

# ASEAN ++ 2013: MOVING FORWARD

## EFFECT OF COMPOSITION IN MIXTURE OF SOLID AND LIQUID WASTES FROM TAPIOCA INDUSTRY TO PERCENTAGE REDUCTION OF COD

Present by:

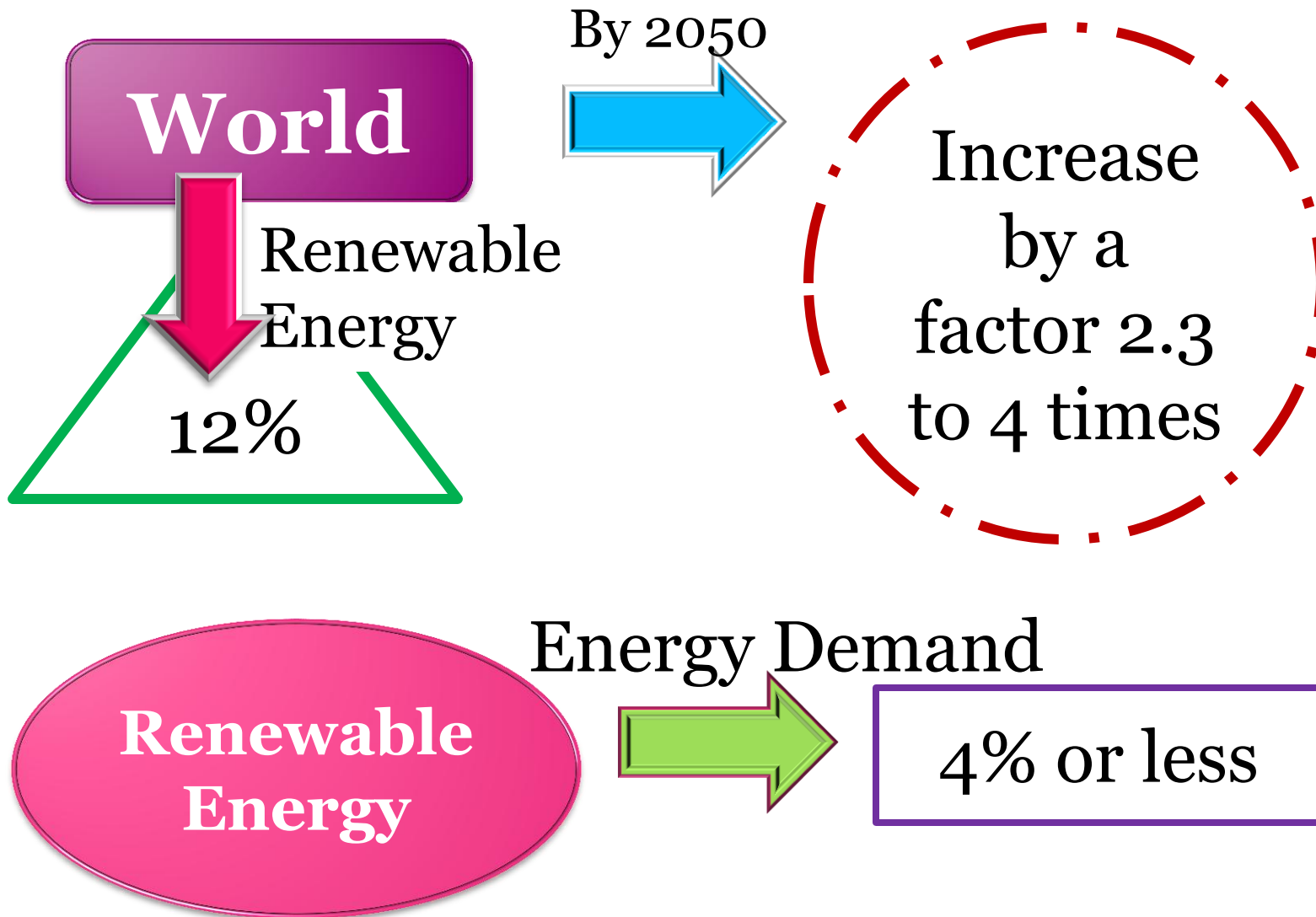
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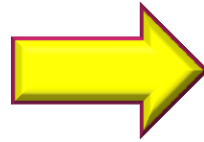


