SMAP NEWSLETTER

October, 2021 | Salt Manufacturers Association of Pakistan's Monthly Newsletter

SALT MANUFACTURERS ASSOCIATION OF PAKISTAN is a non profit organization instituted to represent and protect the rights and forward fair demands of salt manufacturing community through global representation.

Inside This Issue

Chairman's Message

Mr. Ismail Suttar

Chairman, SMAP

Pakistan is located strategically at the crossroads of Central Asia with Afghanistan, Iran as its neighbor in the west, India in the east, and China in the north. This strategic location allows Pakistan to become an important trade corridor for the export of not only Salt BUT its value-added products and it is time that we need to tap on these opportunities to enhance the exports.

The problem identified shows that the thrust of innovation towards value addition through creating new products has somewhat died and the failure lies completely on the Business community as they now prefer to opt for the rentier class rather than setting up industries that involve a lot of hard work and takes a lot of pain in its establishment.

The Salt Manufacturers Association of Pakistan realizing the nature of the problem has devised a working plan to present a possible solution by creating pilot studies of developing value-added chemicals from the basic salt. These value-added products cater Chlor-Alkali Industry, fertilizer industry, electronic batteries, etc. It is now time Pakistan needs more products to sell and more factories to absorb our educated youth who are left to drift through the winds of unemployment. We as an industry need to understand that due to the low salt prices globally and the distance between our Rocksalt reserves and ports we have no other option but to vouch for the production of Value-added chemicals using salt as basic raw material.

The Chlor-alkali industry manufactures soda ash, caustic soda, chlorine, and other chlorine-relevant chemicals such as HCl, and hypo-chloric acid which further supports other industries such as textile and dyes, plastics and rubber, and most importantly wastewater treatment chemicals used in WWT plants. Moreover, Sulphates of Potash (SOPs) is the feed material for the fertilizer industry and lithium found in salt lakes of Pakistan is considered as the future of green fuel.

Global forecasts surveys show that the market value of the Chlor-alkali industry will reach around 77.4 billion dollars by 2026. Exports of such value-added products can boost trade value by billions of dollars but after putting in a lot of serious effort by the salt community as this is our job and our duty as this is our product which is crying to be value-added by us only.

I believe that the business community should work hand in hand with the government to revive the ailing sector of minerals to chemicals which is nowhere to be seen in Pakistan at the moment. We can only surface from the darkness of economic debts after acknowledging the true potential of value-added products from basic minerals.

After the joint effort from SMAP and concerning government bodies, I am certain that we can take Pakistan to its highest level of glory in no time. INSHAH ALLAH.

Meeting with Prime Minister Imran Khan

Mr. Ismail Suttar chairman of SMAP was invited to attend a meeting with Prime Minister Mr. Imran Khan on 30th September 2021 at Prime Minister House, Islamabad to represent the salt sector.

In 74 years it was the 1st time that the salt industry was given the opportunity to represent the sector in front of the Prime Minister so exclusively.

The meeting was attended by Finance Minister Shaukat Tareen, Minister for Industries and Production Khusro Bakhtyar, Commerce Advisor Abdul Razak Dawood, Special Assistant to PM (SAPM) on Health Dr. Faisal Sultan, SAPM on Political Communication Dr. Shahbaz Gill, CEO Drug Regulatory Authority of Pakistan (DRAP) Asim Rauf, representatives of pharmaceutical and salt sectors and other senior officials.

Mr. Ismail Suttar on behalf of the entire salt sector discussed that Pakistan is blessed with a variety of salt ranging from sea salt to 6.2 billion tonnes of Pink Himalayan Salt at Khewra.

Prime Minister was briefed that 60% of the total 350 million tonnes of global salt is consumed by the chemical industry alone. Even though Pakistan's current annual salt production is 4 million tonnes, only 0.3 million tonnes is exported each year. Salt Exports are greatly affected by the various barriers faced by new salt entrants, one of them being the sales tax levied on the Salt Manufacturers and Exporters.

Prime Minister was also informed that the collaboration between the government of Balochistan and Hub Salt is underway regarding the new Solar Salt project that is initiated to tap Pakistan's huge potential in salt export. This new Solar Salt Project will be the world's largest salt works facility and will boost the salt exports by $400m in 2023 and will continue to grow by $200m per annum in subsequent years.

