

Algorithm For Quality Control Of Breweries, Beverages And Cement Industries

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ABSTRACT

The work presented here would motivate entrepreneurs to set up automated small scale units for 'India make' high quality new products for the global market which will create new jobs; generate new wealth. This investigation introduces new concepts, economy and efficient management through the automation of breweries, beverages and cement industries. The study leads to concepts for low cost automation and opens up the global competitive market for Indian entrepreneurs to promote 'made in India' products. The project includes study and development of low cost SCADA automation system applicable to small and medium industries where frequent monitoring of the data is profitable in introducing efficiency, quality and low cost production to fulfill the demand and provide job opportunities. Survey through visit to industries was made to know the state of the art, bottlenecks in technology and need for automation.

Keywords: Winery, SCADA, Beverages, Cement

INTRODUCTION

The three algorithms shown in figure 1, 2 and 3 were developed to improve the process of automated management for quality and efficiency for Winery, Beverage industry and pollution Control for Cement industries.

The benefit of automation is that 8 to 10 percent saving in energy usage during the manufacturing process can be achieved to lower its overall operating costs:

- About seven percent reduction in steam consumption for the beer manufacturing process can be achieved.
- The cost of packaging can be also lowered by two percent.

The work highlights Automation SCADA system for control and distribution applicable to small and medium industries producing a) beverages b) breweries and c) cement where frequent monitoring of the data is essential and profitable. These industries require efficiency, quality and low cost production to fulfill i) domestic demand ii) provide jobs iii) opportunities for export.

Small and medium production units form the economic core of economy of all developing countries. Therefore, an innovative management system is required with automatic features to control and implement the decisions through monitoring of all important functions of these units to meet competition, growth and employment needs of the developing nations with efficiency and promise for future stability.

There is a need for SCADA automation and its applications to some typical industries of national importance which are not up to date with modern technology of automation for delivering quality and quantity at competitive rates and utilizing the available resources fully.