# Energy Demand



# Tapioca Industry

Tapioca Industry



Wastes



1



2

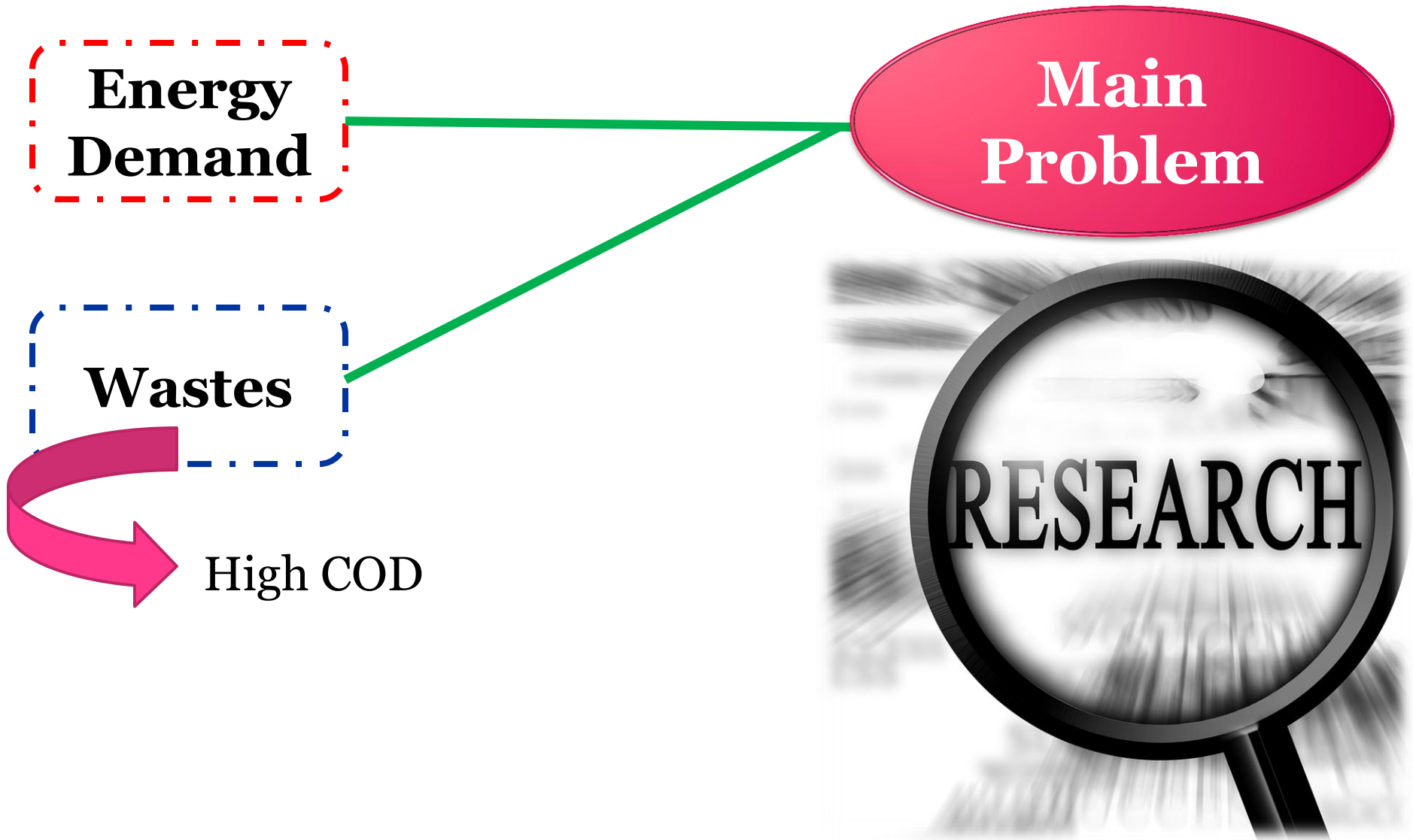


3



4

# Two Cases



# Biogas




1. Energy supply
2. Reduce emission of greenhouse gases

GO  
GREEN

# Wastes From Tapioca

**Solid waste** + **Liquid waste**



Carbohydrates, proteins, a lot of sugar compounds

21% further processed



Food ingredients, animal feed, fertilizers etc

# Purpose of Study

determine the percentage reduction of COD produced from **cassava pulp** combined with **liquid waste** from cassava starch industry using a batch anaerobic digester system.



