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Improvement of Systematic Process in Pharmaceutical Industry Applying Green Productivity on

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I. INTRODUCTION

Industrializing in developing countries has led loss production and pollution which have un compensable harms to environment of the world(1). One of the solutions in order to reduce or omit this loss is in their resource of production (10). according to statistics in our country 98 percent of industrial units of country have influence over pollution and due to shortage of having purification we are in need of billions rails for investment(5). This explanation was the first step of defining a national strategy toward warring prevention methods in producing pollutants and wished to find its stand in stand development plan.

Green profit is a solution to exact determination of current situation, estimation of its distance to desired situation and presenting suggestions (6).

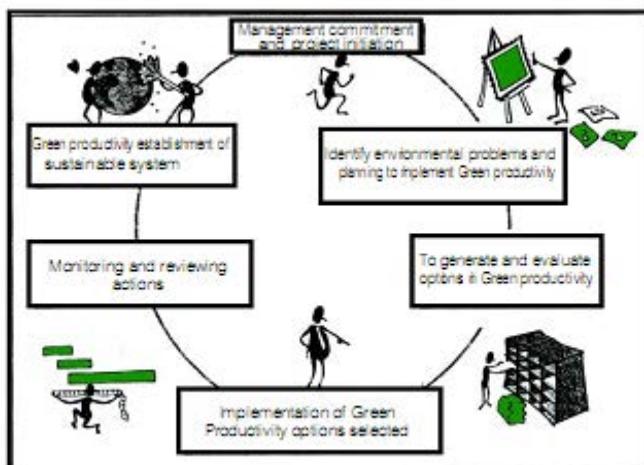
In this trend the base of activity is recognition of situation and problems about water, materials and

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energy consumption and stopping loss in quality and quantity. Then the industrial unit will benefit the maximum amount of its energy and material by minimizing pollution and loss making (1). This action will help the industries to improve their environmental activity and in the same time decrease their profit. Using this tool by neglecting production process is impossible, green profit is administrable in any industry but it's applying strategy is fixed for all cases.



Pic 1: the main steps in methodology of Green productivity

Green profit will get special means with production. green production by minimum sources and the lowest amount of environmental pollution can produce high qualifical with reasonable price and long lasting life, of course all attempts are toward producing goods which are recyclable(6).

Green profit has prevention view which is a reaction to high financial expenses of pollution control methods. There is strong band between environment improvement and economical thrift due to green profit. It's why in industrial scientific communities this trend is seeking a change in technology (picture1) (2).

In order to improve green profit's movement in Asia and Oceania and all over the world. Asian profitability organization with co-operation of Philippine academy have help Apo universal conference in Manila, Philippine, 4-6 December 1996.

Acceptation of principals in Earth meeting based on stability of all aspects on total social

economical advancement of the whole world was the basic rule.

Being a ware of this fast about Asia and Oceania is the settlement of half of world's population(4), and economical improvement in recent years has caused progress in life situation of several people in those zones and also has made natural destroy of environment and loss in renewable resources(3).

So far medicine industry is one of competitor industries, so most plants and factories have no desire to several details about production process.

Reduction in loss of resources and recycle those losses will cause productivity increase, decrease in need of materials and energy and reduction in expenses of hazardous material management (9). There is hope the results of this research about green profit in medicinal industry become noticeable and been applied by managers and experts of this industry.

Green profit's indices are as follow:

- Reduction of pollutants
- Reduction of using resources.
- Reduction of energy consumption.
- Improving product process.

Decreasing high expenses of pollution control management among other researches clone in this filed we can call on:

- Thesis of MA called integration of green profit management in planning and management organization of Isfahan in 2005-2006 by Ms. Maryam Kermani which its results show: one of the best ways to achieve 2.5 percent of economical growth in profit in implementing green management

system of organizations and industries (2012, Author).