The Honorable Prime Minister Imran Khan believed that the full potential of exports diversification in salt is not fully exploited due to a lack of commitment by the business community to adopt modern technologies and establish research units to achieve the maximum value addition. The Honorable Prime Minister reiterated to the business community present in the meeting that the government is focused on creating a business-friendly environment that will not only strengthen Pakistan's economy but will eventually result in a ripple effect that would create multiple employment opportunities.

With sincere efforts from team SMAP, Prime Minister directed the concerned authorities to resolve the salt industrial issues as earliest as possible.

Rock Salt Mining Techniques

A brief overview of Pros and Cons

There are three main mining techniques that have been used over the past 20 years. They consist of single well convection, double well natural connection production, and directional butted well technology.

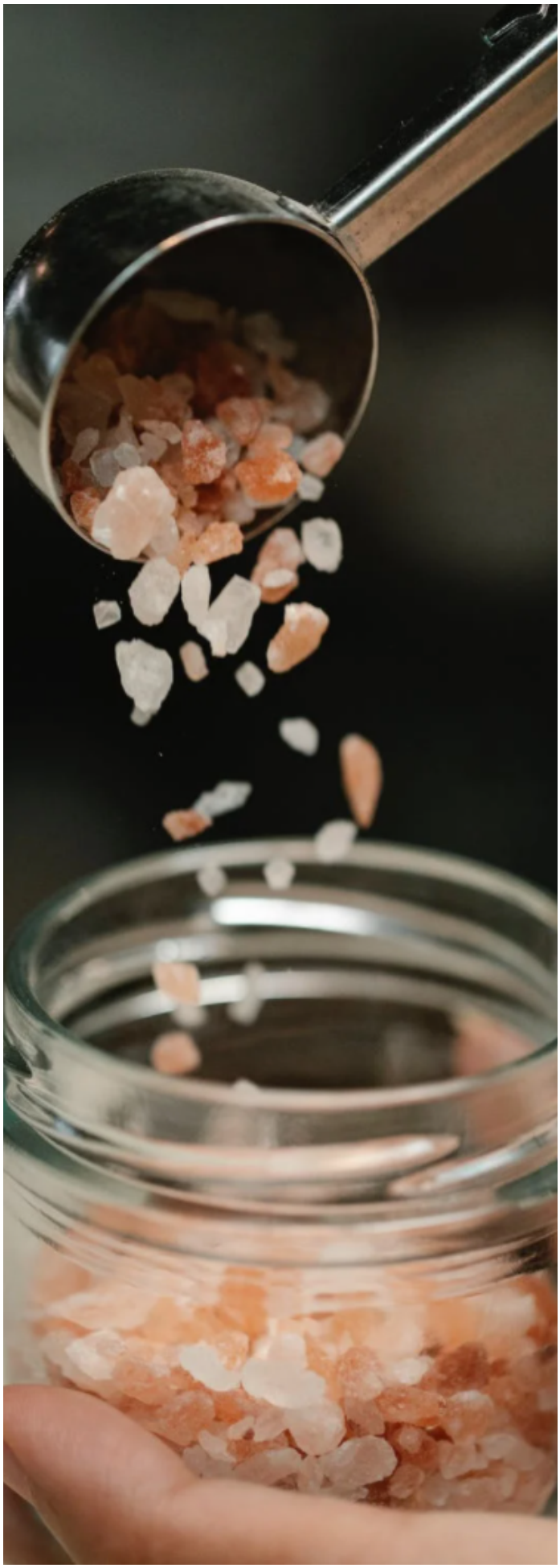
The advantages of the single well convection solution mining method are simple, quick effects, and light workload but many drawbacks are also found in the process of production. Especially the development of rock salt cavity cannot be controlled effectively; the rock is easy to expose in large areas, then it may collapse after destabilization so the casing tube, the central tube may come about bending or deformation. According, the service life of brine wells will be reduced as well.

Along with the development of the rock salt cavity of a single well, rock salt cavities among wells are connected together, with two or three wells connected. To increase the brine production, the central pipe of the single well is taken away, then the casing pipe technology is used to realize the inflows and outflows of water; one well for freshwater injection and another well for brine outflow.