# Materials and Method (1)

## Block Diagram of Biogas Making

Analyze the sample (COD and pH)



Mixture of cassava pulp and liquid waste at ratios of (70:30, 60:40, 50:50, 40:60, and 30:70) (total weight 225 kg)

Cattle manure mixed with water in ratio 1:1 (25 kg)



Digester (Anaerobic batch fermentation till optimum)



Analyze the effluent every 3 days (COD and pH)



Biogas

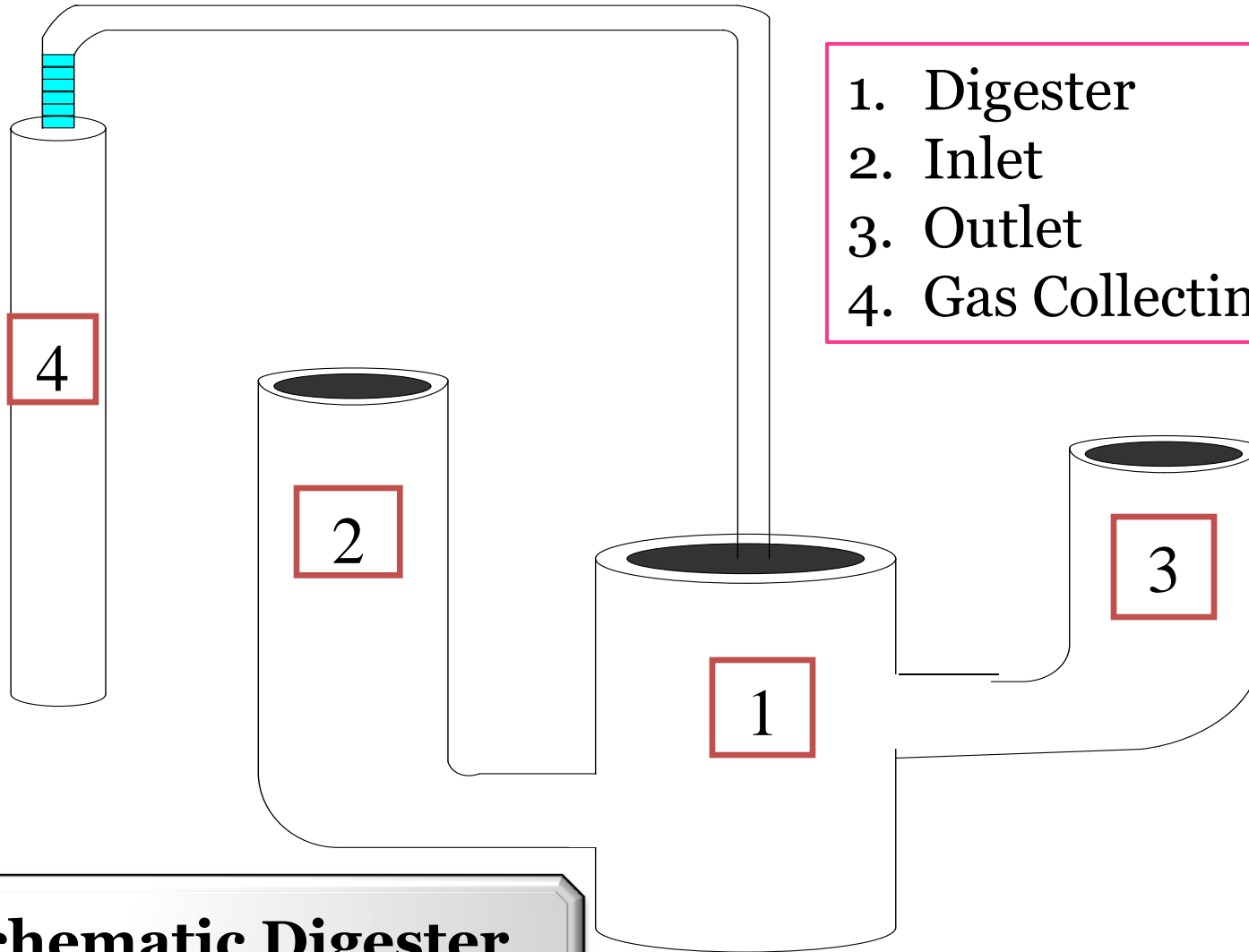


# Materials and Method (2)



**Digester in  
Laboratory**

# Materials and Method (3)



1. Digester
2. Inlet
3. Outlet
4. Gas Collecting System

**Schematic Digester**

# Analytical Methods

❖ **pH** by using pH indicator

❖ **COD** were analyzed using Standard Method for the Examination of Water and Wastewater in Balai Teknik Kesehatan Lingkungan dan Pemberantasan Penyakit Menular (BTKL dan PPM) at Jalan K.H Wahid Hasyim 15 Medan 20154, Sumatera Utara Province, Indonesia.

