

**POTENTIAL APPLICATION OF VETIVER  
PHYTOREMEDIATION TECHNOLOGY TO ALLEVIATE  
HIGH NUTRIENT DISCHARGES FROM NEW ZEALAND  
DAIRY FARMS**

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## **INTRODUCTION**

**Tourism is New Zealand's primary industry, which benefits greatly from the country's picturesque landscape and pleasant year-round climate.**

**However, in recent years, DAIRY has emerged as the leading contributor to this industry.**

## **THE PROBLEM**

**DAIRY farming is a highly intensive practice that generates large quantities and high levels of the environmental pollutants nitrogen and phosphorus.**

**Without regulation and control, the tourism and dairy industries will suffer from this pollution.**

**Government data suggests that 60 % of rivers and lakes in New Zealand are unsuitable for swimming as a result of dairy farming.**

**Cattle urine, which is high in Nitrogen and can promote the growth of toxic algae when it leaches into the water, is the primary cause for concern..**

**In Canterbury, one of the most polluted regions, expectant mothers are advised to test their tap water for nitrates to prevent "blue baby syndrome," a potentially fatal condition believed to be caused by nitrates. Cow dung, which contains pathogenic bacteria such as *E. coli* and *Campylobacter*, poses an even greater threat to human health.**

## **THE SOLUTION**

**Common sources of farm wastewater, such as runoff from manure piles, milking salons, and other sources should be used to irrigate Vetiver pasture to feed the dairy cows as in Australia.**

**The followings are nutritional values of Vetiver plant at different ages**

# Nutritional values of Vetiver, Rhodes and Kikuyu grasses grown Queensland, Australia

Analytes	Units	Vetiver grass			Rhodes	Kikuyu
		Young	Mature	Old	Mature	Mature
Energy (Ruminant)	kCal/kg	522	706	969	563	391
Digestibility	%	51	50	-	44	47
Protein	%	13.1	7.93	6.66	9.89	17.9
Fat	%	3.05	1.30	1.40	1.11	2.56
Calcium	%	0.33	0.24	0.31	0.35	0.33
Magnesium	%	0.19	0.13	0.16	0.13	0.19
Sodium	%	0.12	0.16	0.14	0.16	0.11
Potassium	%	1.51	1.36	1.48	1.61	2.84
Phosphorus	%	0.12	0.06	0.10	0.11	0.43
Iron	mg/kg	186	99	81.40	110	109
Copper	mg/kg	16.5	4.0	10.90	7.23	4.51
Manganese	mg/kg	637	532	348	326	52.4
Zinc	mg/kg	26.5	17.5	27.80	40.3	34.1

# NUTRIENTS LEVEL IN VETIVER BIOMAS (%).

Nutrients	Concentrations (%)
<b>Nitrogen</b>	<b>1.51</b>
<b>Phosphorus</b>	<b>0.29</b>
<b>Potassium</b>	<b>1.75</b>
<b>Calcium</b>	<b>0.52</b>
<b>Magnesium</b>	<b>0.33</b>
<b>Sodium</b>	<b>0.10</b>
<b>Sulphur</b>	<b>0.21</b>
<b>Crude fat</b>	<b>0.40</b>
<b>Crude fibre</b>	<b>7.12</b>
<b>Palatability</b>	<b>Horse, dairy cows, cattle, sheep, buffalo, rabbits, goat, kangaroo, wallaby.</b>



# EATEN READILY BY HORSES AND CATTLE



# CATTLE GRAZE IN VETIVER PASTURE



# BEFORE AND AFTER GRAZING



# AFTER GRAZING



# VETIVER HAY



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## **CONCLUSION AND RECOMMENDATIONS:**

**Vetiver System Technology has shown that, farm, especially intensive ones and industrial wastewaters contaminated with high nutrient should be considered as a resource rather than environmental pollutant.**

**Its nutritious biomass can be grazed fresh, preserves as silage or hay**

**It is, therefore, essential to evaluate and manage water pollution by integrating cutting-edge wastewater treatment innovations with existing methods to protect the environment.**

**THANK YOU**