Double wells can be connected naturally when the cavity reaches a certain volume in the late period of single well exploitation, and it usually happens at the top of the rock salt cavity. Because the connected tunnels are unknown and connected ore layers are unpredictable, the management and control of the rock salt cavity may face some difficulties. It will take a long time to conduct production by use of dual wells natural connection and the ore layers are unknown after connection.

Directional butted technology is a directional drilling technology under manual control, which drills through directly two wells whose surface distance is several hundred meters in the rock salt layer of the deep earth to realize the connection of double or multi wells. Then fresh water is injected into a well to dissolve the salt ore layer for producing brines, and the surplus pressure by injecting water will force brines to return to earth through another well for achieving the convection brine mining.

In recent years, directional butted technology has become the main production process which is an advanced technology with such characteristics of less investment, large ore controlling area, and high mining ratio. Not only does directional butted technology provide a longer security period and fewer underground accidents but it improves the overall productive capacity of the mine.



Production of Rock Salt Products from Alpine deposits

Over the past few years, the demand for rock salt products used as so-called "natural salt products" has been rising. Health food shops and drugstores are offering these salt for various uses such as table salt and bath salts.

Sodium Chloride has been mined from alpine deposits in Austria for more than 3000 years. Formally, mining was accomplished in two ways: On the one hand, the salt was mined underground and the miners followed the salty layers into the mountain. On the other hand, brines of lower grades were collected on the surface.

Nowadays, sodium chloride is mined exclusively by solution mining in Austria, because of the strong intergrowth between salt and gauge minerals. First, the solid phase, consisting of the insoluble residue, is called "Laist" which remains in the cavens and the borehole wells. Second, the liquid phase, consisting of the raw brine which will be processed in the salt purification plant to evaporate salt by extracting the calcium, strontium, magnesium, lithium, carbon trioxide, and sulfate ions and evaporating the brine in crystallizers. The resulting sodium chloride is a very pure and fine-grained salt product.

In Ebensee, the salt purification plant pumps out the brine where it is thermally processed to evaporated salt. Only a very small amount of the range of products is won by drill and blast mining of about head-sized salt pieces. such is used for cattle licks, and as decorative stones or lamps.

According to research studies, desired product quality of rock salt products from alpine deposits could be achieved by the implementation of physical processing techniques. The most promising solution would be the combination of magnetic and electrostatic separation.

History of Nutrient Salt

Large scale salt production occurred in inland China more than 2000 years ago. From ancient historical documents it is concluded that the health care experience from Chinese traditional medicine and the conscience of health care among the high officials in the royal

the contemporary knowledge. However, the only difference was that only the minority of people enjoyed the experience in ancient times compared to the majority of people nowadays who are more privileged.

The ancient Chinese literature explicitly recorded that salt could not only be used for condiment but could also be used for health care treatments. The earliest written record of the **"Salt man"** is in the **"Virtue of Zhou"** which mentions that doctors used salt to treat various diseases.

Another famous book titled **"The Yellow Emperor's Classic of internal Medicine"** states the relationship between human health and the function of salt. According to the theory in this book, each material comprises of five basic elements of "metal, wood, water, fire, earth" which corresponds to the five tastes in diet of "sour, hot, bitter, sweet and salty".

World Health Organization has pointed out that there are over **130 common diseases** concerned with insufficient absorption of vitamins and minerals.

Though the requirements of such vitamins and minerals is little but it is indispensable. In fact, lack of minerals and vitamins will lead to disorders and gruesome diseases.

Most developed countries around the globe have already started to add salt to conquer diseases related to vitamin deficiency.

Salt doesn't just make your food tastier it's actually required for life. Sodium ions help the body perform a number of basic tasks, including maintaining the fluid in blood cells and helping the small intestine absorb nutrients. We can't make salt in our own bodies, so humans have always had to look to their environments to fill the need.

Take care of Dental Hygiene using Fluoridated Salt

For several decades, salt has proven to be a vital element for prevention of Iodine Deficiency Diseases and prevention of dental caries.

Fluoride was first added to salt in the mid 1950s in Switzerland and its use has expanded to other countries that include Europe and America. In 1977 at the First International Symposium on Salt Fluoridation held in Medellin and Columbia, experts in public health and nutrition concluded that "Based on the present state of knowledge, fluoridation of salt is a safe and effective measure for partial control of dental caries. Wider use of Fluoridation of Salt should be encouraged and supported.

