The Change of water PH and E.coli Bacteria Counts when Some Nano fluid compounds Were Added

Elshafia Abd-alla Ali Elzeen — Sudan University of Science and Technology

Mubark Dirar Abd-alla — Head of Shandi University – River Nile State- Sudan.

Rawia Abd Elgani — Sudan University of Science and Technology

Abdalsakhi.S.M.H — AlNeenlen University – Faculty of Science and Technology Department of Physics

Ahmed Mohamed Salih Hamed — Sudan University of Science and Technology

Abstract:

The main objective of this study is to study the change of water PH and E.coli bacteria Counts when some nano fluid compounds were addedand is to see how the addition of some seeds in a nano form affects its PH and E.coli counts in water.**The importance of this study** stems from the importance comes from the importance of having healthy water free of germs and having alkaline tendency. **The research methodology is** based on the experimental work and data analysis.The physical properties water is extremely important for human life. Thus changing their physical properties is needed. To do this 12 samples from four seeds dissolved in three different solvents were added to water. The seeds are azadirchta indica (neem), trigonella foenum graecum (fenugreek), negella sativa, and elettaria cardamomum. The solvents are methanol, ethanol and water. The seeds were grinded in a pow-

der nano form then added to the solvents to form 12 samples. Each sample was added to water. The results obtained show that the PH changes with solvent types and time, where it decreases for ethanol, methanol and water. It also decreases with time. The results obtained indicates that the bacteria counts decreases upon increasing the PH.

مستخلص:

الهدف الرئيسي من هذه الدراسة هو دراسة تغير درجة الحموضة في الماءب إستخدام بكتيريا الإشريكية القولونية عند إضافة بعض مركبات السوائل النانوية معرفة كيفية تأثير إضافة بعض البذور في شكل نانو على الاس الايدروجيني وبكتيريا الإشريكية القولونية الموجودة فيالماء وتعتمد منهجية البحث على االعملي وتحليل البيانات. معرفة الخصائص الفيزيائية للماء مهمة للغاية لحياة الإنسان ،وبالتالي هناك حاجةإ لتغيير خصائصها الفيزيائية. تنبع أهمية هذه الدراسة من الأهمية التي تأتي من أهمية وجودمياه صحية خالية من الجراثيم ولهامي القلوي. لعمل 12 عينة من أربع بذور مذابة في ثلاثة مذيبات مختلفة تمت إضافة الماء والبذور هي النيم و الحلبة والحبة السوداء والهبهان والمذيبات هي الميثانولو الإيثانول والماء وتم طحن البذور في صورة مسحوق نانوي ثم إضافتها إلى المذيبات لتشكيل 12 عينة. تمإضافة كلعينة إلى الإلى. أظهرت النتائج المتحصل عليها أن الأس الهيدروجيني يتغير معأ نواع المذيبات مع مرور الوقت، حيث تنخفض للإيثانولو الميثانول والماء. كما أنه يتناقص مع مرور الوقت. بينت النتائج أن تعداد البكتريا يتناقص مع زيادة الاسالايدروجيني.

Keywords: azadirchta indica (neem) seeds, trigonella foenum graecum seeds, negella sativa seeds, and elettaria cardamomum seeds, methanol, ethanol and water, nanoparticles, E.coli, PH meter.

The importance of this study stems from the importance comes from the importance of having healthy water free of germs and having alkaline tendency. The aim of this work is to see how the addition of some seeds in a nano form affects its PH and E.coli counts in water.

The recommendation of this study requires extending this work to include other seeds and student other physical properties.

Introduction: water plays an important role in our day life. This comes from the fact that more that 60% of our body and cells are water. The cells exchanges which give energy to the cells and

