

A study of adsorption and absorption of ammonia by moss

Miyazaki Ohmiya High School Third Grade

Abstract

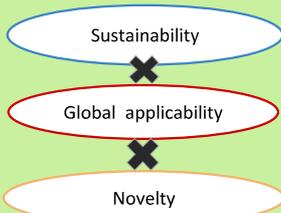
This study focuses on the deodorizing potential of moss which has the ability to reduce unpleasant odors. Unpleasant odors can lead to physical stress in various environments. At our school, the foul smell caused by ammonia in toilets has become a serious issue. Two hypotheses were tested; surface adsorption and inner absorption of ammonia by moss. Experiments confirmed both hypotheses, suggesting moss can reduce unpleasant odors in toilets effectively. These results highlighting moss's application in sustainable odor free toilets align with SDGs six "CLEAN AND SANITATION" and ten "REDUCED INEQUALITIES" and 11 "SUSTAINABLE CITIES AND COMMUNICATION".

1 Background and purpose

Background

Unpleasant odors in the Miyazaki Ohmiya H.S. toilets

Can moss improve the odors?



Purpose

Clarify the mechanism by which moss removes NH₃

Significance



Proof of Concept

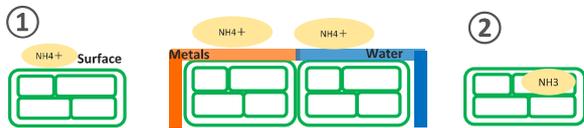
- 1 Untreated
- 2 Squeezed
- 3 Mixed
- 4 Crushed

Compare

Untreated was most effective

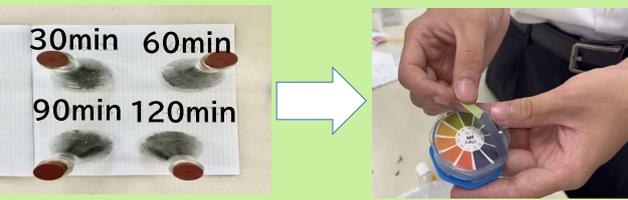
Hypothesis

- ① Surface Adsorption
- ② Internal Absorption



2 Experiment 1

Object: To test the adsorption hypothesis by monitoring changes in pH over time.

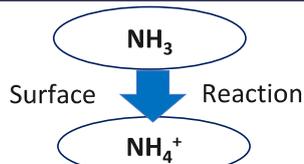


Result 1

Interpretation 1

Time	pH
0	7.0
30	9.5
60	8.0
90	10.0
120	11.0

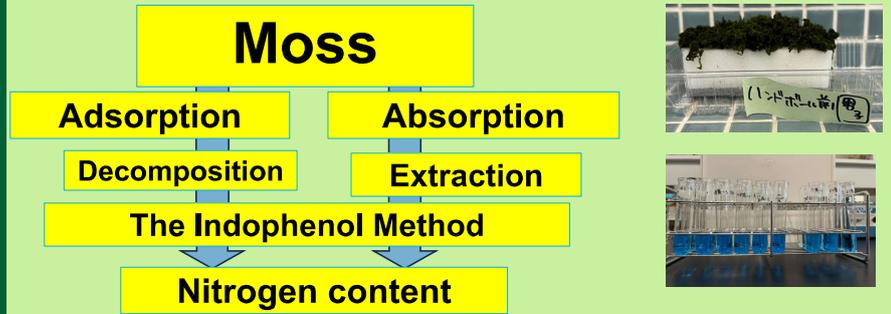
Increase gradually



3 Experiment 2 (in toilets)

Point of view to evaluate

States	Natural	Placed in the toilet
Ex.		
adsorption	A	B
absorption	C	D



Result 2

Interpretation 2

Change in the amount of adsorbed nitrogen

A	ave	SD	B	ave	SD
			Samples' name	ppm	
			Library A	1.4	0.0
			Library B	39.1	0.6
			Science building A	1.8	0.0
			Science building B	2.0	0.0
			Playground A	1.0	0.0
			Playground B	2.6	0.1
Natural moss	0.0399	0.0299			

x 2.7

Change in the amount of absorbed nitrogen

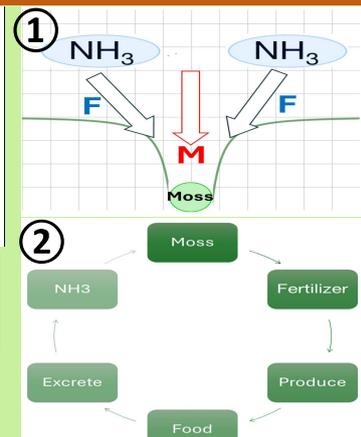
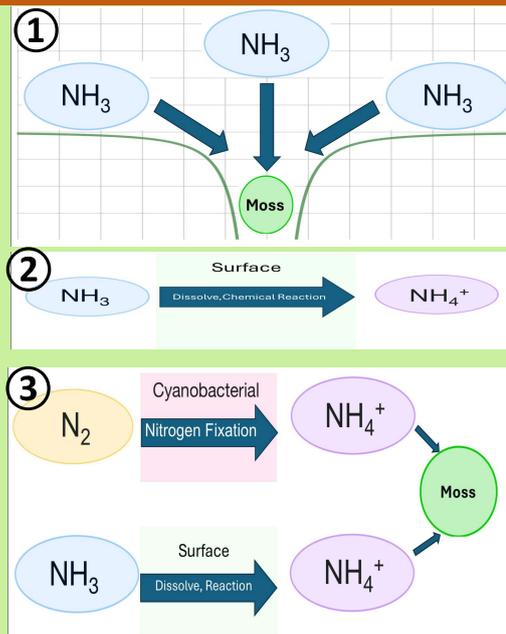
C	ave	SD	D	ave	SD
			Samples' name	mg/gDW	
			Library A	24.5	1.5
			Library B	22.7	0.8
			Science building A	23.0	1.5
			Science building B	24.4	1.5
			Playground A	22.6	2.0
			Playground B	25.8	1.1
Natural moss	9.3	0.1			

x 44

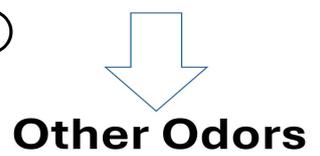


4 Conclusion

Future perspective



Moss Power



5 Acknowledgement • Citation

acknowledges We would like to express our science appreciation to Dr. Yamamoto Yoshiyoshi of the faculty agriculture, University of Miyazaki as well as to all those who assisted us in our research. Thanks (References)
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