- M. A thesis named as analyzing the condition of green profit management in non - lucrative part (Aseman airlines) by Ms. Sahar Azarkamand that results show: applying green profit management will decrease energy consumption and there have been found several methods about environmental conditions:
- MA thesis named as committing loss in medicinal industry in 2011 by Ms. Bahare Ghanbari which based on the results: reduction in departure of an industry can be achieved by changing products, raw materials and organizational activities and its result has profits for medicinal companies, the basic aim of this article is measuring the possibility of fixing green profit management in Hakim pharmaceutics in Tehran. The companies activities:
- Through obeying environmental hints and keeping the right of other neighbor's the company has signed an agreement with one of known laboratories which their duty is measuring gas, steam, dust and sound and sewage amount.
- Equipping the factory to noise management system and sewage purification system.
- Substitution diesel boiler with Gas boiler in agreement with energy consuming optimization.

The construction cost of sewage purification system for every 25 sq.m in 24 Hours was 1,000,000,000 IR Rls, and there is an annual cost of 100,000,000 Rls to maintain it safely .(Author,2012)

Apparently the concentration of gases and elements measured in chimney wail, was not more than permitted limit and has desired number in comparison with Job and social affair ministry standard.

The annual cost	Unit cost (Rial)	Environmental effectiveness	Measurable parameters	row
13842400	133100	Air	CO2	1
13842400	133100		SO2	2
13842400	133100		NOx	3
20763600	133100		Dust	4
1277760	53240	Water	BOD	5
191664	79860		COD	6
191664	79860		PH	7
255552	10648		TSS	8
191664	7986		TDS	9
1597200	66550		Oil	10
638880	26620		Heavy metal	11
12584000	-	Environmental Hearing	Sound level 50 m	12
12584000	121000		Sound level 100 m	13
93528160			Total	

II. MATERIALS AND METHODS

This study has taken one year (Oct.2010-Sep.2011) in filed and librarian study style. Elements of green profit management considered in this study are as follow:

1. Total recognition of production processes.
2. Recognition and classification of medicinal or Non – medicinal loss made in each unit
3. Some methods for determining product loss medicinal or non – medicinal.
4. Measuring the amount of energy and resources usage.
5. Comparing usage amount with index of industry and mines ministry.
6. Defining and selecting green profit methods and preventing loss in production.

7. Presenting suggestions and solutions about reduction in water, electricity, energy usage and loss.

Then for implementing a comprehend practical plan in pharmaceutics company, recognition of producing process and pollution tracking was began in each unit.

III. RESULTS

- a) *Hakim Pharmaceutics Company has concluded*

i. Outgoing chimney elements

Results of sampling and measuring the total volume of outgoing elements and gases of different units of factory was considered in spring in Apr.2011 1390 which shows the amount in gas concentration and element wasn't more than authorized volume and has a desired position in comparison with other indices of environment conservation organization.

Considerations	The sampling and testing		Sampling	Name of the Industry	Row
	Unit of measure	Total particle concentration			
Lower limit	(mg/m ³)	16.5	The rate of ISOkinetic Sampling	Output dust stuck dragee (F182)	1
Lower limit	(mg/m ³)	19	The rate of ISOkinetic Sampling	Juice of 2 Unit Output (F145)	2
Lower limit	(mg/m ³)	21.7	The rate of ISOkinetic Sampling	Out of the mist visor cap (F042)	3
Lower limit	(mg/m ³)	17.5	The rate of ISOkinetic Sampling	Output wash room dragee (F148)	4
Lower limit	(mg/m ³)	18.6	The rate of ISOkinetic Sampling	Output wash room dragee (F185)	5
Lower limit	(mg/m ³)	15.3	The rate of ISOkinetic Sampling	Sai pill dust output 2 (F175)	6
Lower limit	(mg/m ³)	34	The rate of ISOkinetic Sampling	The output of the solid packaging UPS300(F068)	7
Lower limit	(mg/m ³)	19.5	The rate of ISOkinetic Sampling	Dust exhaust unit granules (F113)	8
Lower limit	(mg/m ³)	84	The rate of ISOkinetic Sampling	Mill dust output (F114)	9

IV. VOICE

Based on gathered data of sampling in Day time it can be concluded that the mean of voice level wasn't higher than 65.2 Db and it is close to the permitted number defined by environment conservation organization. In night measurement also the same as what is shown in table 3, it is mentioned that at night the amount of voice in out door areas wasn't satis factory because the achieved mean was 56.8 Db which is higher them determined number of conservation organization (55 Db).

