serum Vitamin D (mmol/L)			
• Mean ± SD	44.81 ± 7.09	46.91 ± 9.16	0.474 ^b

^a Mann-Whitney test, p = 0,05; ^b Independent T Test, p = 0,05; ^c Chi Square, Pearson correlation, p = 0,05

Table 2. Vitamin D levels before and after seluang fish oil administration.

Group	Before	After	p-value
• SFO	44,81 ± 7,09	60,46 ± 8,25	0,000
• Placebo	46,91 ± 9,16	47,01 ± 9,17	0,890

This finding is consistent with the fact that SLE patients are prone to vitamin D deficiency. This condition could be caused by a variety of factors, one of them being the limited exposure to sunlight due to photosensitivity and the use of sun-block lotions. However, it should be noted that they are also experiencing chronic renal insufficiency, chronic inflammation, and most of them are regular users of steroid [15].

5. Conclusion

The administration of seluang fish oil was able to increase serum Vitamin D levels in SLE patients.

6. References

- [1] Yazdany J, Dall'era M. Definition and classification of lupus and lupus-related disorders. In : Wallace DJ, Hahn BH. *Dubois' Lupus Erythematosus and Related Syndromes*. 8th ed 2013 Philadelphia : Elsevier Saunders 1-6.
- [2] Horwitz DA. Regulatory T cells in systemic lupus erythematosus: past, present, future 2008 *Arthritis Research and Therapy* **10** 1-9.
- [3] Yap KS, Morand EF. Vitamin D and systemic lupus erythematosus: continued evolution 2015 *International Journal of Rheumatic Diseases* 242-9.

- [4] Petri M, Bello KJ, Fang H, Magder LS. Vitamin D in SLE: modest association with disease activity and urine protein/ creatinine ratio 2013 *Arthritis Rheum* 1865-71.
- [5] Terrier B, Derian N, Schoindre Y, Chacara W, Gerri G et al. Restoration of Regulatory and effector T cell balance and B cell homeostasis in systemic lupus erythematosus patients through vitamin D supplementation 2012 *Arthritis research and therapy* **14** R221.
- [6] Yap KS, Northcott M, Morand EF, Nikpour M. Association of low vitamin D with high disease activity in an Australian systemic lupus erythematosus cohort 2015 *Lupus Science and Medicine* 1-7.
- [7] Bultink, IEM. Osteoporosis and fracture in Systemic Lupus Erythematosus 2012 *Arthritis Care and Research* **64** 2-8.
- [8] Thudi, Amitha MBBS, Yin SU. Vitamin D levels and disease status in texas patients with systemic lupus erythematosus. 2008 *Am J Med Sci* **334(2)** 99-104.
- [9] Partan RU, Salim EM, Hidayat R. The Potential Role of Seluang Fish Oil (*Rasbora spp*) in Improving Calcium, Zinc, and Vitamin D3 Deficiencies 2017 *International Journal of Oceans and Oceanography* 285-91.
- [10] Bhattoa HP, Bettembuk P, Balogh A, Szegedi G, Kiss E. Bone Mineral Density in Women with SLE 2002 *Clin Rheumatol*.
- [11] Hassanlilou T, Khalili L, Ghavamzadeh S, Shokri A, Payahoo L. Role of Vitamin D Deficiency in Systemic Lupus Erythematosus Incidence and Aggravation 2018 *Autoimmunity Highlights* **9(1)**.
- [12] Abdel Galil SM, Ezzeldin N, El-Boshy ME. The role of serum IL-17 and IL-6 as biomarkers of disease activity and predictors of remission in patients with lupus nephritis 2015 *Cytokine* <http://dx.doi.org/10.1016/j.cyto.2015.05.007>.
- [13] Wang H-X, Chu S, Li J, et al. Increased IL-17 and IL-21 producing TCRabCD4_CD8_T cells in Chinese systemic lupus erythematosus patients 2014 *Lupus* **23** 643 – 654.
- [14] Talaat RM, Mohamed SF, Bassyouni IH, Raouf AA. Th1/Th2/Th17/Treg cytokine imbalance in systemic lupus erythematosus (SLE) patients: Correlation with disease activity 2015 *Cytokine* **72** 146 – 153.
- [15] Schoindre Y, Jallouli M, Tanguy ML, Ghillani P, Galicier L, Aumaitre O et al. Lower Vitamin D Levels are Associated with Higher SLE Activity, but not Predictive of Disease Flare-up 2014 *Lupus Science and Medicine*.

Seluang (*Rasbora agrottyenia*) Fish Oil Increases Vitamin D in Autoimmune Patients (Systemic Lupus Erythematosus)

ORIGINALITY REPORT

18%

SIMILARITY INDEX

13%

INTERNET SOURCES

12%

PUBLICATIONS

1%

STUDENT PAPERS

PRIMARY SOURCES

1	www.science.gov Internet Source	2%
2	siepub.unsri.dev Internet Source	2%
3	"The First China-Indonesia Joint International Symposium on Hepatobiliary Medicine and Surgery", <i>Hepatology International</i> , 2008 Publication	1%
4	www.frontiersin.org Internet Source	1%
5	ijtrichology.com Internet Source	1%
6	kjwhn.org Internet Source	1%
7	www.indonesianjournalofclinicalpathology.org Internet Source	1%
8	brief.land Internet Source	1%

9	coek.info Internet Source	1 %
10	norge.lundbeck.com Internet Source	1 %
11	www.hindawi.com Internet Source	1 %
12	Hyoun-Ah Kim, Jun-Mo Sung, Ja-Young Jeon, Jeong-Moon Yoon, Chang-Hee Suh. "Vitamin D may not be a good marker of disease activity in Korean patients with systemic lupus erythematosus", Rheumatology International, 2010 Publication	1 %
13	lupus.bmj.com Internet Source	1 %
14	Abdel Galil, Sahar M., Nillie Ezzeldin, and Mohamed E. El-Boshy. "The role of serum IL-17 and IL-6 as biomarkers of disease activity and predictors of remission in patients with lupus nephritis", Cytokine, 2015. Publication	<1 %
15	Mohammadreza Nakhjavani, Sima Abediazar, Amir Ghorbanihaghjo, Niloofar Esmaeili, Tala Poulak, Sepideh Zununi Vahed. "Serum tumor necrosis factor-like weak inducer of apoptosis (sTWEAK) and IL-17 levels are	<1 %

associated with disease activity in systemic lupus erythematosus patients with and without nephritis", Journal of Renal Injury Prevention, 2019

Publication

16

journals.sagepub.com

Internet Source

<1 %

17

ebin.pub

Internet Source

<1 %

18

jpmph.org

Internet Source

<1 %

19

www.la-press.com

Internet Source

<1 %

20

Chi Chiu Mok, Eric T. Bro, Ling Yin Ho, Ravinder J. Singh, Paul J. Jannetto. "Serum 25-hydroxyvitamin D3 levels and flares of systemic lupus erythematosus: a longitudinal cohort analysis", Clinical Rheumatology, 2018

Publication

<1 %

21

Samar Soliman, Chandra Mohan. "Lupus nephritis biomarkers", Clinical Immunology, 2017

Publication

<1 %

22

Samar abd Alhamed Tabra, Hend Hassan Abdelnabi, Nivine Fathi Mahmoud Darwish, Amal Mohammed El-Barbary et al. "Juvenile

<1 %

lupus and serum vitamin D levels: A cross-sectional study", Lupus, 2020

Publication

23

hdl.handle.net

Internet Source

<1 %

Exclude quotes Off

Exclude matches Off

Exclude bibliography On