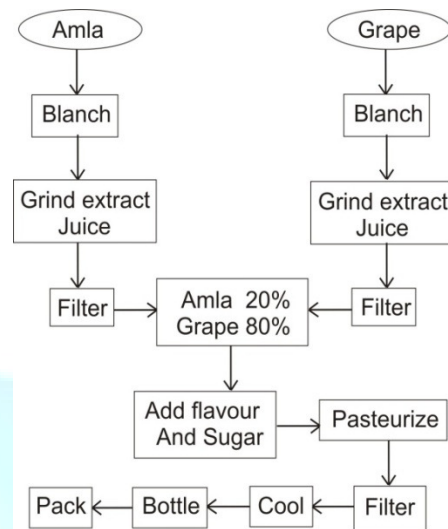


Figure 2 Grapes and Amla Juice

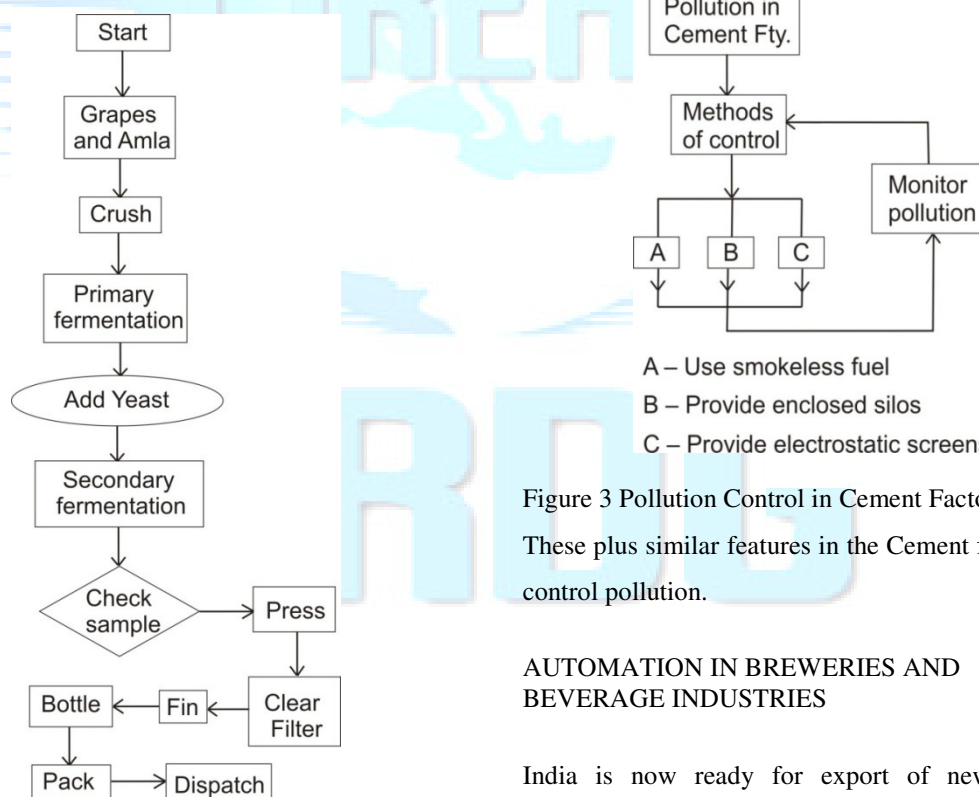


Figure 1 Grapes and Amla Wine

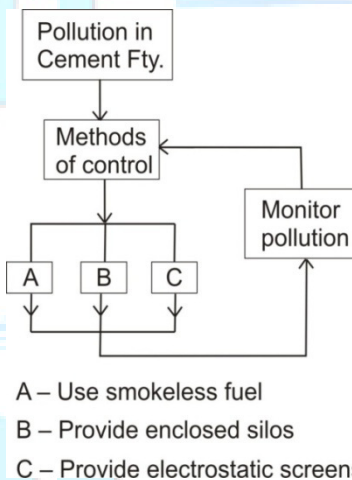


Figure 3 Pollution Control in Cement Factory

These plus similar features in the Cement factory can control pollution.

AUTOMATION IN BREWERIES AND BEVERAGE INDUSTRIES

India is now ready for export of new kind of beverages & drinks not available in the international markets. This can be done without creating local

shortage. India has agricultural resources to become a producer of a large range of beverages and enter into international market as a leading exporter. Brewery industries have potential to become leading exporters if they are modernized through automation to produce quality and quantity of beverages at a friendly cost. The high quality and quantity of Indian agriculture health-benefit-beverages like *tomato, mango, apple, orange, carrot, grape, pineapple* in the conventional categories and other new produce with medicinal properties such as *Aloe Vera, Jamun, Amla* etc. would have demand both in India and overseas.

For quality and timely delivery of the beverages at the right prices it requires a planned production, storage and distribution to compete in the market and attract the user for the new health benefit beverages. The thesis describes automation technology in the beverage industry for organized production for new health-benefit beverages.

Other countries have also introduced automation recently and literature review in the earlier chapter indicates their progress. It is hard for the Indian breweries to enter the international market with various types of hard drink because of popularity and the existing brand names such as Scotch whisky, Vodka, Guinness Beer and other popular brands of beer, wine etc. However, Indian industry has to choose the unbeaten path of the product ideas. Though manpower is cheaper in India yet automation process not only produces quality at lower cost but introduces efficiency and production targets which are necessary to fulfill the demand when generated.

The work highlights some novel raw material for wine which not only gives a new taste but also keeps the “consumer” in good health by providing antioxidant in the wine or beer, and high source of vitamin C and curative effects to some ailments. In this category of new raw material for wine, one of the most desirable is Amla (Indian goose berry), which is full of health benefits. This not only grows in large quantity in India but remains unutilized except for pickling the product, which does not fetch adequate financial return. Jamun for brewing wine is another raw material in the above category which has the health benefits of controlling the diabetes.

The SCADA automation recommended here is based on the latest technique and system and sub system like Programmable Logic Controller (PLC), Remote Terminal Unit (RTU) etc... These are low cost and available at an affordable budget. Some Indian industries participating in wine market overseas are automated and growing rapidly like Sula in Nashik, Maharashtra.

The Indian breweries have large vineyards for growing grapes of varieties. Sula Vineyard is at forefront of the Indian wine revolution. Their award winning Indian wines are available in the best hotels and restaurants worldwide. Built in 2006, York Winery occupies seven acres of vineyards overlooking Gangapur Dam, close to Sula Vineyards. This friendly, young family-owned winery focuses on producing fruity and dry, rather than sweet wines.

These new beverages can be produced even by Small Scale Units with low cost SCADA automation and the product can be launched in competitive market

successfully for its double action that is taste and health. The thesis outlines certain combinations of juices which have not been prepared hitherto. Juices in different proportions were used to obtain the correct taste and health benefits received by consuming ½ liter of the beverage bottle. Amla juices in small proportion also blend well with orange, pomegranate and pineapple and other juices. Right selection of blend is necessary for the beverage to capture the market. Small scale industry can be launched to capture the market.