It's worth mentioning that those distributed voice were accompanied by street noise. So it can be assured that the real number will be lessen than it is measured in different indoor units of factory.

The amount of water usage in medicinal industry was different regarding their producing and it's mostly used in production, cleaning and washing, conditioning, hygienic and servicing usage. All in use water of factory added by drinking and producing is from Tehran in volume of 3 to 4 Tankers of 12000 liter.

Some of it will be purified by water makers (Anion – Kati on Filter) and the purified water is used in product – line for cleaning and constructing.

a) Used amount of water in factory

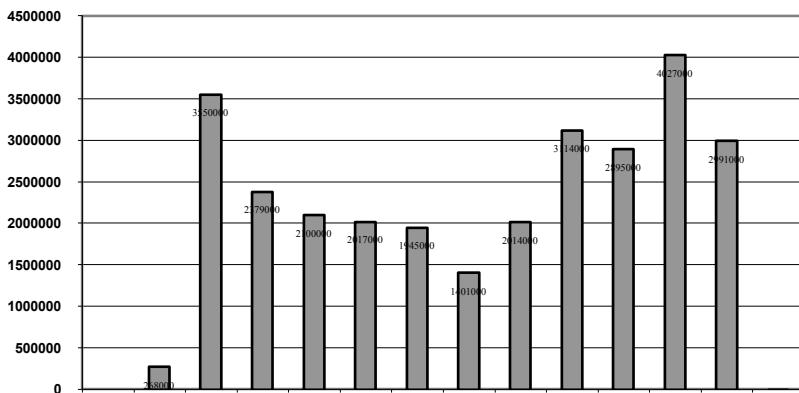
- Deionized water in production: 20000 to 30000 liter daily.
- Distilled water in production: ward 500 to 1200 liter daily.
- Personal hygienic, bathing of personnel usage. 30000 liter daily.
- Water to be used for washing the floor. 2000 liter daily.
- Plant watering: 20 to 50 m³ (Depends on the season and amount of rainfall in a year)

- Restaurant water usage: 5m³

Most of usage is in syrup manufacturing of the factory which is about 35 to 40. Percent of daily use.

- Washing syrup bottles and vials (30000 to 35000 bottles)
- Machine washing
- Syrup filling

Also public usage (bathing, hygiene) about 20% of water.



V. ENERGY

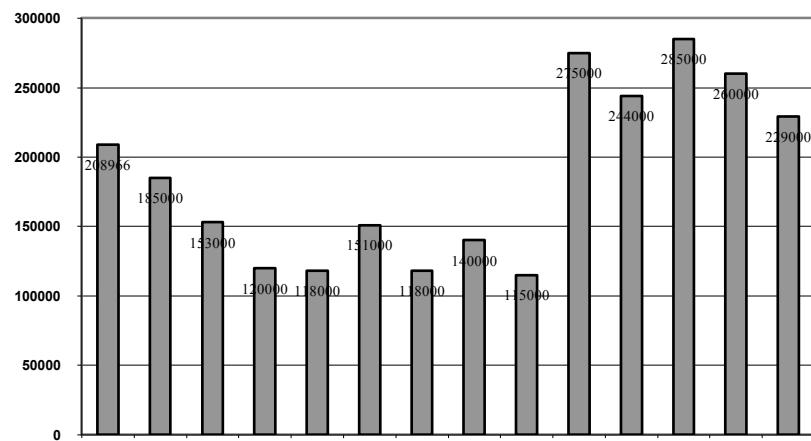
Factory's energy is used as lighting machines official equipment's, heating and cooling and, there are hindrances of daily applications such as fuel of transport.

Machines and equipments of power usage, and information about the heating and cooling are drawn in table 5.

