

1 **Supp Table 1.** The health benefit of liquid smoke from other biomass for human and health

Raw Material	Marker	Result	References
Liquid smoke cocoa pods	Toxicity	Liquid smoke cocoa pods possessed non-toxic	[1]
Liquid smoke Tian Op	Hematological changes Organ weight Chemistry value	Liquid smoke not affected on body weight, hematological parameters, organ weight	[2]
Liquid smoke apple, hickory, mesquite, pecan, oak	Cytotoxicity	No toxicity result	[3]
	Oxidative stress	Increased the Nrf2 expression	
	Genotoxicity	No genotoxicity activity	
	AhR activity	Decreased the AhR activity	
	Estrogenicity	No esterogenicity activity	
Liquid smoke palm kernel	<i>Streptococcus mutants</i>	Liquid smoke possesses good antimicrobial properties against <i>Streptococcus mutants</i>	[4]
Liquid smoke hickory	Cellular protein	The exposure liquid smoke from hickory and mesquite able to induce oxidative stress and affected on skin protection function	[5]
Commercial liquid smoke	Human taste receptors	A component of liquid smoke, EMP, able to interact with human taste receptor especially TA2R1 through hydrogen bonds with residue Arg55, and EMP formed hydrophobic interactions with the residues Leu48, Leu51, Ala96, Leu99, Gly100, and Leu277.	[6]
Commercial liquid smoke	Chromosome aberration	The liquid smoke did not increase the frequency of chromosome aberrations	[7]
Commercial liquid smoke	Ulceration on digestive tract	Liquid smoke does not cause adverse effects such as inflammation or ulceration of the digestive tract, even though the basic nature of this liquid smoke is acid	[8]

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4 **Supp Table 2.** The health benefits of liquid smoke from rice hull for human and health

Classes	Marker	Result	References
Toxicity	Rat insulinoma β -cell line INS-1	Liquid smoke showed highest cell viability	[9,10]
Toxicity	RBL-2H3 and RAW264.7	The highest viability of osteoblast was analyses liquid smoke concentration 1%	[10]
Toxicity	BHK-21	The highest viability of osteoblast was analysed liquid smoke concentration 10%	[11]
Toxicity	Osteoblast	Liquid smoke maintained the viability of osteoblast	[12,13]
Toxicity	Animal models	The toxicity dose of liquid smoke >15000mg/kg body weight and no toxicity symptoms in animals	[14]
Antioxidant	Antioxidant	Liquid smoke exhibited strong anti-oxidative properties	[10]
Anti-bacteria	<i>Porphyromonas gingivalis</i>	Inhibit the growth of <i>Porphyromonas gingivalis</i>	[13,15]
Anti-virus	Covid-19 inhibitor	The 6-octadenocanic acid and oleic acid showed ability as COVID-19 inhibitor	[16]
Anti- inflammation	Oxidative stress	Liquid smoke suppressed the intracellular peroxide level	[9,10]
Anti- inflammation	NO production	Liquid smoke decreased the NO production	[9,10]
Anti- inflammation	iNOS gene and protein	Liquid smoke modulated the iNOS gene expression and protein	[9,10]
Anti- inflammation	TNF- α , IL-1 β , IL-6 and β -actin gene expression	Liquid smoke suppressed IL-1 β , IL-6, and TNF- α genes	[9,10]
Anti- inflammation	5-LOX, COX-2, ICAM expression	Liquid smoke modulated these protein expression	[10]
Anti- inflammation	Myeloperoxidase	Liquid smoke reduced myeloperoxidase activity	[10]
Anti- inflammation	β -Hexosaminidase	Liquid smoke inhibited the release of β -hexosaminidase	[10]
Anti- inflammation	TNF- α , IL-1 β , and IL-6 level	Liquid smoke reduced TNF- α , IL-1 β , and IL-6 level	[10]
Anti- inflammation	PGE2 and LTB4 level	Liquid smoke reduced PGE2 and LTB4 level	[10]
Anti-inflammation	Ear thickness	Liquid smoke reduced ear thickness	[10]
Anti-diabetic	Liver tissue	Liquid smoke ameliorated liver damage and decreased tissue weight	[9,17]
Anti-diabetic	Langerhans islet of pancreas	Liquid smoke restored the size and damage Langerhans islet	[9,17]
Anti-diabetic	GOT and GTP	Liquid smoke decreased the level of GOT and GTP	[9,17]

