

Table III: Emissions during Phase III for Packaging One Lakh Tons of 'Atta'

Emission	gm/km	Excess Emission for Jute Bags (kg)	Plastic Bags
CO ₂	781.0	11107.3	Taken as Basis
CO	4.5	64.0	Taken as Basis
HC	1.1	15.6	Taken as Basis
NO _x	8	113.8	Taken as Basis
HC+NO _x	9.1	129.4	Taken as Basis
Particulates	0.36	5.1	Taken as Basis
Total Regulated Tail Pipe Emission	13.96	198.5	Taken as Basis

Table I: Life Cycle Data for Different Materials used for Packaging One Million Tons of 'Lube Oil'

	Tin cans	HDPE cans
Material Required (MT)	86207	63218
	Energy (Thousand GJ)	Energy (Thousand GJ)
Phase I: Production of Raw Material	3846.02	5052.87
Phase II: Production of Cans & Liners	3638.54	1472.99
Total	7484.55	6525.86

Phase III: Distribution	Tin cans		HDPE Film Bag	
	Fuel (Tons)	Energy (GJ)	Fuel	Energy
	83770.49	4691.1	Taken as Basis	

Phase IV: Waste Management	Tin	HDPE cans
Recycling Percent	Energy Savings (Thousand GJ/86,207 tons)	Energy Savings (Thousand GJ/63,218 tons)
100%	1602.586	1620.287
80%	1282.069	1296.230
Incineration	Energy Recovered	Energy Recovered (Thousand GJ/63,218 tons)
100%	Not Applicable	3276.61
80%		2621.29

leading to dangerous environmental impact apart from health hazards.

HDPE Cans vis-à-vis Tin Cans for 'Lube Oil' Packaging

The study discloses that for producing packaging with HDPE cans for one million tons of 'Lube Oil', the raw material required for packaging is only 63,218 MT. But for the same quantity of packaging with tin cans require 86,207 MT of packaging material. The results of this analysis are organized in two categories: resource utilization, water and atmospheric emission.

Emission to Air

During the transportation phase excess weight of the tin cans leads to consumption of excess fuel resulting in severe atmospheric pollution. The emission of CO₂ for HDPE cans is higher in phase I but leads to overall less CO₂ emission because of its light weight during the transportation phase. The analysis of input effects indicates remarkably high emission of CH₄ emission in case of production of Tin. The comparative study on emission during transportation also shows significantly excess generation of CO, CO₂ and NO_x in case of tin cans as compared to that in case of HDPE cans.



Emission to Water

As shown in the different tables, BOD and COD to water are of a slightly higher amount in case of production of tin cans than in case of HDPE cans.