Oral health is an integral component of general health which is associated with economic development in developing countries. Dental caries result in pain, suffering and diminished quality of life. Oral health tends not to receive high priority within morbidity and mortality focussed government programs.

However, it does present a constant and significant problem to the population and national programs in terms of impact and cost. Untreated dental disease impacts negatively upon the general health, academic performance, school attendance, absence from work and employment possibilities of the future generation.

Treatment of dental caries is expensive, palliative and requires human resource intervention. Costs account for between 4 to 11% of health budgets of European countries. On a population basis, dental caries is considered to be the most expensive human disease in terms of direct costs and the most expensive part of the body to treat.

Immigrant groups that are young and have no access to information tend to have higher rate of dental caries. While caries levels are decreasing in many developed countries, they are increasing amongst preschool children. A study of dental treatment needs in Scotland concluded that the treatment costs between a fluoridated water and non fluoridated community were 45% lower in 4-5 years olds and 47% lower in 9-10 year olds.

The use of fluoride salt is essential for community prevention of dental caries. They are used in all countries in a different variety of approaches and applications. Only in one ingested community, fluoride additive should be permitted either in water, salt or milk. Mild overlap of use of fluoridated salt with consumption of fluoridated milk or water as occurred in thousands of Swiss families and has not resulted in enamel fluorosis problems. More important is the use of low fluoride dentifrices for children up to four to six years due to tooth swallowing.

Salt doesn't produce harmful effects

The evidence over more than 50 years has illustrated that the addition of fluoride to domestic salt does not produce harmful effects and is an effective alternative to water fluoridation for population wide coverage.

The initiative and collaboration of salt industry in the America and a few European countries has been a major factor in the successful implementation of a disease preventive measure for dental caries and the improvement of oral health of the population in the regions. However, the need exists to improve and expand national capability for monitoring and evaluation.

Relationship between salt and the human body

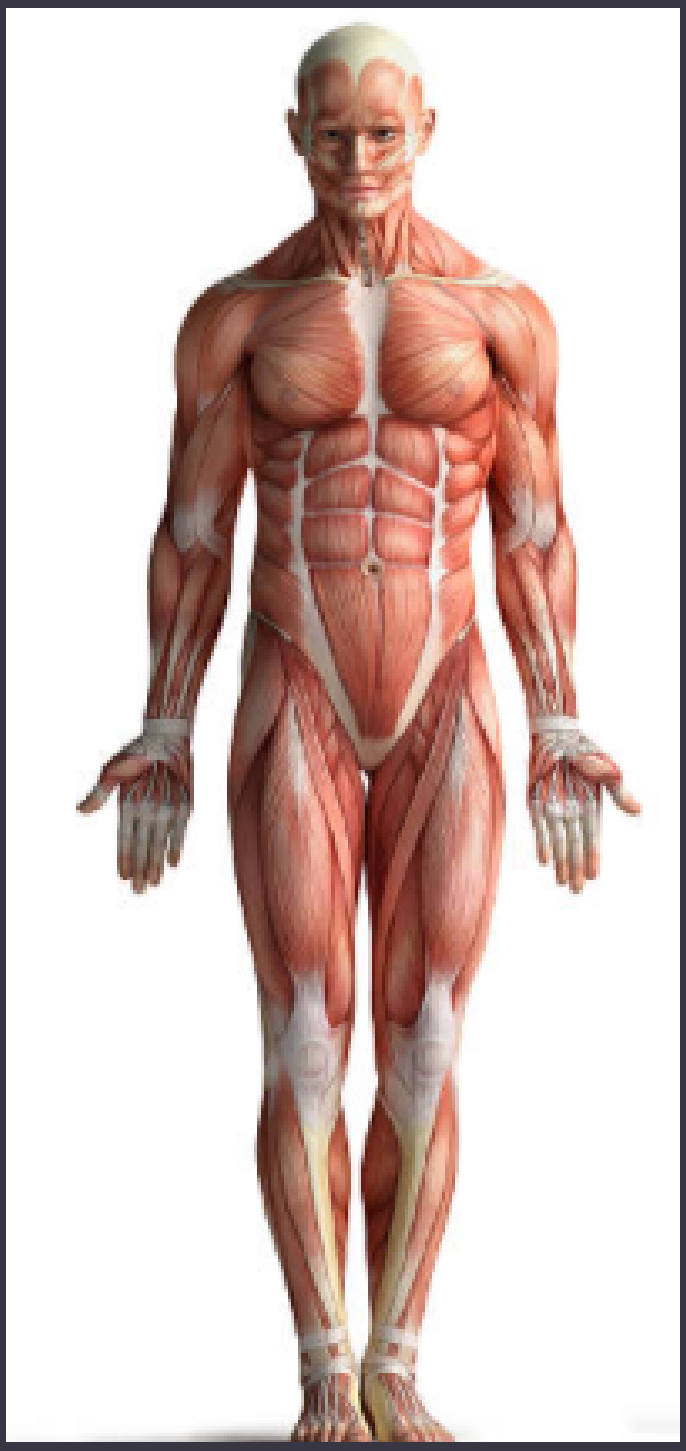
Salt is an origin of life. Salt, Water and Air are the necessities for human's life. The chemical composition is sodium chloride (NaCl).

