



Review

Protective effects of green tea and its main constituents against natural and chemical toxins: A comprehensive review

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ABSTRACT

Toxins are natural or chemical poisonous substances with severe side effects on health. Humans are generally exposed by widespread toxic contaminations via air, soil, water, food, fruits and vegetables. Determining a critical antidote agent with extensive effects on different toxins is an ultimate goal for all toxicologists. Traditional medicine is currently perceived as a safe and natural approach against toxins. In this regard, we focused on the protective effects of green tea (*Camellia sinensis*) and its main components such as catechin, epicatechin, epicatechin gallate, gallic acid, epigallocatechin and epigallocatechin gallate as a principal source of antioxidants against both natural and chemical toxins. This literature review demonstrates that protective effects of green tea and its constituents were mainly attributed to their anti-oxidative, radical scavenging, chelating, anti-apoptotic properties and modulating inflammatory responses. Although, some studies reveal they have protective effects by increasing toxin metabolism and neutralizing PLA₂, proteases, hyaluronidase and L-amino acid oxidase enzymes.

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Abbreviations

A β	amyloid β	i.p.	intraperitoneal
AFB	aflatoxin B ₁	ISO	isoproterenol
AFB-NAC	aflatoxin B ₁ -mercapturic acid	i.v.	intravenous
AFM ₁	aflatoxin M ₁	LDH	lactate dehydrogenase
Al	aluminum	LLC-PK1	pig kidney cell line
ALP	alkaline phosphatase	L-NAME	L-N ^G -Nitroarginine methyl ester
ALT	alanine aminotransferase	LPS	lipopolysaccharide
APAP	acetaminophen (N-acetyl- <i>p</i> -aminophenol)	67LR	67-kDa laminin receptor
AST	aspartate aminotransferase	MAPKs	mitogen-activated protein kinases
AZA	azathioprine	MC-LR	microcystin-LR
B.I.D	twice daily	MDA	malondialdehyde
C	catechin	MPP	1-methyl-4-phenylpyridinium
CAT	catalase	mPT	methyl parathion
Cd ²⁺	cadmium	MPTP	<i>n</i> -methyl-4-phenyl-1,2,3,6-tetrahydropyridine
CHL	chinese hamster lung cells	nAChR	nicotinic acetylcholine receptors
CNPs	copper nanoparticles	NF- κ B	nuclear factor- κ B
COX-2	cyclooxygenase-2	NMDA receptor	<i>n</i> -methyl-D-aspartate receptor
DDT	dichlorodiphenyltrichloroethane	nNOS	neuronal Nitric oxide synthase
D-GalN	D-Galactosamine	NOS	nitric oxide synthase
DON	deoxynivalenol	2-NP	2-nitropropane
Dox	doxorubicin	3-NPA	3-nitropropionic acid
EC	epicatechin	4-NQO	4-nitroquinoline1-oxide
ECG	epicatechin gallate	6-OHDA	6-hydroxydopamine
EGC	epigallocatechin	OTA	ochratoxin A
EGCG	epigallocatechin gallate	PAT	patulin
ERK1/2	extracellular signal-regulated protein kinases 1 and 2	Pb	lead
ET-1	endothelin-1	PGE2	prostaglandin E2
F	fluoride	PI3K	phosphoinositide 3-kinase
FDA	food and drug administration	PKC	protein kinase C
GC	galocatechin	PLA2s	phospholipases A2
GCG	galocatechin gallate	PQ	paraquat
GPx	glutathione peroxidase	ROS	reactive oxygen species
GS	glutathione	s.c.	subcutaneous
GT	green tea	SOD	superoxide dismutase
GTP	green tea polyphenols	TBARS	thiobarbituric acid reactive substances
HgCl ₂	Mercury(II) chloride	Tlr4	toll-like receptor 4
		WHO	world health organization

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