

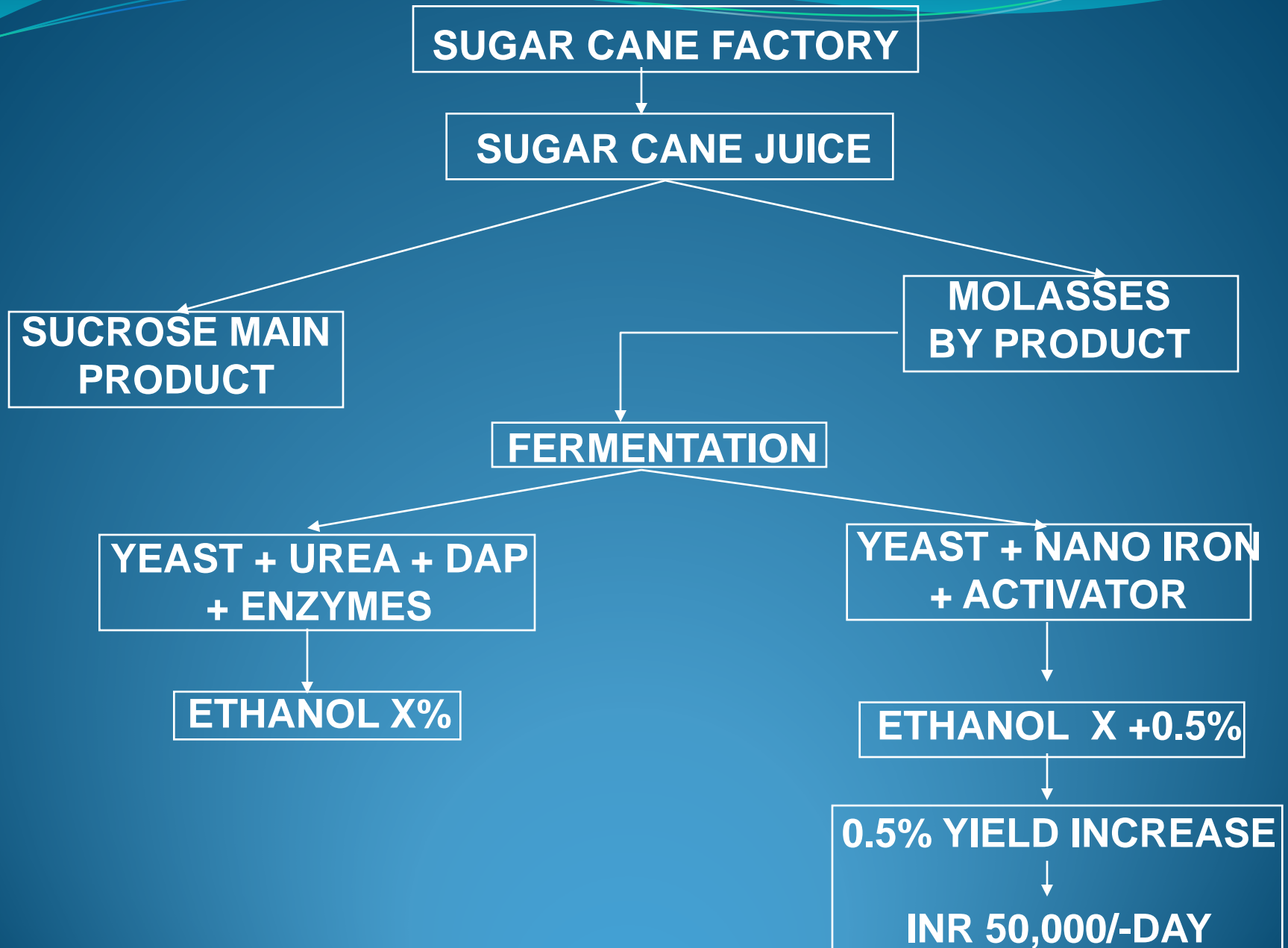
AN EXCELLENT IMPROVEMENT OF ETHANOL RECOVERY FROM MOLASSES BY NANO IRON OXIDE



By

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TECHNOLOGY DESCRIPTION



PROBLEM VALIDATION AND MARKET POTENTIAL (RS.)