extract wastes utilize water. Recently it was discovered that most water in plastic pipes and containers become in the form of big clusters that cannot penetrate inside cell membranes. This reduces cells activations appreciably. A plastic container increases water acidity by reducing its PH. This requires using some techniques to cure these defects. Recently nano science and technology opens new horizons to cure these defects. Nanotechnology ("nanotech") is the manipulation of matter on an atomic, molecular, and nano scale. The earliest, widespread description of nanotechnology [1,2] referred to the particular technological goal of precisely manipulating atoms and molecules for fabrication of macro scale products, also now referred to as molecular nanotechnology. A more generalized description of nanotechnology was subsequently established by the National Nanotechnology Initiative, which defines nanotechnology as the manipulation of matter with at least one dimension sized from 1 to 100 nanometers. This definition reflects the fact that quantum mechanical effects are important at this quantum-realm scale, and so the definition shifted from a particular technological goal to a research category inclusive of all types of research and technologies that deal with the special properties of matter that occur below the given size threshold. Because of the variety of potential applications (including industrial and military), governments have invested billions of dollars in nanotechnology research. Through its National Nanotechnology Initiative, the USA has invested 3.7 billion dollars. The European Union has invested 1.2 billion and Japan 750 million dollars [3]. Nanotechnology as defined by size is naturally very broad, including fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, micro fabrication, etc. [4].The associated research and applications are equally diverse, ranging from extensions of conventional device physics to completely new approaches based upon molecular self-assembly, from developing new materials with dimensions on the nanoscale to direct control of matter on the atomic scale Scientists currently de-

bate on the future inventions of nanotechnology. Nanotechnology may be able to create many new materials and devices with a wide range of applications, such as in medicine, electronics, biomaterials and energy production. On the other hand, nanotechnology raises many of the same issues as any new technology, including concerns about the toxicity and environmental impact of nano materials [5]. These concerns have led to a debate among advocacy groups and governments on whether special regulation of nanotechnology is warranted.

Materials and Methods: Four samples azadirchta indica (neem) seeds, trigonella foenum graecum seeds, negella sativa seeds, and elettaria cardamomum seeds (see figures 1, 2, 3, and 4) were dissolved in three different solvents (water, methanol and ethanol.

Preparation of Samples: Trigonella foenum graecum seeds were collected from the local market. The T. foenum graecum (seed) was powdered finely using morter and pestle. Five gram powder was dissolved in 250 mL beaker Including 25 mL (Distilled water, ethanol and methanol) for 72 hours. The neem seeds were collected from the local abofroa city. The neem (seed) was powdered finely using morter and pestle, 5gram powder was dissolved in 250 mL beaker including 25 mL (distillation water, ethanol and methanol) for 72 hours. The negilla sativa seeds were collected from the local market. The negella Sativa (seed) was powdered finely using morter and pestle. Then five gram powder was dissolved in 250 mL beaker Including 25 mL (distilled water, ethanol and methanol) for 72 hours. The elettaria cardamomum seeds were collected from the local market. The elettaria cardamomum (seed) was powdered finely using morter and pestle. Then five gram powder was dissolved in 250mL beaker including 25mL (Distilled water, ethanol and methanol) for 72 hours. Five samples from each seed with 4 different concentrations were added to water to get about 20 samples beside the control. The PH and E.coli already existing in water samples for all water samples were found.

Figure (1): Dry seed of Azadirchta Indica seeds (Neem seeds)

Figure (2): Dry seed of Trigonella Foenum Graecum

Figure (3): Dry seed of negell sativa

Figure (4): Dry seed of Elettaria Cardamomum

PH meter: To determine the PH of the synthesized nanoparticles and the reaction mixtures, systronic digital PH meter. Model MAC (MSW-552) was used with maximum uncertainty in PH of ±0.01 unit. To determine the PH of solution first calibrate the pH meter using buffer solutions of different PH such as 7.0, 4.0, and 9.2. Thoroughly wash the PH electrode between measurements with distilled water to avoid carryover impurity of the tested solutions. Softly blot the electrode on a tissue paper to remove the excess rinse water and do not rub the bulb to avoid build-up static charge [6].

Figure (5): shows the pH meter.

Characterization studies: The material Characterization Lap has a wide variety of tools in terms of their structural, composition and optical properties. The crystal structure of the samples was characterized at room temperature by using a Philips PW1700 X-ray Diffraction. The location of band position of the examined were example by using PH and E.coliBacteria counts for the 12 samples of water When the four seeds powders were dissolved in the three solvents they form 12 samples. An equal amount from each sample was added to water to form 12 water samples. The PH and the E-coli count existing already in water was found as shown by the figures and tables below.

Table (1): The PH of the 12 water sample beside control.