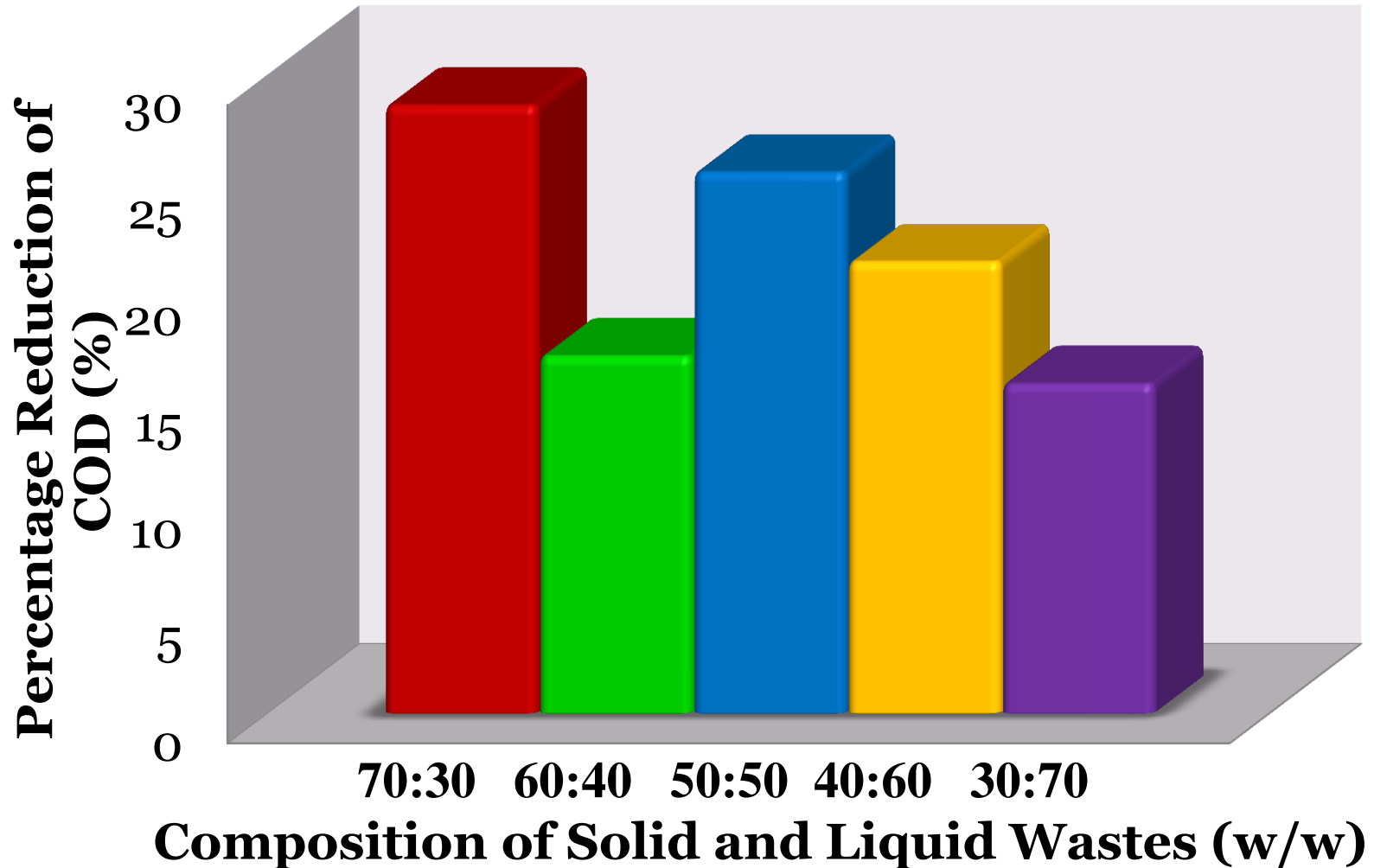


# Results

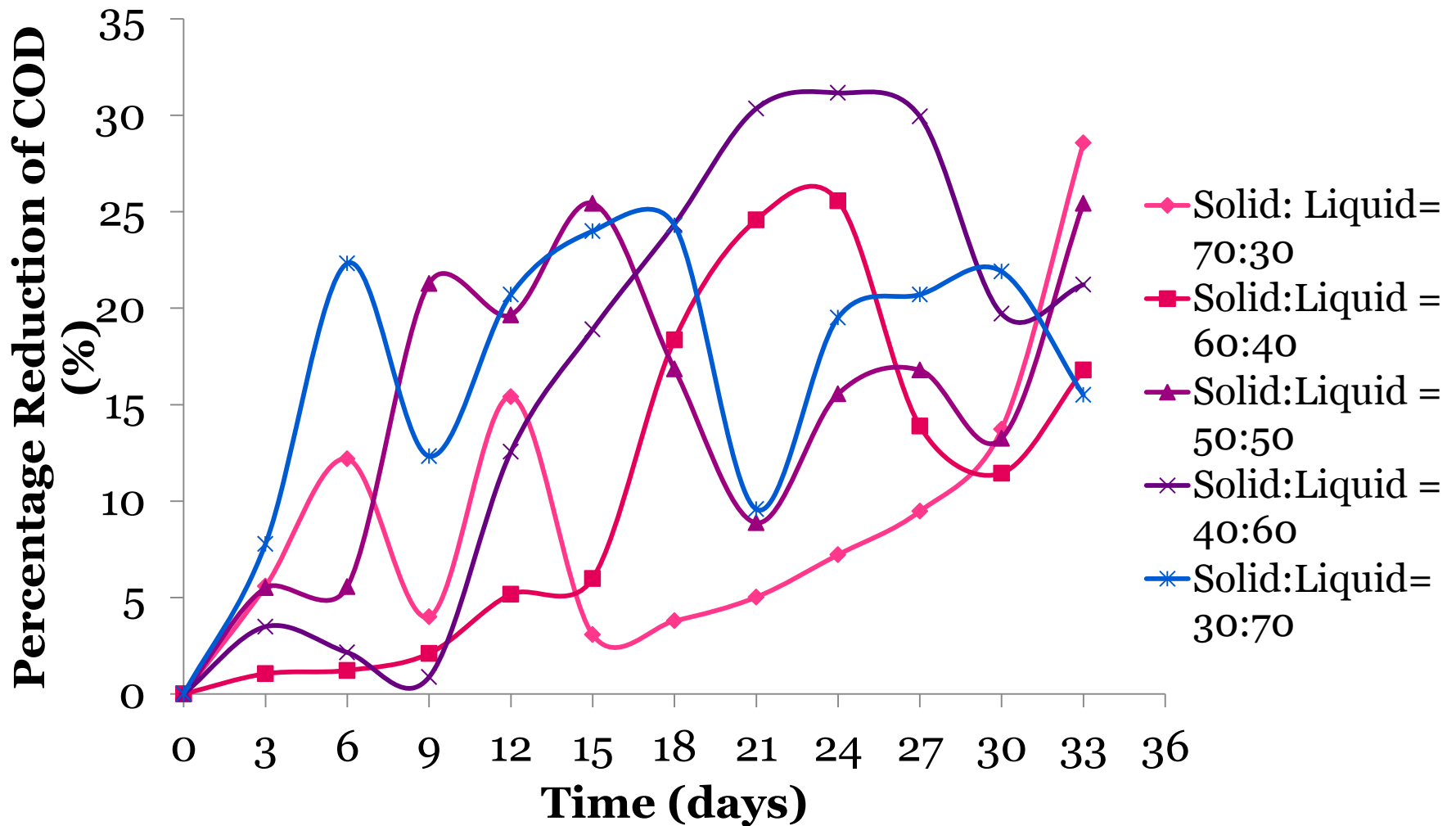
Ratio of cassava pulp: liquid waste (w/w)	Day-	COD (mg/L)	pH
70:30	0	1953	7
	33	1395	7
60:40	0	1721	7
	33	1432	7
50:50	0	1781	7
	33	1328	7
40:60	0	1720	6
	33	1355	7
30:70	0	1671	7
	33	1412	7

# Discussion (1)

Effect of composition to % Reduction of COD



# Discussion (2)



# Discussion (3)



$\leq 140$  mesh 15 gram  
to 100 mL effluent



Moisture content 3.11%  
Ash content 1.36%

COD = 233 mg/L

# Discussion (4)

## Effect of Composition to pH



6-7

Flame Test



# Conclusion



The more cassava pulp (solid content) were added to mixture, the percentage reduction of COD become higher and the highest percentage reduction of COD at a ratio by weight from composition of solid waste (cassava pulp) and liquid waste was 70:30 which the percentage reduction of COD was **28.5714%** and after the adsorption, value of COD was **233 mg/L**.



THANK  
YOU

