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RESEARCH ARTICLE

CANCER PERCOLATION THEORY: TOXIC CONTAMINATION OF GROUND WATER BEDS

***Aulakh, B.S.**

Department of Applied Pharmacology, Gregor Mendel Institute for Research in Genetics, No. 144/2, Netaji Park, Baloke Road, Haibowal Kalan, Ludhiana, India. PIN-141001

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****Corresponding author:***
Aulakh, B.S.

ABSTRACT

Cancer is the new pandemic on earth although its being a non-communicable disease. The major cause for it is the toxic contamination of environment especially the ground water with known carcinogenic agents like insecticides, pesticides, phthalates, fertilizer residues etc used extensively in intensive farming models preached under green revolution and also by the poisonous outputs by chemical industry. These contaminants percolate down to ground water strata by various means. The toxic contamination of ground water this way has resulted in health emergencies in areas around chemical industries, tanneries, sewage disposal pits, sugar, ethanol and paper industries etc where such contaminated waste water collects in large quantities in the shape of toxic ponds, lakes or marshes etc. Medical consequences of such fallouts are just too obvious. Lots of news in press and media all around the world is reported on this matter especially in developing countries where there is scant concern for health of people by governments concerned. The methodology is still getting promoted to a new scale with the installation of numerous biogas plants which have all the known side affects and harmful content. The ground water once contaminated with these percolated chemicals causes diseases like cancer, reproductive inefficiency and internal organs malfunctioning in people who happen to depend on this water for drinking purposes and also use it for irrigation and livestock needs. These chemicals are often bio-non-degradable and interfere in hormonal pathways and disturb the genetic behavior of organisms especially humans and have become a real big health threat. Various fallouts are discussed in this write up.

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INTRODUCTION

The ground water contamination is big issue these days often discussed in press and media. It is true that governments in developed nations have become sensitive on this but they still make mistakes in case some new breakthroughs of developmental nature are reported. We are well aware of arsenic poisoning, lead poisoning, mercury poisoning etc by heavy industries in many parts of world and the subsequent struggles of people against such hazardous enterprises and the resultant closure of many such industries. Percolation by definition is a process explained in pharmacological sciences of the extraction of active constituents soluble in a liquid preferably water from a mass of organic matter by slow and continuous digestion of these ingredients and then collecting them in the resultant liquid from an outlet placed right underneath. It is sort of a continuous process as long as the solvent liquid is present in there that continues trickling downwards depending on the forces of gravity, porosity or relative differential diffusion coefficients of the extractable materials. This phenomenon also applies when reservoirs rich in certain chemicals are present above ground like ponds, lakes etc and they continue contaminating the ground water below with these chemicals as long as they do not get dried up or the respective concentrations of such chemicals fall to levels equal or lower to the concentrations of these chemicals in the water down below. We are encountering such phenomena already at work in case of sewage disposal pits, ponds or lakes etc. Such is also the case with sugar and ethanol factories and recently this phenomenon is also noticed in case of biogas factories. Biogas factories are advocated as centers for energy generation. After Ukraine War, various nations have become too conscious on energy and more and more of technologies aimed to harness energy are getting developed. Since, this is the very starting stage of the installation of these energy units on a massive scale, so very little knowledge is available about the potential hazardous fallouts but in long term the outcome may be devastating.

Cancer: The deadly disease: Cancer is the most dreadening disease on earth. Cancer is a disease in which some of the cells of body (National Cancer Institute, 2021) grow uncontrollably and spread to other parts of body. Cells usually divide in the body as a regular process but sometimes this orderly process breaks down and abnormal or damaged cells grow and multiply when they shouldn't.

This forms lumps of tissue in the affected part of body called tumors. These tumors can be benign or cancerous. Cancerous tumors spread and invade into other parts of body and even can travel to distant parts also resulting into a process called metastasis whereas benign tumors are localized. Cancerous tumors are also called as malignant tumors. Benign tumors do not invade or spread into nearby tissues and when removed they do not grow back. Benign tumors can be sometimes very large and pose serious problems when they are in vital parts such as brain. Upon removal also cancerous tumors may grow back sometimes and pose serious threat. So, the proper care and treatment takes a very long and comprehensive course in such cases.