AUTOMATION IN CEMENT INDUSTRIES:

The cement industry is growing rapidly on account of the overall development of the Indian economy resulting into increased civil constructions activity due to expanding investment in the infrastructures. The cement industry experienced a complete shift in the technology of production from wet process to dry process. The automations are not only cost effective method but also improve the longevity and reduce the total cost of operation over the life of the system. This thesis discusses automation process for cement plant.

The export of Indian cement has enhanced over the years mostly after decontrol which has given boost to the industry. The demand for cement depends on industrial, real estate, and construction activity. Since growth is taking place around the world Indian export of cement is increasing. India has potential to take up cement market demand in the Middle East and South East Asia.

Since energy cost of cement production is large, energy conservation is important. The wet process is

cheaper than the dry process as regards energy consumption. At the technical level of quality and productivity, the dry process is superior.

This innovative automation process is flexible and easily adaptable. Automation provides monitoring capabilities and provisions for programmable trouble-shooting and reduces the downtime. The automation process provides better control. The environment of cement plant is temperature, with dust and electro-magnetic interference (EMI). The process automation improve environment for the workers and prevents direct contact with the gases & dust that are emitted during cement manufacturing. As the PLC performs the operation intelligently and as it has centralized control features; it also helps to reduce the manpower and at the same time it reduces the workers' load.

Cement is an important ingredient of civil construction. The Indian cement industry is the second largest producer of cement in the world, ahead of the United States and Japan. It is considered to be a core sector accounting for approximately 1.5% of GDP and employing large manpower. The cement market is increasing at of twenty percent a year due to residential building constructions.

The paper discusses industrial automation that gives a framework about the equipment, programming used for automation and methodology involved in implementing it for a modern automation system.

CONCLUSIONS

This paper discusses techniques of automation applied to breweries. Survey shows that in most cases in India and abroad modernization of breweries

through automation has been sought to introduce economic and efficient production to make this industry most competitive in the world market. Russian brewery supplies a large percentage of their product to the world and since after their automation a few years ago they have been able to generate profits due to improving quantity, target delivery resulting in higher sales. Automation has not only been introduced in production but also in marketing and stock taking in the warehouses.

It is deducted that artificial intelligence is needed to be introduced to control certain functions in Winery and Beverage production process to check the taste of the product through intelligence provided in the process itself through the software. A flexible SCADA is proposed for these industries. Flexible means that the communication can take place between any random two or more points at any time. The main function can be described as follows:

- a) Providing data exchange and data sharing among independent system.
- b) Providing function coordination and result interaction among independent system.

SOME SPECIAL PROPERTIES OF HEALTH BEVERAGES & DRINKS

Wine which is much less intoxicating and offers a high global market for the entrepreneurs is one of the functional fermented foods and has many health benefits. These include anti-ageing effects in red grape skins, improvement of lung function from antioxidants in white wine, reduction in coronary heart disease, development of healthier blood vessels in elderly people, reduction in ulcer-causing bacteria, destruction of cancer cells by protein present in red

grape skins, prevention of stroke by keeping the arteries clean by polyphenols in red grape skins, decreasing ovarian cancer risk in women and making the bones stronger. Many wines are made from fruits having medicinal value and such wines have many additional benefits. The exact composition of a herbal product is influenced by the method of extraction. A hot water extract is generally rich in polar components because water is a polar solvent. Oil on the other hand is a non-polar solvent and it absorbs non-polar compounds. Alcohol lies somewhere in between the polar and non-polar compounds.

India is now ready for export of new kind of beverages without creating local shortages. For quality and timely delivery of the beverages at the right prices it requires a planned production, storage and distribution to compete in the market and attract the user for the new health benefit beverages. The paper describes automation technology in the beverage industry for organized production for new health-benefit beverages.

Health Benefits beverages can be created from some of the agricultural produce that are a boon to human beings because of their overall health benefits and properties as anticancer and anti-oxidant. Some of these also have life saving properties, like: Green Tea, Aloe Vera, Amla, Tulasi and Ginger.

India produces many such fruits which have anticancer properties in addition to overall health benefits. To present some of these as palatable beverages a combination has to be created for a taste that appeals to all ages. For example the sourness of the Amla can be overcome by blending its juice with

another equally healthy produce with anticancer properties such as Tulasi, Ginger, seabukthorn berry and other wild blue berry, black berry, strawberry or and sweet cherry. A very good combination is Amla-grape juice (anti-oxidant). Apart from being a healthy and tasty beverage, wine can also be produced with this combination. Fruit mixed beverage having composition 30% Amla and 70% Grape juice, 0.3% yeast, 0.4% acidity, 15.24 degree centigrade mix was found to be optimum among the other formulation. It is concluded that Amla berries can be used as valuable ingredient for the production of mixed fruit beverage with all the important properties and medicinal characteristics of Amla and grape fruits. This can thus, prove to be a good health drink with phenolics, vitamin C as antioxidant.

