

2019

ACADEMIC INTELLECTUAL
INTERNATIONAL INVENTION,
INNOVATION & DESIGN BOOK

Published by : Student Affairs Department,
Universiti Teknologi MARA Kedah,
P.O. Box 187, 08400 Merbok, Kedah, Malaysia.

Patron : Dr. Wan Irham Ishak
Dr. Abd Latif Abdul Rahman

Project Manager : Yazwani Mohd Yazid

Design Director : Mohd Hamidi Adha Mohd Amin
Fadila Mohd Yusof

Editorial Director : Mohd Hamidi Adha Mohd Amin
Mas Aida Abd Rahim

Copyright © 2019 Student Affairs Department, Universiti Teknologi MARA Kedah.

No part of this publication may be reproduced, stored in retrieval system, or transmitted in any form or by means, electronic, mechanical, photocopying, recording, or otherwise, without the prior permission of the publisher.

ISBN : 978-967-0314-71-6

Printed by : Perpustakaan Sultan Badlishah,
Universiti Teknologi MARA Kedah,
P.O Box 187, 08400 Merbok, Kedah, Malaysia.

55.	LinProT: AN INNOVATIVE COURSEWARE WITH INTEGRATION OF AUGMENTED REALITY FOR OPTIMIZATION METHODS	57
56.	HEALTHNAV@INFO: A PERSONAL MOBILE MAPPING HEALTHCARE SYSTEM FOR COMMUNITY ACCESSIBILITY SERVICES	58
57.	MyDISEASE@MAPPER: A FREE AND OPEN SOURCE PLATFORM FOR GEOSPATIAL DISEASE EPIDEMIOLOGY IN MALAYSIA	59
58.	THE DEVELOPMENT OF INTERACTIVE LEARNING METHODS THROUGH AUGMENTED REALITY IN ENGINEERING DRAWING	60
59.	HEALTHY LIFESTYLE WITH DIABETEA	61
60.	EDUCATIONAL ANDROID SIMULATOR OF RES-CIRCUIT QUIZ BOARD	62
61.	BELOVED TRACKER SYSTEM	63
62.	GAS LOAD MONITORING SYSTEM BASED ON IOT TECHNOLOGY	64
63.	MONOENGLISH	65
64.	HOMETUTORINK: A MOBILE APPLICATION FOR HOME-TUTORING SERVICES IN MALAYSIA	66
65.	UTILIZATION OF BEESWAX TRIGONA Sp. AS A BIOSOLAR ADDITION TO INCREASE SUPPLY OF RAW BIODIESEL FRIENDLY IN THE FUTURE	67
66.	ECO BIO-SPRAYER	68
67.	BELIMBING TUNJUK, A CHEMISTRY AND COOL IN JAR: NUTRITIOUS AND SATISFYING LOCAL FRUIT	69
68.	ECOSEGAR BIO-STRAW	70
69.	3 IN 1 BABY CUTIE DISPENSER (BCD)	71
70.	MOBILE ADJUSTABLE ROSTRUM	72
71.	FUN-EDU	73
72.	SMART CHAIR	74
73.	RAK PUSTAKA MINI	75
74.	EZHCHECKUP	76
75.	PHARMACY QR CODE	77
76.	EDU-BAR RULER	78
77.	ACCOUNTANTALIZING	79
78.	EZ-STOPPER	80
79.	FLAWASH	81
80.	IMPLEMENTING THE BOUTIQUE OF CHARITIES IN IMPROVING THE DISCIPLINE AND BASIC NEEDS OF STUDENTS AT PERAK MATRICULATION COLLEGE	82
81.	@LUNA: EFFECT OF MOON PHASE	83
82.	ORGANIC FERTILIZER	84
83.	MECHATRONIC SMART TRAINING KIT	85
84.	GREELA: GREEN PULSED ELECTRIC FIELD-ASISSTED EXTRACTION OF SPIRULINNA SP. CAROTENOID FOR ENRICHED-OLIVE OIL TO ACHIEVE SUSTAINABLE HIGH VITAMIN A OIL AVAILABILITY	86
85.	REVISITING THE INDIGENOUS FOLKLORES: AN EDUTAINMENT PROJECT	87
86.	SUSTAINABLE TABLE POT 1.0	88
87.	MAHIR JAWI (MAJA)	89
88.	CODETOPROTECT	90

INNOVATION

CATEGORY

GREELA: GREEN PULSED ELECTRIC FIELD-ASISSTED EXTRACTION OF *SPIRULINNA SP.* CAROTENOID FOR ENRICHED-OLIVE OIL TO ACHIEVE SUSTAINABLE HIGH VITAMIN A OIL AVAILABILITY

Annisa Aurora Kartika¹, Ulfatu Mahmuda¹

¹Brawijaya University, Malang, Indonesia,

annisaaurora.k@gmail.com

Vitamin A deficiency (KVA) is one of the nutritional problems in Indonesia which is often referred to as the problem of micronutrient or hidden hunger. One effort to overcome KVA is through daily non-food intake, such as supplements rich in carotenoids. Carotenoids as pro-vitamin A, are widely used in various sectors as nutraceutical, cosmetical, and supplements. According to WHO (2015), high carotenoid supplementation can be an alternative step to overcome KVA. On the other hand, one of the plants containing high carotenoids is *Spirulina sp.*, with several advantages including low cost of cultivation, fast growth, has a high enough protein content, and is easier to extract. In its cultivation, Malang Raya is one of the right locations for developing *Spirulina sp* micro algae. Where Malang Raya has a good supply of marine and freshwater waters. GREELA, comes as a solution to these two main problems. GREELA is a breakthrough innovation supplement that combines the advantages of *Spirulina sp.* Microalgae, produced with Electric Pulse technology Field-assisted as an extraction method and olive oil as a carotenoid solvent, with high carotenoids produced with environmentally friendly technology in order to create a good environment for human life in the present and future. In addition, the use of GREELA is more time-efficient and efficient. Where the use of making caroteoid extract takes 24 hours, now it only takes 60 seconds. GREELA has total carotenoids of 1802.25 µg / gr with high activity. Moreover, there is no solvent residue in the manufacturing process so that it is classified as environmentally friendly technology that is **feasible** to develop and commercialization.

Keywords: GREELA, supplement, *Spirulina sp.*, vitamin A deficiency,



UNIVERSITI
TEKNOLOGI
MARA

Cawangan Kedah
Kampus Sungai Petani



KEMENTERIAN
PENDIDIKAN
MALAYSIA



ISBN 978-967-0314-71-6



9 789670 314716