Cause of cancer: Cancer is caused by genetic changes leading to uncontrolled cell growth and tumor formation (Wikipedia). This may result from DNA damage and genomic instability (Schmitt *et al*. 2012). Cancer may also occur from environmental factors alongside lifestyle and behavioral patterns such as tobacco smoking etc. Tobacco alone counts for about 25-30% of all cancer deaths. Further 30-35% deaths are due to other environmental pollution, diet and obesity etc. Infections also add to about 15-20% of cancer deaths and ionizing and non ionizing radiations (IARC, 2011) contribute to about 10% of cancer deaths. So, there are multiple causes for cancer to happen.

The harmful chemicals: Insecticides are known harmful and so are the pesticides (Jolodar *et al*, 2012; Salazar and Rand, 2020) but they are also carcinogenic (Bassil, 2007; Gil *et al*, 2012) to the body tissues and internal organs (Panis and Lamos, 2024; Patil, 2014). They are often studied as included in one group. Herbicides are also harmful. Various governments (Daniel, 2015; The Guardian, 2016) have banned the use of many of them in their national jurisdictions. Urea is also connected to cancer incidence (Ward, 2008). All these chemicals are known to be used extensively in the green revolution model of agriculture. Fungicides and bactericides are also carcinogenic (Raman, 2014; Werder *et al*, 2020). Phthalates are carcinogenic (Adhern *et al*, 2019; Adhern *et al*, 2022; Khan *et al*, 2022; Wang *et al*, 2021; Yang *et al*, 2024). Phthalates often derived from petrochemical source; are also a group of chemicals of concern and are often present as residues in various fertilizers because fertilizers are prepared from natural gas, a compound of known petrochemical origin. So, any crop that is cultivated and harvested on modern agricultural green revolution lines is supposed to contain such impurities however minuscule they may be.

The petrochemical connection: Group of chemicals like insecticides, pesticides, herbicides and phthalates etc are essentially of petrochemical origin. They are known to contain single or multiple benzyl and phenyl rings and may also be derivatives of alkyl, alcohol or other single or multivalent organic compounds. The petrochemicals are obtained from natural source and they also contain compounds like o-xylene and naphtha etc. The various compounds are then separated from one another and marketed and used variously but traces of them remain as impurities in the bulk of other compounds and are often unnoticeable. But as in case of super purified pharmaceutical industry where the strictest protocols are applied in such matters but impurities still remain therein, in limits usually excessive to the desired ones; these petrochemicals too remain laden with ultra thin impurities of their sister chemicals. Compounds like o-xylene and naphtha can very easily get converted into phthalic acid and then to various phthalates by simple chemical reactions.

The hormonal disruptions: Hormonal disruptions are a known cause for cancer, especially breast cancer (Calaf *et al*, 2020). This is done through estradiol mimicking pathways and most of the positive tested adults with BC (breast cancer) have shown phthalate metabolites in urinary samples (Adhern *et al*, 2019). He concluded that phthalates are potential endocrine disruptors-exogenous compounds that mimic hormones and may therefore affect fertility, fetal/child development and some cancers. Some phthalates promote breast tumor growth through estrogen receptor signaling. Estrogen independent breast cancer mechanisms have also been reported. This was also pointed by Anne and Paulauskiene (2021) that PAEs (phthalic acid esters) are potential risk to human health and can cause reproductive problems, birth defects, children growth disrupting effects, decreased testosterone levels, thyroid disrupting effects, hormonal and endocrine disruptions, respiratory allergic symptoms, asthma and can cause breast cancer. Moreover, exposure to PAE's can adversely affect various human organs such as kidneys, respiratory organs, liver as well as endocrine system and developmental stage of organisms.

The childlessness: Hormonal disruptions give rise to even bigger problems. They interfere in the reproductive pathways and once happened, act suppressive of sex organs development in adolescents. The sex organs do not get fully developed. These children when they grow up; will not be able to produce further progenies. They will become unproductive. Even if their sex organs are functional, they are not competent enough to produce viable gametes; ova and sperms and the end result will be the situation of childlessness in future generations. This in itself is a bigger problem. Just imagine a situation where a significant section of populace is without offsprings? Such a childless society will be like a barren, infertile land without joy and happiness.