Use of Aloe Vera in nutritional, pharmaceutical & cosmetic preparations draws attention for generation of scientific information. Looking to the importance of biologically active components possessed by the leaves of the Aloe Vera plant and its wide spread use, it has become imperative that, the leaf should be processed with the aim of retaining essential bioactive components. In this review paper, Aloe Vera gel expulsion, gel extraction and storage of gel are critically described from different references. Aloe Vera processing methods for gel expulsion by splitting of leaf, roller method, crushing of whole leaf, hand filleting methods and stabilization are described with various references. Present processing techniques aims at producing best quality aloe products but end products of Aloe Vera contain very little or virtually no active ingredients. Hence, appropriate processing techniques should be

employed during processing to extend the use of Aloe Vera gel.

Proper scientific investigations on Aloe Vera have gained more attention over the last decade due to its reputable, medicinal, and pharmaceutical and food properties. Some publications have appeared in reputed scientific journals that have made appreciable contributions to the discovery of the functions and utilizations of Aloe Vera lacking processing of leaf gel. Present processing techniques aims at producing best quality aloe products but end aloe products contain very little or virtually no active ingredients.

Hence, appropriate processing techniques should be employed during processing in order to extend the use of Aloe Vera gel. Further research needs to be done to unravel the myth surrounding the biological activity and the exploitation of aloe constituents.

Phyllanthus emblica, commonly known as Amla is widely distributed in tropical and subtropical areas and has therapeutic potential against deleterious diseases. It is a notable fruit for its rich amount of vitamin C, polyphenols such as tannins, gallic acid, ellagic acid, flavonoids like quercetin and rutin.

Amla is a natural, efficacious, antioxidant with the richest natural source of Vitamin C. These berries have the highest amount of naturally occurring vitamin C of any ripe fruit in the world used as a traditional food. Numerous studies conducted on this fruit suggest that it has anti-viral properties and also functions as an anti-bacterial and anti-fungal agent.

The gelatinous plum-sized Amla fruit contains naturally occurring vitamin, heat stable vitamin C. A clinical study on patients with pulmonary tuberculosis showed that the vitamin C contained in *Emblica officinalis* was better assimilated than synthetic vitamin C. Further research of contemporary and traditional medical literature indicates that Amla either in combination with other herbs or alone has been useful in the amelioration of colds, warts, skin afflictions, influenza, anemia, diabetes, lung conditions, elevated cholesterol and as an immune restorative in cancer conditions. It is one of the best natural antigenic remedies, *Emblica officinalis* is used in treatment of Acne and other skin problems.

This is amazingly effective natural anti-ageing produce. It is very effective in treatment of Acidity and Peptic ulcers. It is rich in Calcium, Iron, essential amino acids and other vitamins and minerals and anti-oxidants. Regular Use of this fruit improves immunity, fights cancers, and rejuvenates the body. It fights chronic diseases like hypertension, high Cholesterol, Diabetes, influenza, chronic cough and cold, chronic infections, chronic fatigue and Chronic inflammatory conditions.

FURTHER READING

1. Anil Kumar Udugu, Dr. Anand Khare “SCADA Automation of Breweries” in *IJSHRE International Journal of Software & Hardware Research in Engineering*, Volume 1, Issue 3, *IJSHRE-1301*, Nov2013 ISSN NO:2347-4890

2. Anil Kumar Udugu, Dr. Anand Khare “SCADA Automation of Cement Industries” in *IJREAT International Journal of Research in Engineering & Advanced Technology*, Volume 1, Issue 6, Dec-Jan, 2014 ISSN: 2320-8791.

3. Anil Kumar Udugu, Dr. Anand Khare “Automation in New Health-Benefit Beverage Industry” in *IJREAT International Journal of Research in Engineering & Advanced Technology*, Volume1, Issue 2 April- May, 2014 ISSN: 2320-8791.

4. Amit Shrivastava, Dr. Anand Khare,” Artificial Intelligence in Supervisory Control” in *IJREAT International Journal of Research in Engineering & Advanced Technology*, Volume1, Issue 5 Oct-Nov,2013 ISSN: 2320-8791