Number	Power (kW)	System	Name System
4	340	Condensation	Chiller
3	35	Boiler	Radiator
7/10	30/80	Water/gas	Cooler
10	40	Aerator	Other

Regarding the substitution of gasoil boiler with gas boiler to optimize energy usage and having clean fuel instead of fossil fuel, the gas of factory is optimized.

Regarding this substitution, pollutant gases in chimney of boiler which are mostly CO, SO₂ will be purified respectively and are in standard line of environment organization.



a) *Most gas of factory is used in two parts*

- Boiler, due to using warm water in various parts such as bathing and personal usage which is about 30 percent of total amount.
- Restaurant for cooking and dishwashing which is about 30 percent of total.

Totally results conclude that green profit management in Hakim pharmaceutics has made total reduction of 5% in drug eruption, 75.3% for Elect Power, 12.6% for Gas and 35.2% for water.

VI. DISCUSSION AND CONCLUSION

Regarding harmful environmental disadvantages of high energy consumption and medicinal loss.

Green profit programs according to materials, energy and improvement of production process has made loss manufacturing and in the other hand rule making and administration of principals has stepped toward economical and social profitability, according to various processes of medicinal plants large amount of energy and water is wasted, energy is consumed by power generators, transports, and much water usage in

washing units and solid, semi – solid and liquid manufacturing lines. Also series of loss and damages such as expired medicine, medicinal packs, blisters, tubes, glass and ext are mode.

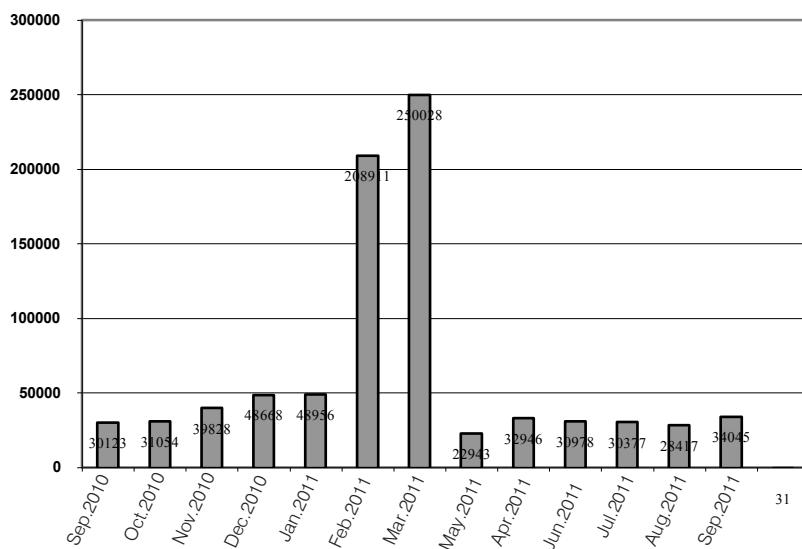
In past, medicinal wastes were buried with home mode and urban wastes but nowadays by noticeable attention toward hygen and environment, there has been managerial plans and laws determined, nationally and internationally to consider these cases.

According to indices of industry and mines ministry, the amount of water consumption is 48046 m³, while the factory usage is 31113 annually which is 16933 m³ less than the index.

Based on the current consumption of factory, 2598966 kw/h is 1116266 kw/h (75/3%) more than the index of ministry. (1482700).

According to the factory indices about gas consuming it is using 7413521 m³, while Hakim pharmaceutics factory uses 837274 annually which is 12/6% or 93753m³ more than determined index.

The company has applied following solutions to be balanced with real amount of authorized consumption.



a) Water reduction solutions

- Using waste water of abashing glasses and salon
- Using the last washing step as the prewash step of next cycle.
- Reusing waste water of air conditioning systems or boilers in the case of being non – pollutant to wash saloon floor or returning to process.

b) Power reduction solutions

- Perfect canals insulation.
- On time servicing and monitoring.
- Washing the steam pot in order to lessen. The sediments and lessen gas consumption.
- Adding heating pump in order to turning law head to high heat.

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