The genetic damage and cancer: Cancer is a genetic disease and spreads by genetic pathway (National Cancer Institute, 2021). When genetic changes happen in genes which control the growth and division of our cells; the progression of cancer happens. This may happen due to some error in the general mitosis process or by damage to DNA due to some harmful carcinogenic compounds in the environment such as tobacco or xenoesterogenic molecules or the presence of radiation like ultraviolet or X-rays (IARC, 2011) etc and also by the general hereditary mechanisms when such deforming genes are passed from generation to generation. Khan *et al* (2022) performed in-silico analysis and functional studies to understand the association between phthalate exposure and BC progression. They identified 20 genes as commonly altered in response to multiple phthalate exposure. Of the 20 genes, 12 were significantly differentially expressed between normal and BC samples.

The fate of chemicals: No chemical can have any harmful or good effect until it reaches the desired place of action. So, the chemicals have to travel exactly where they can exert their activity in action. Therefore a means of their transport has to be present and operational as the vehicle of their carriage. These chemicals need a solvent for this purpose. Since, most of these chemicals are soluble in water; so water carries them

as dissolved in it to the desired site of action and storage. These chemicals are accumulated and stored in ground water. This ground water is then used for cooking and drinking purposes by humans and animals as well. These chemicals may also be carried in various crops that are dependant on this ground water for irrigation purposes. Any human or animal upon consumption of such a crop, fruit or vegetation contaminated with these chemicals just consumes in the harmful chemicals too. Even animals like cow, goat or buffalo etc when fed upon the fodder contaminated with such chemicals ingest these poisons and further when used for milk or meat purposes, will contaminate humans with such harmful chemicals. So, once these chemicals reach their organs of concern, they shed their usual good or bad effects on them. So, the fate of these chemicals is decided by the carriage or not of them on their target organs or organisms.

The percolation process: The entire operation of agricultural cultivation is getting transacted through the methodology of green revolution; is in the soil cover which is the upper few inches crest of land. The concerned chemicals are getting applied in this layer only. These chemicals find their way into the crops yields or residues etc and a big chunk of them gets accumulated in the soil cover only. It is true that crop yields may be directly consumed by humans or pet animals and even crop parts may be used as fodder but a big portion of them remains as straw or hay. This in a further step may also be used as fodder or other applications like paper or pulp production but recently with the advent of biogas plants, this straw has gotten started to be used as the bio-mass for gas production. This biomass as described above contains considerable amounts of the various insecticides, herbicides, pesticides, fertilizers, phthalates etc due to the process of green revolution having already been in action in the modern style agricultural cultivation. So, when this biomass is digested in the digestion chambers of the anaerobic digestion (AD) process, the biodegradable ingredient of crop (rice, Napier grass or sugarcane etc) straw or other parts; is digested and after the production of biogas and extraction of solid bio-fertilizer, the remaining dirty solution does not contain anything harmful other than these insecticides, herbicides, phthalates and fertilizer residues etc. So, this dirty watery efflux turning stinky afterwards turns out to be the seat of these harmful chemicals. This dirty liquid is stored in big sewage pits or disposed in public sewerage systems or sprinkled in agricultural lands etc. These days farmers in states like Punjab and Haryana in India have become conscious of their harmful affects, so, they are not allowing these chemicals to be disposed in their farm lands. So, when this dirty water is also not getting disposed in public sewerage systems, it is definitely going to be poured in somewhere. Here comes the creation of big sewage pits (Grubel, 2013) for their disposal near the factories or at places where such liquid has to be transported to be disposed off. Such dirty liquid is in the quantity of hundreds of thousands of liters per day. So, these disposal pits get filled up very soon and they are bound to take the shape of big dirty ponds or even lakes etc extending to several acres often. These ponds or lakes may have concrete flooring or raw muddy ground beneath. Even if this floor lining is of concrete nature, it is bound to general decay and destruction within a course of time and also we know very well that concrete is porous in nature. The water rich in harmful compounds will start to seep downside this way sooner or later depending just on the matter of time which may be tomorrow or few years later.