Cost of product (iron nano+activator) =15,000

Income from additional 0.5% ethanol yield/day =50,0000

Gross Profit per day =35,000

Total profit expected per day (35000x100 distilleries) = 35,00000

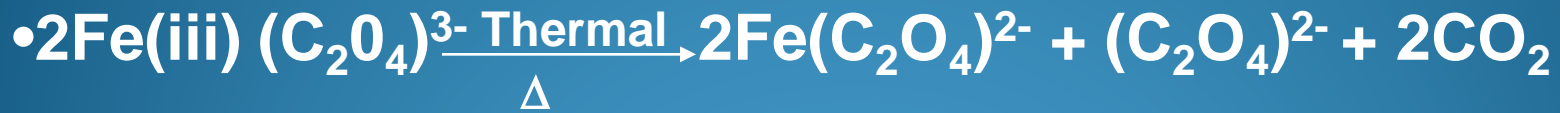
Total increase income per session (150 days x 3500000) =52,50,00000



Price of Ethanol 40 Rs. per lit. hence $1250 \times 40 = 50,000$ Rs.

TECHNOLOGY VALIDATION AND MARKET POTENTIAL

- Nano iron oxide produces ferri-oxalate complex which later dissociates by absorption of thermal energy of the fermentation medium.



- Thermal energy adds value to the ATP energy of yeast to transform more sucrose into ethanol.

IP PROTECTION

- Patent was granted in India (2017)
- Innovator owns the I.P. right



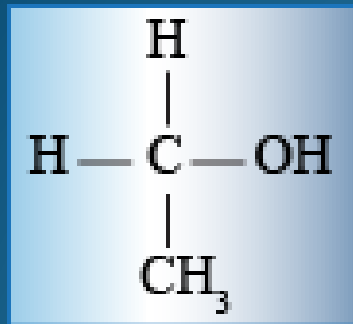
BENEFITS

- Nano iron oxide, much cheaper than urea, can be domestically produced and exported to other countries.
- Will save foreign exchange and oil import.
- Will divert Government's allocation of subsidy in Urea and DAP from distilleries to farmers for their prosperity.
- Improvement in yield of ethanol will provide much cash flow to mills to pay cane arrears of farmers.

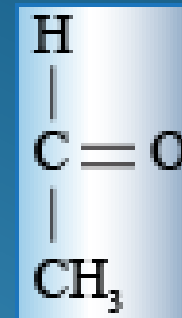
ADVANTAGE TO COUNTRY

- It may become India's proprietary technology due to I.P. right.
- India can sell nano iron to other countries to fetch royalties.
- Due to higher productivity at a lesser cost, it may come with a workable economic solution.
- India's ambition to create more jobs in the green energy sector by 2022 may be fulfilled.

