

# Development of functional Compounded Papers Using Wasted Tea Leaves

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With the health boom, demand is growing for tea drinks in PET bottles. On the other hand, large amounts of wasted tea leaves, an industrial waste, are produced. They need to be effectively utilized. Catechins contained in wasted tea leaves are a useful substance that possesses various functions. An attempt was made for the development of papers containing wasted tea leaves as an effective utilization method for wasted tea leaves. As a result, papers containing wasted tea leaves were found to show good antibacterial properties only to harmful bacteria and good deodorant properties to ammonia gas and the like. Papers containing wasted tea leaves seem to have various applications, such as paper diaper and wall paper.

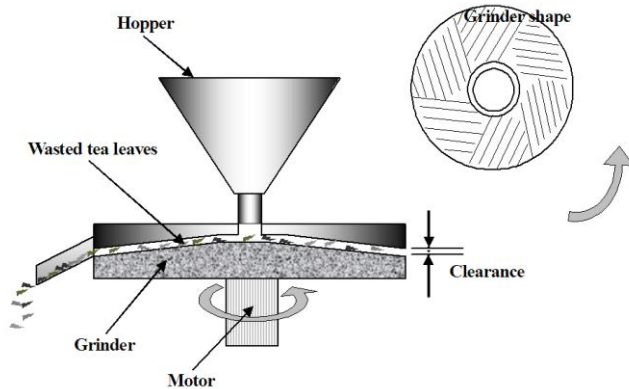


Fig. The schematic representation of *Mass-Colloider* (Stone mill type crusher)

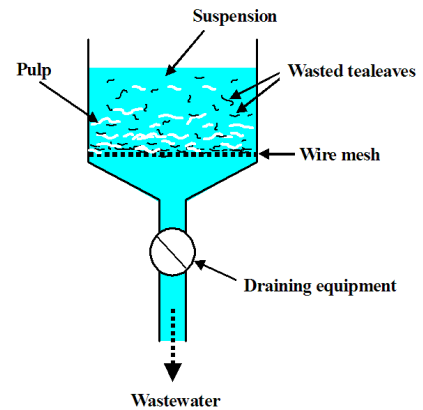


Fig. The schematic representation of the paper machine

Table Papers containing wasted tea leaves for different kinds of tea

	Green tea	Oolong tea	Black tea	Hoji-Cha	Pu-Erh tea
0 wt%					
20 wt%					
40 wt%					
60 wt%					

(Size of samples: 4×5cm)



Fig. Procedure of papermaking

Table The antibacterial properties of Papers containing wasted tea leaves for *Staphylococcus aureus*

Sample	Kinds of tea	Wasted tea leaves content (wt%)	Incubation time (Hr.)	Antibacterial properties			
				Viable bacteria (CFU/ml)	Bacteriostatic activity	Bactericidal activity	
Initial	—	—	0	$1.0 \times 10^5$	—	—	
Papers containing wasted tea leaves	Green tea	20	18	$1.39 \times 10^7$	1.08	-2.14	
		60	18	$5.36 \times 10^6$	1.49	-1.73	
	Oolong tea	20	18	$1.60 \times 10^4$	5.97	0.8	
		60	18	ND*	—	—	
	Black tea	20	18	ND	—	—	
		60	18	ND	—	—	
	Hoji-cha	20	18	ND	—	—	
		60	18	ND	—	—	
	Pu-Erh tea	20	18	ND	—	—	
		60	18	ND	—	—	
	Ref.) Pulp paper	—	0	18	$1.64 \times 10^8$	—	—

\* Not detected (<440)

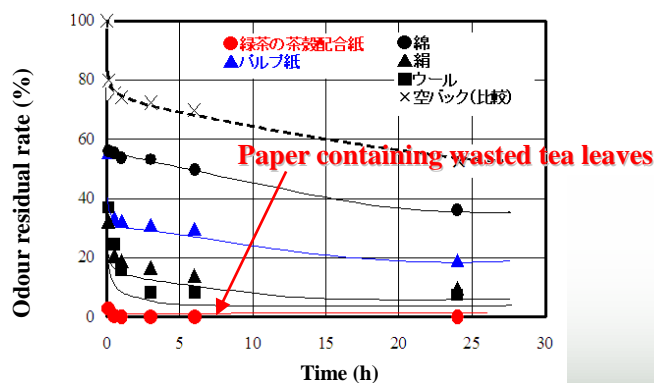


Fig. Time dependence of odour residual rate on Ammonia gas (Initial concentration:  $60 \pm 2$ ppm)