

POTENTIAL OF FENUGREEK SEED EXTRACT FOR HEALTH, THE ENVIRONMENT AND THE ECONOMY



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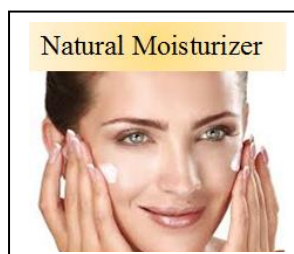
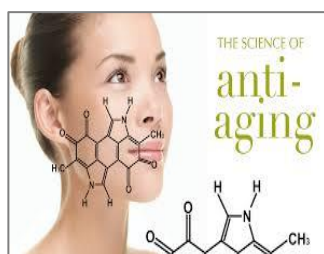


PRODUCT BACKGROUND

Bioactive compounds extracted from natural sources and plants have received potential interest in food, cosmetic and pharmaceutical industries. Recently, the use of synthetic antioxidants such as BHT and BHA are not very encouraged to be used in food, pharmaceutical and cosmetic products. Beside the application of synthetic surfactants at high volume in health-related products are prohibited by world health organization (WHO) due to their risks and side effects.

In this research, fenugreek seed has been used to produce a multifunctional bioactive extract containing saponin, phenolic and antioxidant compounds via microwave-assisted extraction technology. Fenugreek seed is a low price and abundantly found material with many health benefits. The extract characterized using LC-QTOF-MS, FTIR, SEM, and also determined the total saponin, total phenolic compounds inside the extract. Due to the high amount of saponin inside the extract, it has been tested for emulsification and wettability properties. In addition, the properties of saponin makes it a good biosurfactant for food, cosmetic, pharmaceutical, water and soil treatment industries. It has been reported that biosurfactant are efficiently used for removal of heavy metals from water and soil.

STATE OF THE ARTS



PATENT

PI 2013004106
PI 2015001044

USEFULLNESS

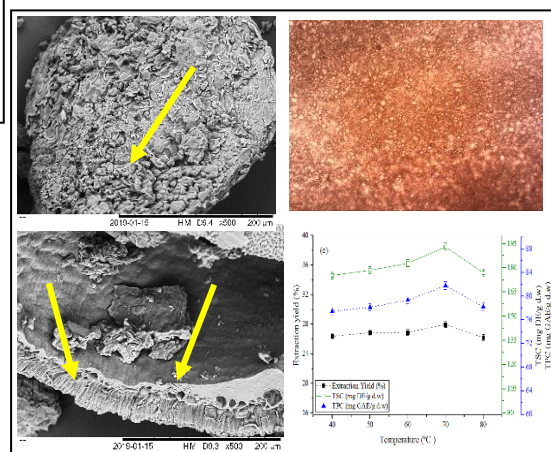
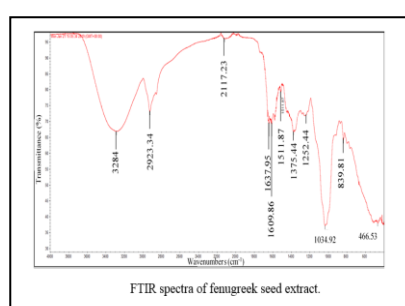
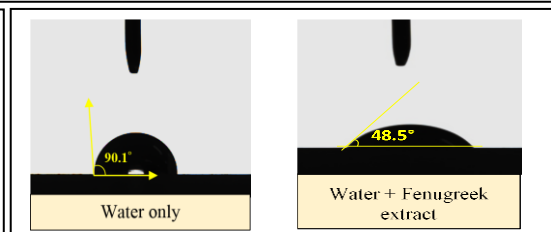
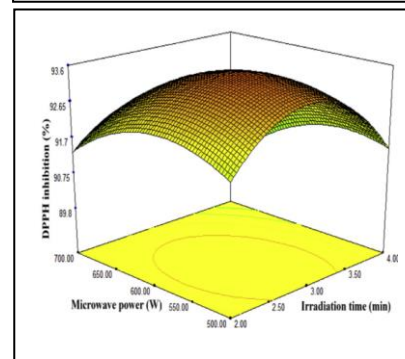
- ✚ Environmentally friendly
- ✚ Economically competitive
- ✚ Technically visible
- ✚ Can be used as co-emulsifier
- ✚ Reduces the consumption of commercial synthetic surfactants
- ✚ Useful for health, environment and economic purposes

ENVIRONMENTAL IMPACT

1. Fenugreek seed extract is a multifunctional extract contains many bioactive compounds without having any negative impact to the environment.
2. It can be used as in food, cosmetic and pharmaceutical products as natural ingredient due to containing phenols, saponins and antioxidants.
3. The saponin compound of the extract makes it a good co-emulsifier and natural preservative.
4. Biodegradable and able to **remove Heavy Metals from contaminated soil and water.**
5. **Zero waste**

PRODUCT CHARACTERISTICS & PRICES

Fenugreek extract Vs Tween 80			
Fenugreek (F.G)		Tween 80 (T80)	
1 Kg F.G seed	RM 5.5	1 Kg T80	RM 80
Yield	27%	-	-
Yield from 1 kg seed	270 g	-	-
100g extract	RM 2.03	100g T80	RM 8
Extract solution and consumption	20g/L (2%)	solution and consumption	(≤1%)
Saving compared to T80	50%	Can be used only as emulsifier	Not safe at > 1%



Heavy Metal Removal Efficiency		
	Before treatment %	After treatment %
Chromium (Cr)	0.1	0.02
Cadmium (Cd)	0.2	0
Barium (Ba)	0.6	0
Mercury (Hg)	1.0	0.6
Lead (Pb)	0.3	0.1

PUBLICATIONS

- 2020: Determination of phenolics and saponins in fenugreek seed extracted via microwave-assisted extraction method at the optimal condition. Sweeta Akbari, Nour Hamid Abdurahman, Rosli Mohd Yunus, IOP Conference series: Material Sciences and Engineering. (Scopus).
- 2019: Optimization of saponins and antioxidants extracted from fenugreek seed using microwave-assisted extraction and response surface methodology as optimizing tool. Sweeta Akbari, NH Abdurahman, Rusli Mohd Yunus *Journal of Comptes Rendus Chimie (Elsevier, Q2, ISI, IF = 2.366).*
- 2019: Microwave-assisted extraction of saponin, phenolic and flavonoid compounds from Trigonella-foenum-graecum seed using two level factorial design. Sweeta Akbari, NH Abdurahman, Rusli Mohd Yunus *Journal of Applied Research on Medicinal and Aromatic Plants (Elsevier, Q2, IF=1.966, Scopus).*
- 2018: Extraction, characterization and antioxidant activity of fenugreek (Trigonella-Foenum Graecum) seed oil. Sweeta Akbari, NH Abdurahman, Rusli Mohd Yunus *Materials Science for Energy Technologies (Elsevier)*
- 2018: Biosurfactants - A new frontier for social and environmental safety: A mini review. Sweeta Akbari, Abdurahman Hamid Nour, Rusli Mohd Yunus Fahim Fayaz. *Journal of Biotechnology Research & Innovation (Elsevier).*
- 2018: Biosurfactants as promising multifunctional agent: A mini review. Sweeta Akbari, Abdurahman Hamid Nour, Rusli Mohd Yunus. *International Journal of Innovative Research and Scientific Studies.*

TARGET CUSTOMERS

- ✚ Food industries
- ✚ Cosmetic companies
- ✚ Pharmaceutical industries
- ✚ Wastewater and contaminated soil industries
- ✚ Individuals

THERAPEUTIC USES