THERMAL ANAEROBIC RESPIRATION



2 Ethanol

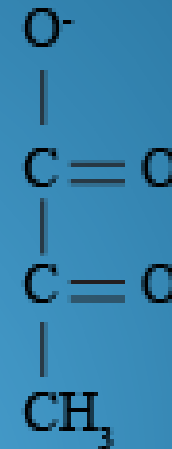


2 Acetaldehyde

2 NAD⁺

2 NADH

Glucose

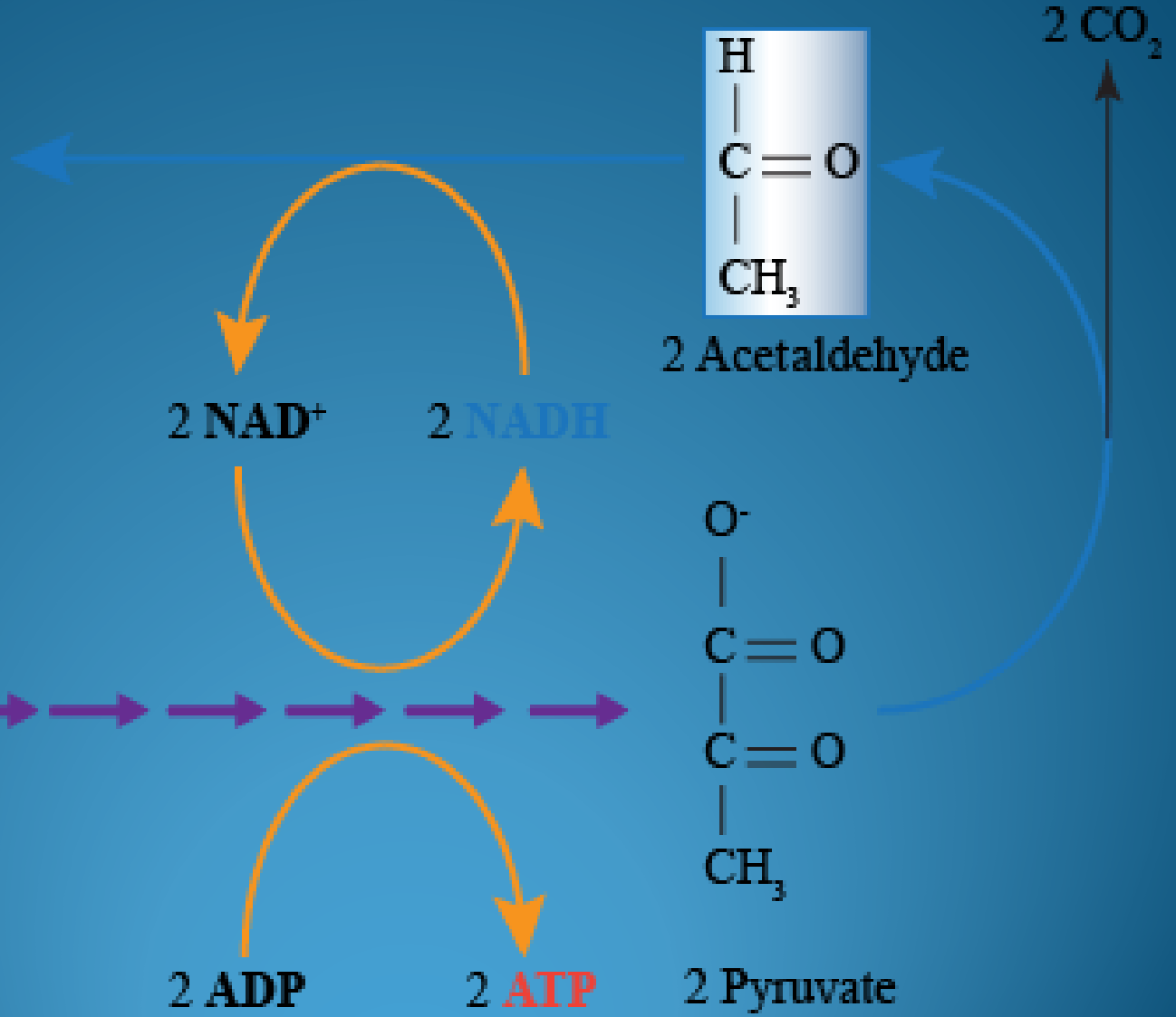


2 Pyruvate

2 ADP

2 ATP

2 CO₂



PILOT SCALE TESTING CERTIFICATE



K. M. Sugar Mills Ltd.

Corporate Office and Works : Motinagar, Faizabad-224 201
Phone : 05278-254059/254173 Fax : 05278-254031
E-mail : director@kmsugar.com