Sample	Water mixture	First Week	Second Week	Third Week	Fourth week
Sample C	Control	14.75	12.21	11.83	9.95
sample 1	Neem ethanol	14.64	11.63	10.24	8.95
sample 2	Neem methanol	14.52	10.411	9.12	8.83
sample 3	Neem water	14.48	10.21	8.05	7.73
sample 4	T.F.G ethanol	14.29	9. 93	7.81	7.52
sample 5	T.F.G methanol	14.13	8.72	7.69	6.46
sample6	T.F.G water	14.05	8.54	7.34	6.23
sample 7	N.Sativa ethanol	14.02	7.36	6.24	5.95
sample 8	N.Sativa meth–anol	14.53	11.42	10.13	8.73
sample 9	N.Sativa water	14.36	10.09	8.02	7.58
sample 10	E.cardamom ethanol	14.09	8.58	7.75	6.34
sample 11	E.cardamom methanol	14.01	8.43	7.23	6.11
sample 12	E.cardamom water	14	8.33	7.11	6.01

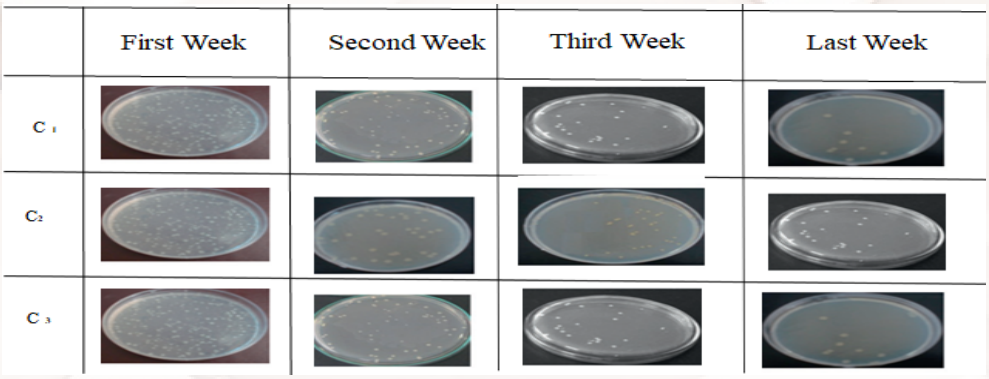

Figure (6): bacteria activity of E.Coli

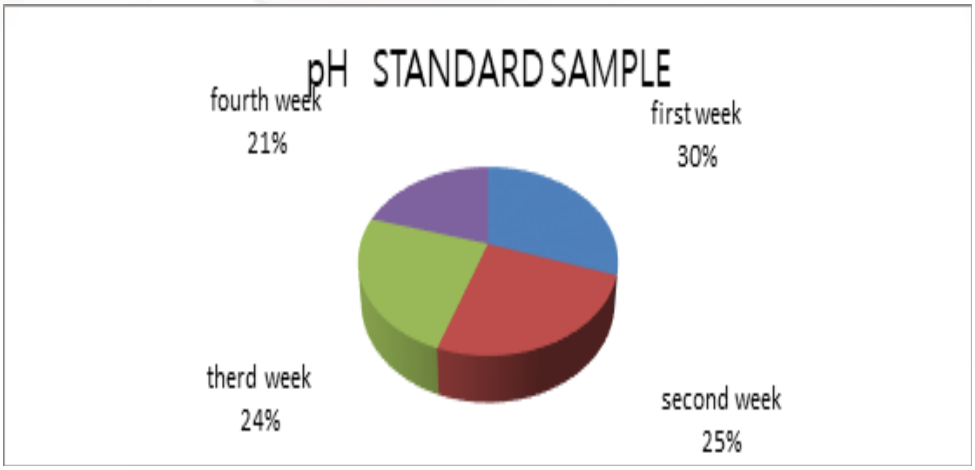

Figure (7): Statistical bacteria activity E-Coli results of pH for the standard sample.

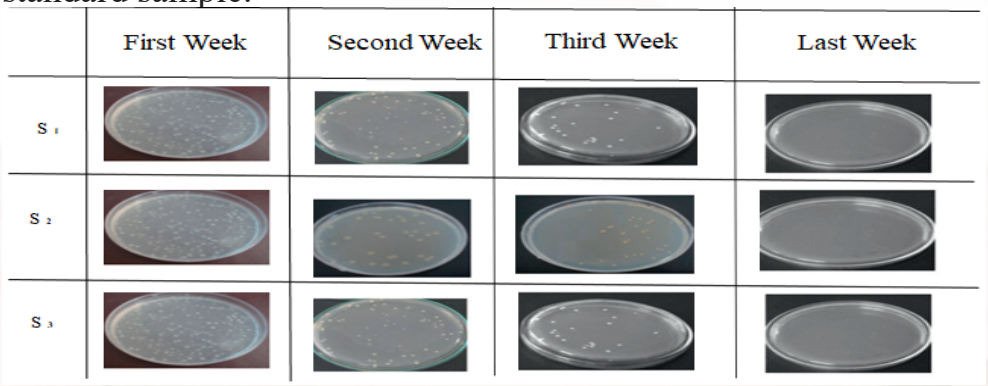

Figure (8): Antibacterial activities ofthe Azadirchta Indica seeds (Neem seeds) against of E-Coli.