The entire percolation process takes place by a lengthy mechanism elaborated in detail by Aulakh (2024) in a paper submitted for publication in the International Journal of Current Research entitled, "Biogas factories and carcinogenicity: A new arena of applied research". He explains that "the various compounds of petrochemical origin get accumulated in the above said sewage tanks and go in increasing in concentration day by day by a continuous process till a limit which is much above the tolerable diffusion coefficient levels. The said chemicals start to ooze down to the outlet connection solutions which is nothing but the extensions to the ground water underneath. The process employs the general laws of porosity and diffusion mechanisms side by side. The force of gravity also plays a part and the high density (insecticides, phthalates, fertilizers etc) liquid starts to shed its superior density content to the one of the lower density (or zero density at first) by a natural process. The water beds down there start to get contaminated toxically and when they are sufficiently done so, start in turn to pollute other water beds nearby. Slowly the entire ground water is polluted with toxic limits of the poisonous and cancerous compounds. The percolation process is a continuous process till the feeding liquid stock is not totally dried and exhausted. The ground water once polluted starts to cause its side affects". One more point should be noted here that as long as there is dirty water present on the ground above and it continues to contain toxic contaminants in higher concentrations, the percolation process will also continue happening and until and unless this solution is dried up or ceases to contain these toxic contaminants in higher concentration, then only this percolation process will stop. This may also mean the closure of such factory operations.

The percolation theory: The percolation theory is nothing but the natural process taking place of the seeping down of the above ground water soluble contaminants (harmful or otherwise) present in sewage pits, ponds, lakes, channels etc and the subsequent percolation of them to the ground water beneath in such a way that the underground water beds get polluted with such toxic chemicals and start spreading the pollution of contamination to residents and other fauna and flora of the region. The percolation of the said pollutants downwards is a natural process and extends to the jurisdiction of the water beds down below. The percolation theory takes its substance from the essence of green revolution itself. The green revolution is the one which ladened our once pure and virgin lands with super toxic doses of harmful and devastating chemicals such as insecticides, pesticides, herbicides, phthalates and chemical fertilizer residues etc and has given rise to very big health emergencies. There are countless episodes of the spread of deadly diseases like cancer, hormonal dysfunction, liver, kidney, internal organ malfunctioning etc and lot more problems having already arisen in human beings and animals as well.

The percolation process involves very simple and fundamental truths of life and is under the guiding principles of nature. The concentration gradients of the concerned chemicals in the solvent material of waste/sewage water above and below ground play their usual parts. The diffusion laws and porosity principles and capillary action of the general physics and chemistry play their respective roles and the entire process goes on unabated until there are prerequisite conditions

available for such a process to happen. When such conditions cease to exist, the said percolation process will also end.

The cancer percolation theory: Cancer percolation theory is the toxification process of ground waters by high concentrations of harmful cancerous chemicals present in sewage pits, ponds etc formed by toxic watery efflux generating enterprises over ground and the subsequent seepage of them down thereby contaminating ground water beds. It is also true that the cancerous compounds like insecticides, pesticides, phthalates etc are not just cancerous but they are also hormonal disruptors and damaging for organs like kidney, liver, lungs, heart, brain etc. Since cancer is a dreadening disease of very high concern and it attracts the attention of human mind very rapidly, so, we may call it a cancer percolation theory but side by side it is also the hormonal disruption percolation theory and also the internal organ toxification percolation theory as well. All the compounds enumerated above have a proven track record of cancer causing and they are in fact ill known for this reputation of theirs, so, rightly said this toxic percolation theory with respect to them can be called as cancer percolation theory. In fact, the cancer percolates down to the ground water in the form of these chemicals and then to the bodies of the humans and animals that depend upon this water for drinking and food purposes etc. The contamination of various crops, vegetables and fruits etc by irrigation with such polluted water has already been discussed in detail above.

The cancer belt: Malwa: Malwa region is known as the cancer belt of Punjab. It is generally presumed that it is excessive if the number is 100 cases out of a population of one hundred thousands. The cancer load is definitely more in red zone in many districts of Punjab except three districts namely Gurdaspur, Tarantaran and Nawan Shaher. It should be noted that Punjab has a total of 27 districts. In some districts like Muktsar, it is even more. A famous train named as the Cancer Train (The Hindu, 2017) runs daily from Bathinda station in Punjab to Bikaner in Rajasthan and is famous for the travel of cancer patients and their kith and kin in it because Bikaner is famous for its government run cheap and quality cancer hospitals. The point should be noted that the name cancer train is not an official nomenclature but well known in public. The national cancer load of India is also increasing and worrisome data is pouring in from states like Maharashtra, Kerala and Uttar Pradesh and even from north eastern states.