KMSM/Dist/2016-17/

January 21, 2017

TO WHOM IT MAY CONCERN

This is to certify that Dr Anil Kumar Gupta who is an innovator had tested his research sample as a new catalyst in the form of iron nano particle in our laboratory for the enhancement of ethanol during fermentation of molasses. When 250 grams of iron nano was used as catalyst, an enhancement of 0.3 liter of ethanol had been observed per quintal of molasses fermented. This would have been approximately equal to 750 litres of increase in yield of ethanol per day if we would use 2500 quintal molasses per day in our factory. The said amount of molasses would need 500 kg of iron nano catalyst/day. If the cost of one kg nano iron would have been Rs.20 then total expenditure per day of nano becomes Rs.10000. Since the cost of 750 liters of ethanol becomes equal to Rs.30,000, therefore a gross profit of Rs.20,000 is expected after subtracting the price of total nano iron consumed per day. Hence the technology of nano iron used as catalyst during the manufacture of ethanol is quite profitable, which has been already patented by Dr Anil Kumar Gupta in India.

We highly recommend this new technology for the income generation in all the ethanol refineries all over the world and wish him great success in this field.

For K M Sugar Mills Limited

(Executive Director)

Regd. Office : 11, Moti Bhawan, Collectorganj, Kanpur-1, Phone : 2310762
Branch Office : 76, Eldeco Greens, Gorninagar, Lucknow-226010 Phone : 0522-3298333, Fax : 2308772



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E-mail : director@kmsugar.com
CIN No. : L15421UP 1971 PLC 003492



Ref. 54

Dated : 02.06.2017

TO WHOM IT MAY CONCERN

This is to certify that Dr. Anil Kumar Gupta (Innovator) has successfully tested his nano catalyst and activator in our factory in pilot scale. When he had mixed 21 Kg. of iron nano with activator in 64 tons of molasses, a rise of 0.04% of ethanol was observed in each of Fermentor. Therefore, these results completely match the results we had obtained in our laboratory when he tested the same iron nano on dated 21.01.2017.

We wish him for successful test results of their Nano catalyst in our factory.

For K.M. Sugar Mills Ltd.
(Distillery Division)

Authorized Signatory

Regd. Office : 11, Moti Bhawan, Collectorganj, Kanpur-1, Phone : 2310762
Branch Office : 76, Eldeco Greens, Gorninagar, Lucknow 226010 Phone : 0522-3298333, Fax : 2308772

THE PRODUCT



IMPROVEMENT IN THE RECOVERY OF ETHANOL USING NANO IRON OXIDE

Sl.No.		Feed stock taken	Period of fermentation in hours	Nutrients Added with yeast					%age of Ethanol produced	Increased in yield of ethanol
				Urea (gms)	Iron Nano gms	DA P	Enzyme	Activator		
1.	a)	Molasses	24	0.3	x	✓	✓	x	8.22	0.52
	b)	Molasses	24	x	0.6	x	x	✓	8.74	
2.	a)	Molasses	24	0.3	x	✓	✓	x	8.53	0.60
	b)	Molasses	24	x	0.6	x	x	✓	9.13	
3.	a)	Molasses	24	0.3	x	✓	✓	x	6.97	0.57
	b)	Molasses	24	x	0.6	x	x	✓	7.36	
4.	a)	Molasses	24	0.3	x	✓	✓	x	6.59	0.53
	b)	Molasses	24	x	0.6	x	x	✓	7.12	
5.	a)	Jaggary	48	0.3	x	✓	✓	x	6.31	1.42
	b)	Jaggary	48	x	0.6	x	x	✓	7.73	
6.	a)	Jaggary	48	0.3	x	✓	✓	x	6.7	2.05
	b)	Jaggary	48	x	0.6	x	x	✓	8.75	
7.	a)	Molasses	48	0.3	x	✓	✓	x	6.7	1.6
	b)	Molasses	48	x	0.6	x	x	✓	8.3	
8	a)	Molasses	24	0.3	x	✓	✓	x	7.08	0.79
	b)	Molasses	24	x	0.6	x	x	✓	7.87	

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TECHNOLOGY VALIDATION CERTIFICATE FROM XLR 8 A.P. (TIRUPATI)

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WHAT STARTS HERE CHANGES THE WORLD

This certificate is awarded to

Gupta, Anil Kumar

For their successful completion of the

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On this date:

June 19, 2017



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THANK YOU