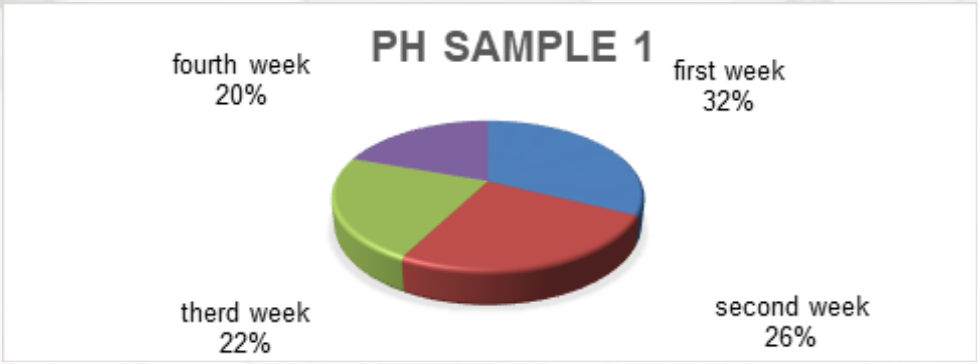

Figure (9): Statistical bacteria activity E-Coli results of pH for Azadirchta Indica seeds dissolved by ethanol.

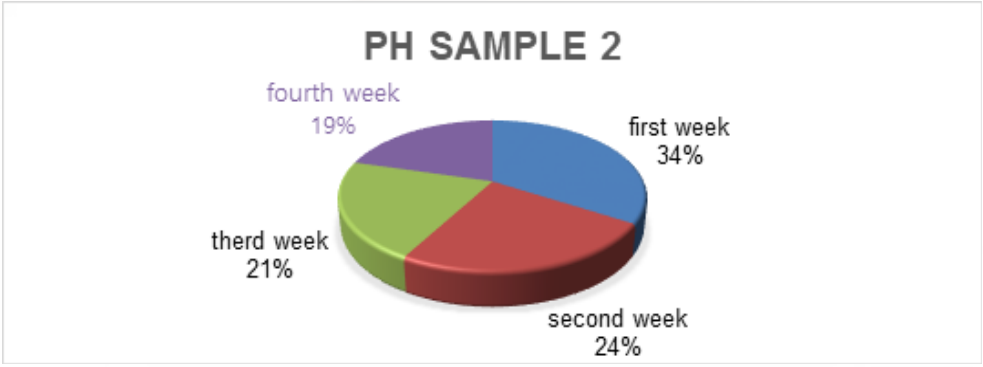

Figure (10): Statistical bacteria activity E-Coli results of pH for Azadirchta Indica seeds dissolved by methanol

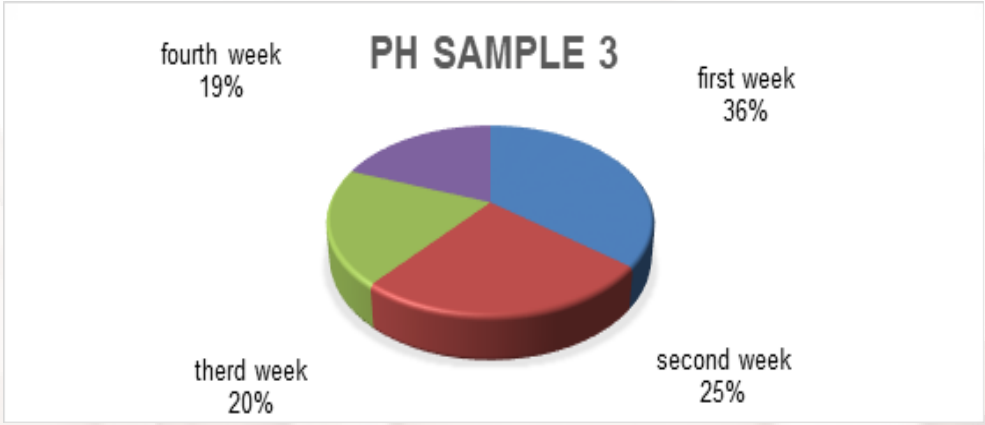

Figure (11): Statistical bacteria activity E-Coli results of pH for Azadirchta Indica seeds dissolved by water.