Classes	Marker	Result	References
Anti-diabetic	C6, PEPCK and GCK gene expression	Liquid smoke suppressed these gene expression and protein	[9,17]
Anti-diabetic	GLUT2 and PPAR- γ	Liquid smoke increased the mRNA expression in hepatic and adipose	[17]
Anti-diabetic	TNF- α , IL-1 β and IL-6 level	Liquid smoke decreased these cytokines serum and adipose tissue	[17]
Anti-diabetic	Insulin release	Liquid smoke increased insulin level	[9]
Anti-diabetic	Serum insulin	Liquid smoke increased serum insulin level	[9,17]
Anti-diabetic	Blood glucose	Liquid smoke decreased blood glucose level	[9,17]
Anti-diabetic	Glycogen	Liquid smoke restored glycogen content	[9]
Anti-diabetic	Oral glucose tolerance	Liquid smoke decreased oral glucose loading	[17]
Anti-diabetic	Body weight	Liquid smoke suppressed body and liver weight	[17]
Anti-diabetic	Serum lipid	Liquid smoke decreased serum triglycerides	[17]
Anti-diabetic	White adipose tissue weight	Liquid smoke reduced amount of white adipose tissue	[17]
Periodontitis	NF-kB, TNF- α and IL-6 expression	Topical administration of liquid smoke decreased NFkB expression	[18]
Periodontitis	TGF- β expression	Topical administration of liquid smoke decreased TGF- β expression	[18]
Periodontitis	FGF2 and COL-1expression	Topical administration of liquid smoke increased FGF2 and COL-1 expression	[18]
Periodontitis	IL-1 β and Nrf2 expression	Topical administration of liquid smoke increased IL-1 β and Nrf2 expression	[19]
Ulcer healing	Macrophages, lymphocytes and fibroblast	Topical administration of liquid smoke increased number of these cells	[20]
Ulcer healing	IL-6 and TGF- β expression	Topical administration of liquid smoke increased IL-6 and TGF- β expression	[20]
Ulcer healing	FGF-2, VEGF, COL-1 and PDGF expression	Topical administration of liquid smoke increased FGF-2, VEGF, COL-1 and PDGF expression	[21]

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7 **Supp Table 3.** The health benefits of liquid smoke from coconut shell for human and health

Classes	Marker	Result	References
Toxicity	BHK21	Liquid smoke maintained the viability of BHK-21	[22]
Anti-bacteria	Wound healing <i>Streptococcus aureus</i>	- increased healing - inhibit <i>Streptococcus aureus</i>	[23]
Anti-inflammation	Anti-inflammation	Provide anti-inflammation properties	[22]
Anti-nociceptive	Analgesic properties	Provide anti nociceptive properties	[22,24]
Wound healing	Wound contraction and fibroblast	Promotes burn wound healing by increasing the number of fibroblasts and wound contraction	[25]
Ulcer healing	Ulcer diameter	Topical administration of liquid smoke decreased the oral ulcer diameter	[26]
Ulcer healing	NF-kB expression	Topical administration of liquid smoke decreased NF-kB expression	[27,28]
Ulcer healing	Nrf2 expression	Topical administration of liquid smoke increased Nrf2 expression	[29]
Ulcer healing	IL-6 and IL-1 β expression	Topical administration of liquid smoke decreased TNF- α , IL-6 and IL-1 β expression	[29]
Ulcer healing	TNF- α expression	Topical administration of liquid smoke decreased TNF- α , IL-6 and IL-1 β expression	[28,29]
Ulcer healing	FGF-2 and VEGF expression	Topical administration of liquid smoke increased FGF-2 and VEGF expression	[30]
Ulcer healing	Neutrophils	Topical administration of liquid smoke decreased number of neutrophils	[31]
Ulcer healing	Macrophages	Topical administration of liquid smoke increased macrophages number	[28,29]
Ulcer healing	Lymphocytes	Topical administration of liquid smoke increased these cells	[31]
Ulcer healing	Fibroblast	Topical administration of liquid smoke increased number of fibroblasts	[30,31]
Ulcer healing	Collagen	Topical administration of liquid smoke increased the number of collagens	[32]