The sodium (Na+) is the main positive ion circulated outside the cell. The major function is to maintain sensitivity of the muscle and nerve to receive the irritating quality, promoting nutrition absorption, nerve cells information transmission, adjustment and control of blood pressure related hormone secretion.

The chloride ion (Cl-) is not only essential component for human body to digest fluid but when combined with sodium ion and potassium ion it helps to keep the balance of water and pH value of the blood.

Our body is composed of 6 trillion cells. Each cell floats in the solution of sodium chloride. Excessive shrinkage or expansion without explosion of cell is caused by the fluctuating content of sodium. It means that the concentration in or outside the cell should keep a certain balance. When the balance is broken, it usually causes low blood pressure.

Moreover, the human body pH value should be maintained at weak alkalinity. However, the human body process many acidic materials: it is sodium cushioning effect that maintains the body of weak alkalinity. When the sodium is insufficient in the body, the pH value will reduce and



the body will show anorexia, weary feeling, unstable spirit and symptoms of sleepiness.

Table salt contains many essential mineral substances for human health maintenance. Some of which are Calcium, Iron, Potassium, Zinc and Magnesium. Since table salt is a long term essential edible salt, therefore we can absorb the mineral substances for the human body needs. However, in order to absorb the sufficient mineral substance, we should take it from the fish, meat, shellfish, cereal and dairy products.

Effects of mineral rich solar salt on blood pressure and insulin resistance

Salt plays various important roles in human physiology such as maintaining membrane potential of cells, nutrient absorption and transport, and maintaining blood volume and blood pressure. There is no substitute for salt and a regular intake is required to maintain body functions.

However, it is known that excessive intake of salt causes increment of blood pressure and is a major factor of circulating system related diseases. However, this knowledge comes from researchers that used reagent grade salt, purified salt or rock salt which are all lacking in minerals.

There are various types of salt for food consumption. Korean solar salt which is produced in tide flat has plenty of minerals such as potassium, calcium and magnesium. These minerals have been reported to reduce blood pressure.

Thus, it is quite possible that mineral rich salt does not increase blood pressure as much as mineral deficient salt does.

On the other hand, insulin resistance is also known to be induced by high salt consumption. Insulin resistance contributes significantly to the pathophysiology of type 2 diabetes mellitus. Type 2 diabetes mellitus is affecting more than 150 million people worldwide. It is characterized by insulin resistance, impaired glucose tolerance, reduce glucose uptake from blood into adipose tissue and skeletal muscle.

Experiments were conducted around the globe to investigate the differences in effects between mineral rich salt and mineral deficient salt on blood pressure and insulin resistance.

The results of experiments showed that those people who consumed mineral rich salt had lower systolic and diastolic blood pressure than those people who consumed mineral deficient salt. Also, it was noted that mineral rich salt intake helps reduce the risk of insulin resistance by improving glucose tolerance and insulin stimulated glucose uptake.

The Addition of Additives on Rock Salt Enhances De-icing Performance

Rock salt is considered to be the most efficient and cost-effective agent for the prevention and removal of ice mainly in North America and UK. Additives added to salt consist of de-sugared molasses.

