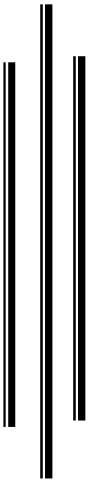
EFFECT OF DISTILLERY INDUSTRIAL EFFULENT ON AGRICULTURAL CROPS AND ENVIRONMENTAL JUSTICE: A CASE STUDY OF KHAJURA VDC, BANKE



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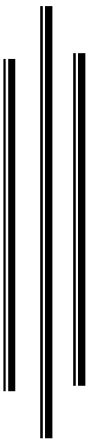

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ABSTRACT

Effluent discharged from the Karnali distillery Pvt. Ltd was analyzed to measure its effect on agricultural crops and environmental justice. Various physico chemical parameters like pH, temperature, Dissolved Oxygen (DO), BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), TSS (Total Suspended Particles), Nitrogen (N), (Phosphorus (P), Potassium (K) and some heavy metals such as iron (Fe), Manganese (Mn), Cadmium (Cd), lead (Pb), Zinc (Zn), and Copper (Cu) were analyzed and found most of the physicochemical parameters were above the toxic level set by Nepal bureau standard. The analysis of physico chemical parameters of the soil irrigated with effluent polluted water showed appreciable increase in the soil nutrients (Organic Matter, Nitrogen, Phosphorus, Potassium) along with the increase of toxic heavy metals such as Fe, Cd, Mn and Pb in the soil which has affected annual crop productivity by around 40 percent. Similarly the effect of the effluent on seed germination, seedling growth, fresh weight and dry weight of seedlings of two test crops (*Oryza sativa* and *Triticum aestivum*) were also analyzed with statistical test and found the effect was different according to the test species and concentration of treatment. Higher concentrations (10%, 25%) were found completely inhibitory where as lower concentrations (1%, 5%) were found stimulatory and reached up to the level of control. The present study showed that the distillery effluent was highly loaded with organic pollutants along with harmful heavy metals which showed significant effect on soil quality and the crop productivity and was also responsible for the environmental injustice of the local people in terms of crop production, compensation and environmental hazards.

CONTENTS

			Page
1.	**INTRODUCTION**		**1-8**
	1.1	Background	1
	1.2	Environmental Justice	4
	1.3	Environmental Justice in Nepal	5
	1.4	Statement of Problem	6
	1.5	Justification	7
	1.6	Objectives	8
	1.7	Limitation of the Study	8
2.	**LITERATURE REVIEW**		**9- 26**
	2.1	Industrial Effluent Pollution	9
	2.2	Effect of Effluent on Plant Growth and Development	15
	2.3	Effect of Effluent on Soil	22
	2.4	Environmental Justice	24
3.	**METHODOLOGY**		**27-39**
	3.1	Description of the Study Area	27
	3.2	Test Seeds	29
	3.3	Industrial Effluent and Soil	29
	3.4	Sampling of the Industrial Effluent and Soil	29
	3.5	Physico-Chemical Analysis of the effluent and Soil	30
	3.6	Method of Effluent Test	30
	3.7	Method of Soil Analysis	35
	3.8	Germination Experiment	37
	3.9	Statistical Analysis	39
	3.10	Interview with Local People	39
4.	**RESULTS**		**40-56**
	4.1	Physico-Chemical Parameters of Effluent	40
	4.2	Effect of the Karnali Distillery Effluent on Soil Characters	42
	4.3	Effect of Effluent on Seed Germination	43

4.4 Evaluation of Relative Degree of Enhancement or Inhibition by Effluent on Seed Germination 45
4.5 Effect of Effluent on Seedling Growth 46
4.6 Relative Degree of Enhancement or Inhibition by Effluent on Seedling Growth 48
4.7 Effect of Effluent on Seedling Weight 49
4.8 Evaluation of Relative Degree of Enhancement or Inhibition on Fresh Weight of seedling 51
4.9 Effect of Effluent on Dry Weight of Seeding 52
4.10 Evaluation of Relative Degree of Enhancement or Inhibition in Dry 54
4.11 Interview with Local People 55
5. DISCUSSION 57-69
5.1 Environmental Justice 67
6. CONCLUSION AND RECOMMENDATIONS 70-72
REFERENCES 73-90
APPENDIXES 91-96

LIST OF TABLES

		Page
Table 1	Pysico-Chemical Characteristics of Effluent from Karnali Distillery Pvt. Ltd. and its Associated Stream Water	40
Table 2	Chemical Characteristics of Soil from Effluent Irrigated and Non-Irrigated Area	42
Table 3	Texture class of soil samples of two different sites	43
Table 4	Crop productivity in the study area as given by different respondents	56