The limits of contamination already over: There are usually many angles from which a given problem is viewed and ascertained. It may be a question that what are the genuine limits of contamination of the carcinogenic agents that should make the matter a real serious one and those limits should not be crossed at all in any of the situation? The Punjab is already in the red zone as concerns the cancer question except few districts and it has won the worse reputation of being the Cancer Capital of India (Singh *et al*, 2021). So, the tolerable limits have already been crossed in this regard. Now, there may be a further question that how these chemicals get into the living systems of the bodies of humans or animals so that they end up causing cancer to these organisms. This may be from the food chain. This may be from drinking water. This may be from air in the atmosphere and inhaled via respiratory tracts or simply from touch with contaminated parts of these crops. This might have taken any route as mentioned just above but the tolerable limits have already been crossed.

The social thinkers and wise men have already expressed concern over this growing menace of cancer in this area. Now, in such a scenario it will not be intelligent in any way to further compound the situation by plunging Punjab in a further deeper well of cancer with the starting of any new enterprises with even a slightest of a possibility of causing cancer including biogas units.

The material of cancer percolation theory: Green Revolution is the rightful material of cancer percolation theory in practice and principle as well. Nobody can refute the fact that Green Revolution is an event of great happening on earth and it is very much present everywhere and in the lives of us all. We can feel it in every aspect of day to day life. It is moreover a big vehicle of economy of nations. The farmers depend on it for their livelihood and nations need it for the much needed food requirement. The legendary agriculture scientist, Norman Borlaug once commented, “This is a basic problem to feed 6.6 billion people. Without chemical fertilizers, forget it. The game is over” (Mathers, 2012). The green revolution concentrated on hybrid varieties of crops known as hybrid dwarfs. Incidentally these hybrid dwarfs needed too much of nitrogen fertilizers. Since they were hybrids, they were not as naturally equipped to cope with the microbial infections, insects and pests etc and even their survival in comparison to the natural existential struggle was a big question mark. So, they were propped up with the additional doses of chemical sprays of fungicides, bactericides, insecticides, herbicides etc. The hybrid varieties are natural in a way and they are unnatural too in the same way. They can cope better when exposed to adverse conditions and they can fare very bad too when put face to face with such an onslaught. The original varieties from which they had evolved were definitely better suited (Nelson *et al*, 2019) as it turned out later to cope with the natural struggle for existence in comparison with these newer varieties. Many of the gene pools of these newer varieties in India were imported from other countries e.g. Mexican wheat had genetics from far away Mexico and many rice varieties had their gene pools descended from countries like Philippines, Indonesia etc. They could not cope well when put in open competition to local weeds, pests and diseases. So, in order to make these varieties survivable in the local environment, they were extended support systems in the form of fertilizer replenishments and chemical sprays of weedicides, insecticides and antimicrobial agents etc. All this was done with the best of intentions in mind and the most kind and magnanimous personalities like great Norman Borlaug and MS Swaminathan took bigger initiatives in the direction of promoting this new model of harvest. Even the results were astonishing. The food productions rose to levels by hitherto unimaginable. There was happiness seen glowing on every face in the world. There was bountifulness of food grains in almost all countries on planet. The Green Revolution emerged the milestone in human development only next to the great Industrial Revolution. This is a very brief history and content of the great Green Revolution. This massive human achievement is still there and will continue to exist in very distant future in coming generations of mankind as far as the greatest visionaries on earth can foresee. Now with such a great happening already having materialized, who can be so super intelligent to deny the existence of such a phenomenon? The answer is a plain no in every aspect. When something is already present in the matter and material of it in everyday life of all but one, then where therein creeps the need to put forward a proof in the

