

# Toxicity of Fucoxanthin on Balb/c Mice Splenocytes and Thymocytes

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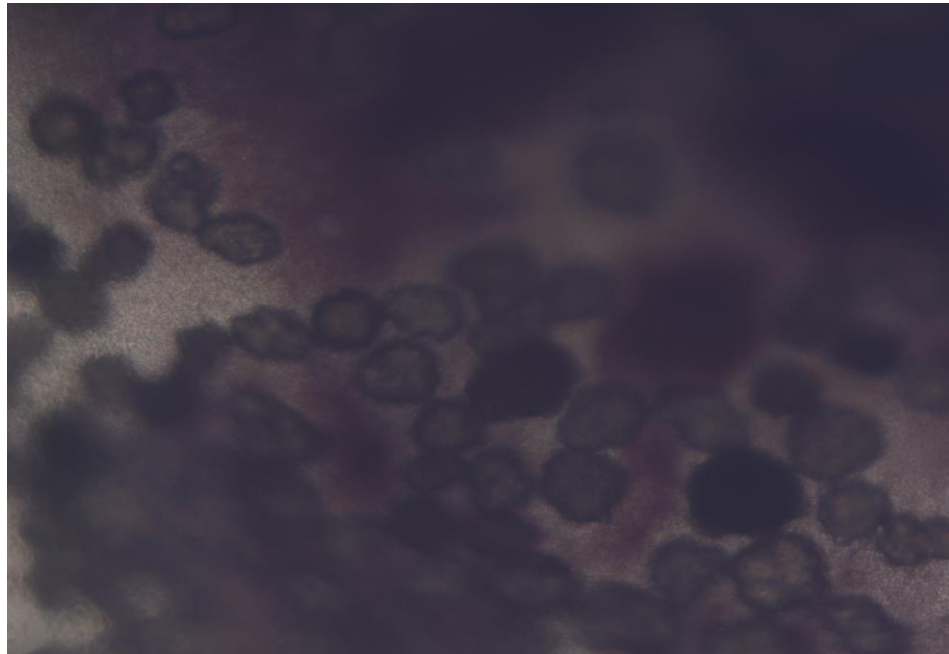
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Fucoxanthin (Fx) is a naturally marine carotenoid in chloroplasts of brown seaweeds (brown algae) and diatoms possess various health benefits, such as antioxidant and anticancer properties, anti-obesity, and anti-diabetic activities.

Fucoxanthin (Fx) was extracted from *Cylindrotheca closterium* (EhrenbERG) using a series of steps. Briefly, fucoxanthin isolation with ethanol, then concentrated, and purified by precipitation, and dried.

Modification of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>/PDMS composition was carried out by immobilizing the Fx in the aqueous phase (Fx@Al/PDMS) by physical adsorption, then the obtained matrices was subjected to drying and short-term low-temperature heat treatment up to 120 °C, the obtained matrices were loose powder materials.

Splenocyte and thymocytes were extracted from Balb/c male mice, then crushed by homogenization, and twice washed in phosphate-buffer saline, and transplanted in RPMI-1640 (Biolot, Russia) medium with the addition of 80 µg/mL of gentamicin, 2 mmol L-glutamine, 5 mmol HEPES-buffer and 10% FCS at a concentration 10<sup>6</sup> cells/mL.



Microphotograph of modified porous material based on  $\gamma$ -AL<sub>2</sub>O<sub>3</sub> and polydimethylsiloxane by fucoxanthin in splenocytes suspension (x10).

EFFECT OF FUCOXANTHIN ALONE OR IN COMBINATION WITH POROUS MATERIAL BASE ON  $\gamma$ -AL<sub>2</sub>O<sub>3</sub> ON LYMPHOCYTES PROPERTIES IN VITRO (M  $\pm$  SD)

Splenocytes (24 h)				
Basal	100	1.37 $\pm$ 0.23	NA	8.39 $\pm$ 0.6
96% Ethanol	92 $\pm$ 20	1.26 $\pm$ 0.28	NA	7.87 $\pm$ 0.53
Fx (ethanol extract)	110 $\pm$ 24	1.5 $\pm$ 0.33	NA	10.64 $\pm$ 0.66*
Al/PDMS	120 $\pm$ 30	1.64 $\pm$ 0.41	NA	10.57 $\pm$ 1.06 *
Fx@Al/PDMS	130 $\pm$ 24*	1.79 $\pm$ 0.33*	NA	9.36 $\pm$ 1.03
Splenocytes (120 h)				
Basal	100	0.9 $\pm$ 0.19	1.51 $\pm$ 0.31	6.97 $\pm$ 0.79
96% Ethanol	75 $\pm$ 10 *	0.68 $\pm$ 0.09 *	1.71 $\pm$ 0.34	7.69 $\pm$ 1.04
Fx (ethanol extract)	78 $\pm$ 15 *	0.7 $\pm$ 0.13 *	1.62 $\pm$ 0.31	9.41 $\pm$ 0.78*
Al/PDMS	116 $\pm$ 33	1.05 $\pm$ 0.29	1.58 $\pm$ 0.36	8.58 $\pm$ 0.74*
Fx@Al/PDMS	89 $\pm$ 11	0.81 $\pm$ 0.1	1.7 $\pm$ 0.33	8.46 $\pm$ 0.74*
Thymocytes (24 h)				
Basal	100	0.69 $\pm$ 0.21	NA	8.62 $\pm$ 0.59
96% Ethanol	67 $\pm$ 12 *	0.46 $\pm$ 0.08 *	NA	7.72 $\pm$ 0.75*
Fx (ethanol extract)	94 $\pm$ 40	0.65 $\pm$ 0.27	NA	12.1 $\pm$ 0.53*
Al/PDMS	98 $\pm$ 25	0.68 $\pm$ 0.17	NA	10.17 $\pm$ 1.01 *
Fx@Al/PDMS	115 $\pm$ 48	0.8 $\pm$ 0.33	NA	9.24 $\pm$ 1.07
Thymocytes (120 h)				
Basal	100	0.55 $\pm$ 0.07	1.07 $\pm$ 0.11	6.95 $\pm$ 0.92
96% Ethanol	119 $\pm$ 22	0.66 $\pm$ 0.12	1.11 $\pm$ 0.03	6.75 $\pm$ 1.0
Fx (ethanol extract)	109 $\pm$ 32	0.6 $\pm$ 0.17	0.96 $\pm$ 0.08	9.28 $\pm$ 0.78*
Al/PDMS	116 $\pm$ 24	0.64 $\pm$ 0.13	1.18 $\pm$ 0.11	8.21 $\pm$ 0.68*
Fx@Al/PDMS	153 $\pm$ 48 *	0.84 $\pm$ 0.32*	1.15 $\pm$ 0.13	8.83 $\pm$ 0.9*

Note. MPO, myeloperoxidase activity; NO, nitric oxide; Fx, ethanol extract of fucoxanthin; Al/PDMS, porous aluminum oxide with polydimethylsiloxane particles; Fx@Al/PDMS, fucoxanthin immobilized on porous aluminum oxide with polydimethylsiloxane particles; NA, not analyzed; \*p<0.05 compared with control.