LIST OF FIGURES

		Page
Fig. 1	Effect of effluent on seed germination of *Oryza sativa*. Variance ratio at 5% level Fcal=14.64 and 39.59 (Ftab=3.01 and 3.24) for hours of sowing and treatment concentration at d.f. (4, 16 and 5, 16)	44
Fig. 2	Effect of effluent of seed germination of *Triticum aestivum*. Variance ratio at 5% level Fcal=14.87 and 205.89(Ftab=3.26 and 3.49) for hours of sowing and treatment concentration at d.f. (4, 12) and (3, 12) respectively.	45
Fig. 3	Relative Degree of Inhibition on Seed Germination of *Oryza sativa* by Effluent	46
Fig. 4	Relative Degree of Inhibition on Seed Germination of *Triticum aestivum* by Effluent	46
Fig 5	Effect of effluent on seedling growth of *Oryza sativa*. Variance ratio at 5% level, Fcal=9.51, 6.96(F tab=3.84, 4.46) and Fcal 7.24, 5.10(Ftab= 3.84,4.46) for days of sowing and treatment concentration at d.f.(4,8),(2,8) for shoot and roots respectively.	47
Fig. 6	Effect of effluent on seedling growth of *Triticum aestivum* variance ratio at 5% level, Fcal=23.23, 19.61(Ftab=4.76,5.14) and Fcal=4.83, 6.06 (Ftab=4.76,5.14) for days of sowing and treatment concentration at d.f.(3,6) (2,6) for shoots and roots respectively.	47
Fig. 7	Relative Degree of Enhancement/Inhibition on Shoot Growth by Effluent	48
Fig. 8	Relative Degree of Enhancement/Inhibition on Root Growth by Effluent	49

Fig.9	Effect of seedling on fresh weight of *Triticum aestivum* seedling, variance ratio at 5% level, Fcal= 7.74 (Ftab=5.99) at d.f. (1,6) for seedling weight regarding to effluent concentration.	50
Fig 10	Effect of effluent on fresh weight of *Oryza sativa* seedling, variance ratio at 5% level, Fcal=12.03(Ftab=5.32) for seedling weight regarding to effluent concentration at d.f. (1, 8)	50
Fig. 11	Fig 11.Relative Degree of Enhancement/Inhibition on Fresh Weight of Shoot by Effluent	51
Fig12	Relative Degree of Inhibition on Fresh Weight of Root by Effluent	52
Fig.13	Affect of effluent on dry weight of *Triticum aestivum* seedling, variance ratio at 5% level, Fcal= 7.88 (Ftab=5.99) at d.f.(1,6) for seedling weight regarding to effluent concentration.	53
Fig.14	Effect of effluent on dry weight of *Oryza sativa* seedling. Variance ratio at 5% level, Fcal=4.34(Ftab=5.32) at d.f. (1,3) for seedling weight regarding to effluent concentration.	53
Fig. 15	Relative Degree of Enhancement/Inhibition on Dry Weight of Shoot by Effluent	54
Fig.16	Relative Degree of Enhancement/Inhibition on Dry Weight of Root by Effluent	55

Acronyms and Abbreviations

APHA	American Public Health Association
BID	Balaju Industrial District
BOD	Biological Oxygen Demand
$CaCl_2$	Calcium Chloride
CBS	Central Bureau of Statistics
CEDA	Center for Economic Development and Administration
CF	Carpet Factory
Co_2	Carbon dioxide
COD	Chemical Oxygen Demand
$Cu\ SO_4$	Copper Sulphate
d.f.	degree of freedom
DHM	Department of Hydrology and Meteorology
DO	Dissolve Oxygen
E.J.	Environmental Justice
EIA	Environmental Impact Assessment
EISP	Environmental Impact Study Project
EPR	Environmental Protection Rule
FAS	Ferrous Ammonium Sulphate
$Fe\ Cl_2$	Iron Chloride
H_2SO_4	Sulphuric Acid
HCl	Hydrochloric acid
HNO_3	Nitric Acid
ICIMOD	International Center for Integrated Mountain Development
IUCN	International Union for Nature Conservation
$K_2\ SO_4$	Potassium Sulphate
$K_2Cr_2O_7$	Potassium dichromate
$Mg\ SO_4$	Magnesium Sulphate
MOPE	Ministry of Population and Environment
MPHPP	Ministry of Housing and Physical Planning
Na_2SO_4	Sodium Sulphate
NaOH	Sodium Hydroxide
NPC	National Planning Commission
NS	Nepal Standard
OM	Organic Matter
PRA	Participatory Rapid Appraisal
RONAST	Royal Nepal Academy of Science and Technology
TSS	Total Suspended Solid
U.S. EPA	Unites State Environmental Protection Act
UNIDO	United Nations Industrial Development Organization
VDC	Village Development Committee
WHO	World Health Organization