support of such a thing as existing? Again the answer is a grandest no. Now we have reached an interesting stage. The green revolution is a great reality. Even the chemical fertilizers are a great reality. The insecticides, pesticides and the herbicides too are also great realities. The chemical sprays are showcase phenomenon present Omni places. The poisons in agriculture practice are a reality Omni places. Only we have to discuss is whether or not these chemicals are carcinogenic or hormonal disruptors? If they are such as proven by scientific history irrefutably and subtly, then where does the question arise to deny their devastating harmful affects? The answer is that they are undoubtedly carcinogenic along with being hormonal disruptors and internal organ damagers. Needless to say those internal organs include most valuable instruments of life like kidneys, liver, heart, brain, pancreas etc. The dangers with genetically modified (GM) crops so vociferously advocated for these days will be even multifold in quantity and severity than with these hybrid dwarfs. They will be catastrophic. GM crops are being propped up with the slogan, "Second Green Revolution". They will be more dependent on these artificial super doses of fertilizers, insecticides etc because they are double unnatural (with even the DNA tempered), more alien to the natural fauna and flora than even the hybrid dwarfs. We have already witnessed the devastating route of BT cotton in practical farm conditions in Punjab. So, it confirms that on confirming the existence of Green Revolution, the cancer theory automatically gets confirmed along with the hormonal disruptor theory and internal organs damage theory. The question only remains on how these harmful chemicals are taken into the living systems of humans and animals as well. The grand percolation process comes at this point as the explanation to carry these magnificent chemical carriers of disease and evil to the ground water down below. Of course, they may also get carried in the air or otherwise or directly in the diet or above ground drinking ponds for animals but the mainstay of this carriage into living systems is definitely via the ground water only. The biogas units will further speed this process up many times and result in devastating loss to mankind.

Does the solution exist somewhere?: The solution does not seem to exist in producing more bio-energy or in increasing the world food productions but on the contrary it should focus around in deceasing world populations. If this ubiquitous wishful thinking materializes, then we can afford one fine day to decrease the world food grain productions. Then the dependence as well as pressure on Green Revolution will also be lessened. Then, there will be lesser or even no need to use chemical fertilizers, insecticides etc. Then further on a day we will be able to reinvent the traditional and natural gene pools of our valuable crops as naturally adapted to local regions of their production and do away with hybrid varieties of all types and even the GM varieties. But the question is that all the nations of the world should be unanimous on this issue and make strict family planning a UN (United Nations) agenda and apply it on a world scale with strict measures. But for the time being with so much hatred and strife everywhere in the world, this seems a far fetched happening.

The safe protocols: Wherever be a problem, the solution lies therein; is a fundamental truth but it needs the best of intentions and mindset to make it a working reality. Of course, the safe protocols can be devised like the Double Decker full concrete disposal pits for such toxic generating factories with actual sewage tank being roof top at least 10 feet above ground and the lower sewage tank on ground being kept totally dry as an additional cover to stop possible seepage of harmful chemicals to ground water below. The thumb rule should be that the ground level sewage surface should be kept perpetually dry and clean at all times with proper sunlight vertical exposure windows at regular spaces and free air flow conductivity to keep the entire place tidy, neat, clean and glowing. Such a facility should be under strict public vigilance twenty four seven at least for people living in area with a five kilometer radius vicinity. The bureaucratic controls over these operations often lead to deterioration in working standards due to well known corruption and other mal-practices so rampant in governmental machinery. So, public inspection is a must. Even public committees of elected citizens of Gram Sabha or village panchayat for this purpose can do this job along with trade union of the respective factory. Other measures like monthly regular total drying and sludge removal protocols can also be designed and applied. For this purpose such sewage tanks can be constructed as compartmentalized. When one compartment is under cleaning process, the other portion(s) can be used to house the efflux discharge of the factory. The ETP's (effluent treatment plants) will be of a null and void outcome for practical reasons in this materialistic society where economics weigh much heavier than moral and dutiful obligations. The poor performance of sewage treatment plants in various cities of India and other ETP'S in various industrial units is a striking exemplary proof in this regard. Moreover, biological detoxification protocols should also be devised and applied. These measures may increase investment but health question is definitely more valuable than economics.

