

Alginate/lignin: Antioxidant Activities, Anticancer Activity, Physico-chemistry Characteristics, and Acute Toxicity

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Abstract: Alginate/lignin is a synthetic polymer rich in the biological activity of great interest. Alginate is extracted from seaweed and lignin is extracted from corn stalks and leaves. Antioxidant activities of alginate/lignin were evaluated such as total antioxidant activity, reducing power activity, DPPH free radical scavenging activity, and α – glucosidase inhibition activity. Anticancer activity was evaluated on four cell lines (Hep G2, fibroblast, MCF-7, and NCI H460). Physicochemistry characteristics of alginate/lignin were determined through FTIR, DSC, SEM_EDS, SEM_EDS mapping, XRD, XRF, and ¹H-NMR. Acute toxicity of alginate/lignin was studied on *Swiss albino* mice. The results showed alginate/lignin possessed antioxidant activity such as total antioxidant activity, reducing power activity, especially, α – glucosidase inhibition activity, and no free radical scavenging activity. Alginate/lignin did not be typical in cancer cell lines. Alginate/lignin existed in a thermally stable regular spherical shape in the investigated thermal region. Some specific functional groups of alginate and lignin did not exist in alginate/lignin crystal. Elements such as C, O, Na, and S were popular in the alginate/lignin structure. LD₀ and LD₁₀₀ of alginate/lignin in mice were 3.91 g/kg and 9.77 g/kg, respectively. Alginate/lignin is the potential for application as pharmaceutical materials, functional foods, and supporting diabetes treatment.

Keywords: antioxidant; anticancer; glucosidase, physic-chemistry characteristics, acute toxicity

Table S1. Mass and atom of elements in alginate/lignin on SEM_EDS mapping.

Display name		Standard data	Quantification method	Result Type
Map_007_wholespectrum		Standardless	ZAF	Metal

Element	Line	Mass%	Atom%
C	K	22.16±0.08	31.20±0.11
O	K	41.55±0.13	43.91±0.13
Na	K	27.62±0.12	20.32±0.09
S	K	8.66±0.08	4.57±0.04
Total		100.00	100.00
Map_007_wholespectrum		Fitting ratio 0.0210	