The majority of treated salt in UK is rock salt that has been premixed with an agricultural by-product at 3% by weight liquid per tonne of rock salt. It is estimated that treated salt account for more than 20% of overall sales in the UK but less than 5% of the North American Highway Salt Market.

The colder climate in North America dictates the need for lower temperature de-icing agents. The addition of Magnesium chloride to rock salt helps to negate these effects. About 3% to 4% of Magnesium Chloride liquid is added to dry rock salt. When agricultural by-products resulting from processes such as sugar and corn treatment are added to Magnesium Chloride, it lowers the freezing point of Magnesium Chloride which helps salt adhere to the roads.

Treated salt can reduce the need for sand in a road maintenance plan. As temperature fall, road crews abandon de-icing in favor of using sand to aid traction. With the lower effective working temperature of treated salt, road crews are now delayed or eliminating this strategy switchover.

Also, treated salt has a number of cost benefits that outweigh any savings made by using traditional rock salt. For example, economic benefits of having roads free from ice, accident benefits, and traffic flow benefits. Also, there are other benefits such as a reduction in operating cost, reduction in corrosion to vehicles and infrastructure.

Moreover, treated salt is easily degradable after it has been applied to roads. The addictive derived from agricultural by-products makes it natural and environmentally friendly.

According to maintenance contractors in the UK and North America, treated salt has had a positive effect on their operation. For instance, engineers reported a greater adhesion to the road surface, a more even spread, and a better flow of material in the hopper with little or no clogging to spinners and chutes.

In addition to the environmental and corrosion improvements associated with treated salt, highway de-icing performance and overall cost reductions continue to substantiate the use of this important tool.

Chlor-Alkali Industry

In 2015, the world production capacity of chlorine reached **65 million tons** compared to approximately 22 million tons in 1970. **By 2026, the market for chlor-alkali is expected to reach 288 million tons.** The investments for the expansion of production facilities in China, India, and ASEAN countries are expected to, drive demand in the chlor-alkali market.

Chlorine is either sold as liquid, gas or caustic soda which is sold as 50% to 73% as solution or as flakes. An electrical current is passed through brine (common salt dissolved in water) to produce Chlorine, Caustic Soda and Hydrogen. Caustic Soda and Chlorine produced are widely used in the chemical industry.

Chlorine has a multitude of industrial uses, including making bulk materials like bleached paper products, chloroform and dichloromethane. It is also used to make dyes, textiles, medicines, antiseptics and paints.

Chlorine with its excellent anti-bacterial properties is widely used to disinfect swimming pool and drinking water.

However, the most important application of Chlorine is in the production of plastics (Polyvinyl Chloride). PVC pipes and other products.

The demand for quality of salt has increased with the introduction of membrane technology into the Chlor-Alkali Electrolysis. The determining factor for the life of the membrane cells depends on the quality of Chlor-Alkali Electrolysis. Moreover, the consumption of electricity is purely dependent on the level of impurities in the salt. The overall chlor-alkali electricity consumption has dropped by roughly 10% since 2001 due to energy efficiency improvements such as the switch from mercury-based production technology to the more energy-efficient membrane technology and the increased re-use of hydrogen and locally applied efficiency measures.

Around the globe, the Chlor-alkali sector had developed over time and is scattered geographically. The co-production of chlorine and sodium hydroxide in almost equal amounts has always been a problem for the industry because both the products are used for very different end uses with differing market dynamics. It is a rare chance that the demand for the two products coincides.

The growing industrialization in emerging economies such as China, India, South Korea, Indonesia, Thailand, Taiwan, Mexico, Brazil, and Argentina is expected to drive the chlor-alkali market during the next five years. This is because the increase in demand for packaging, construction and consumer goods increases the demand for plastics, aluminium and other materials. In fact, business friendly government policies are supporting the growth of Chlor-alkali industry as leading companies are establishing their facilities in Asian market to cater to their regional demands.

Adding Iodine to salt is the most effective method to eliminate the Iodine deficiency

According to the United Nations statistics, **1.5 billion** people lives with iodine deficiency world wide.

The bigger harm was the low intelligence of the new born babies and infants. The iodine deficient child's intelligence quotient was lower than the normal child by 10-15 percentages.

The table salt containing iodine has three merits.