The cancer percolation theory re-ascertained: It is true that percolation is a continuous process that helps in transmitting the harmful chemicals when present in higher concentration above ground to the ground water down below. This phenomenon has been taken note of countless times in scientific history and we very well know about contamination of ground water in localities near to sugar factories, ethanol units, tanneries, chemical industries, paper industry etc. The sewage pits present a striking example in this case. The ground water in areas around them contains phthalates (Anne, 2021). These days even fresh water village ponds are known to have these chemicals (Rajput, 2022). The ground water of villages nearby gets contaminated thus. There is lot of other work reported also of the contamination of ground water by chemical contaminants in sewage sludge (Iqbal *et al*, 2013; Luczkiewics, 2006). There is very strong ground for the phthalates and other chemicals to accumulate in waste water pits even of sugar factories (Choudhury *et al*, 2018; Malik, 2019; Rahim and Mustafa, 2021). These days, phthalates have started to appear in aquatic cultures (Prevaric *et al*, 2021; Rajput *et al*, 2022 and Zolfaghari, 2014). These chemicals are known to travel to ground water down below. This is an example of not only continuous percolation process but also of the cancer percolation process getting transacted on regular basis because phthalates have well established cancer history.

Even there is evidence available that along with chemicals getting percolated down below, the bacteria and viruses can also do the same (Scandura and Subsey, 1997). European Union Pollution Agency (EPA) has also warned about the ground water pollution getting happened by the water contamination over ground. It has given a detailed explanation about how the contaminants pass down to ground water below from the contamination terminals of agriculture chemicals and municipal sewage ponds and also from petrochemical based

gasoline stations etc. All these examples clearly demonstrate that if there is toxic containing water accumulated anywhere above ground, it will surely seep down below to the ground water some other day by natural percolation process taking place automatically and continuously. So, similarly when there will be installation of new biogas factories and dirty toxic contaminated water will accumulate in the ponds above ground, the harmful toxins in them will surely seep through soil strata one day to the ground water below and get into the usual cycle of use for drinking and food purposes and get into living systems and then it will surely give deadly diseases like cancer. So, the cancer percolation theory is in a way re-ascertained by these vivid examples.

Postulates of cancer percolation theory: It definitely needs a separate write up to elaborate on the detailed postulates in this regard. However, a brief account can be summarized as follows:

- Cancer is a disease of genetic malfunction involving defective functioning of certain genes on the DNA probably during or around the time of mitosis.
- This genetic malfunction may be the direct derivative of hormonal disruptions such as involving the hormones like estradiol or progesterone etc.
- Certain compounds notably of petrochemical origin like insecticides, pesticides, herbicides, fertilizer residues, bectericides, fungicides etc are known hormonal mimics and hence hormonal disruptors and they wreck upon the mechanisms involving hormonal functioning.
- These chemicals are extensively used in the general Green Revolution model of agriculture and hence retained as residues in the grains as well as straw.
- These chemicals are non biodegradable to a greater extent.
- When such plant derivatives like straw or even grain are used in processes like biogas production or ethanol manufacture or any other similar digestion process involving organic material obtained from Green Revolution, they remain non biodegradable whereas other organic material of such crops may be totally biodegradable and metamorphosed.
- Upon extraction of valuable output like biogas or solid fertilizer or ethanol etc, the remaining harmful chemicals remain as abundant in the dirty waste water or efflux.
- Such dirty contaminated water or efflux when stored in big sewage pits, ponds etc will have a tendency to percolate down to the ground water by natural mechanisms.
- The ground water will thus get toxic by chemicals enumerated in 3 and serve to cause hormonal disruptions, cancer or internal organs/physiological damage in humans or animals feeding upon such contaminated ground water.

CONCLUSION

The process is very simple. The percolation process transmits harmful carcinogens in the vicinity of poisonous efflux discharge pits, reservoirs etc by way of a natural continuous mechanism guided by the laws of science and nature. Very simple laws governing the usual movement of molecules from high density above ground water reservoirs to the low density ground water like diffusion laws and porosity principles and capillary movements coupled with the forces of gravity play their roles. The thumb rule is the presence of toxic chemicals in the accumulated dirty watery efflux from such industries including biogas factories. When in a situation of already worsened cancer emergency in society by conditions aggravated by the carcinogenic chemicals present in air, water or diet; no wise person will endeavor to do anything that will further aggravate this beforehand worsened case scenario. The biogas factories are certainly no intelligent model to be enforced on such a society already fallen victim of such a big cancer menace. Not only biogas but any other nasty industry with the slightest of an inclination to spread cancer this way should be the rightful choice in this regard.

GLOSSARY OF ABBREVIATIONS

AD: Anaerobic Digestion
BC: Breast Cancer
ETP: Effluent Treatment Plant
GM: Genetically Modified
PAE: Phthalic Acid Esters

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