1. It is safe and effective. If each person absorbs 5-15 grams iodized salt every day, they will obtain 100-300 micrograms iodine every day which satisfies human body's physiological requirement's.
2. It is a long term mission because outside environment is deficient of iodine and the humanity needs to make up the iodine regardless of the race, the nationality, the age and sex. Therefore, the table salt is the best carrier for iodine.
3. It is easy to promote table salt product. The edible salt iodized salt is very economical and it only cost little money.

Iodine is the necessary element for the synthesis of thyroxin in human body. Thyroxin is the essential hormone for cerebrum and physical growth.

Iodine, the trace element of intelligence.

Table salt is essential item of three meals a day. After professional validations, compulsive adding of iodine to edible salt is the best solution proved by many countries around the globe.

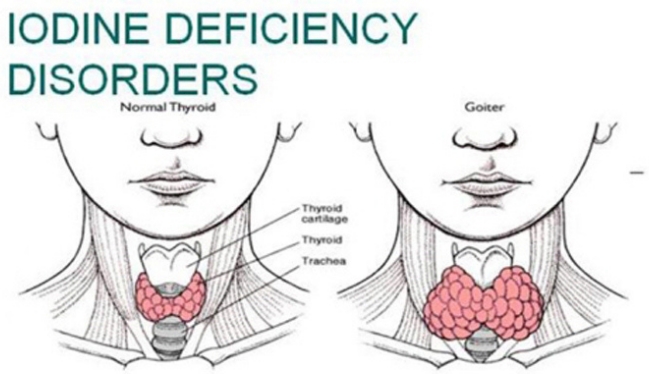
Improving lives through intake of Fortified Salt

Haiti is one of the only four countries left in America where transmission of lymphatic filariasis still occurs. In fact, Haiti has the highest rates of elephantiasis (lymphatic filariasis) which attacks the lymphatic system, leading to abnormal enlargement of body parts, disfigurement, pain, disability and social ostracism.

According to the World Health Organization, it is estimated that 856.4 million people living in 53 countries remained threatened by the disease known as elephantiasis. In addition, the Haitian population also suffer from the most widespread disease iodine deficiency. The top priority of the Haitian government is to completely eradicate elephantiasis and iodine deficiency disorders in Haiti by 2025.

Luckily, there is a simple cure for these conditions: salt fortified with iodine and diethylcarbamazine citrate (DEC).

For a healthy human being, iodine is one of the most essential elements that enable to the function of thyroid glands to produce needed hormones for proper metabolism. When children in womb don't get enough iodine from their mother, the fetal brain development is impaired. During pregnancy, iodine deficiency can cause developmental problems affecting speech, hearing and growth. Also, iodine deficiency can cause a child to develop learning and intellectual disabilities.



Iodine is an essential element for function of thyroid glands

Salt Improves Hydration Levels

Pakistan have a low life expectancy rate than most developed countries that include America, United Kingdom, and Australia. In fact, the country has more young individuals than it ever had in history and is forecasted to continue to rise at an exponential rate until at least 2050.

About 29% of Pakistani's are between the age of 15 and 29. The reason behind this low number is dehydration, fractures, malnutrition, cognition loss and attention deficits.

A research paper titled **"Salt Appetite Across Generations"** presented at a medical conference in Switzerland, stated that a reduced sense of thirst in individuals could increase the risk of dehydration. They also came to the conclusion that the appetite for salt in individuals does not diminish as you age and that it could help sustain hydration and prevent threatening symptoms that result from dehydration.

Senior Pakistani citizens living in old age homes and rehabilitation centers are more susceptible to the dangers of low salt diet.

According to researches the low salt diet contributed to malnutrition and weight loss among a significant percentage of senior's members living in these centers. A low salt diet can cause senior citizens suffering from mild hyponatremia which can result in walking impairment and become more vulnerable to bone fractures.

Falls can not only cause bone fracture but can also lead to permanent disability and may even result in death.

The SMAP Newsletter is published monthly by the Salt Manufacturers Association of Pakistan and distributed free of charge by individual mailing. The Newsletter is distributed to email subscribers and appears on the SMAP website **(www.smap.org.pk)**.

The Newsletter welcomes feedback, new information, and relevant articles on all aspects on salt industry.

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