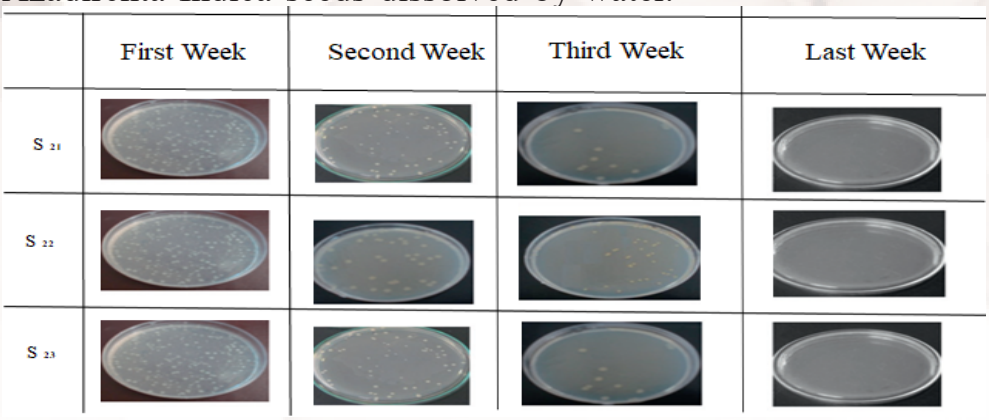

Figure (12): Antibacterial activities oftheTrigonella Foenum Graecum seeds against of E-Coli.

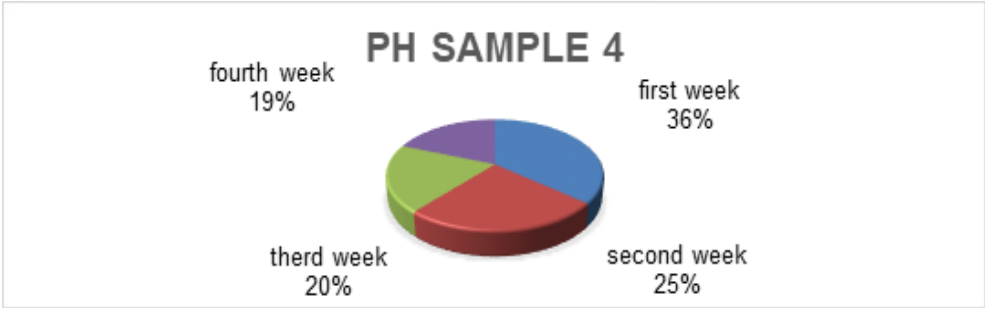

Figure (13): Statistical bacteria activity E-Coli results of pH for Trigonella Foenum Graecum seeds dissolved by ethanol.

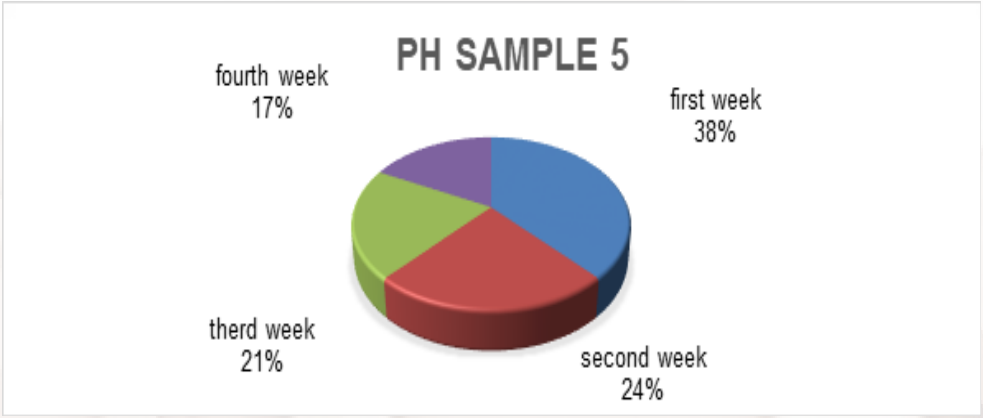

Figure (14): Statistical bacteria activity E-Coli results of pH for Trigonella Foenum Graecum seeds dissolved by methanol.

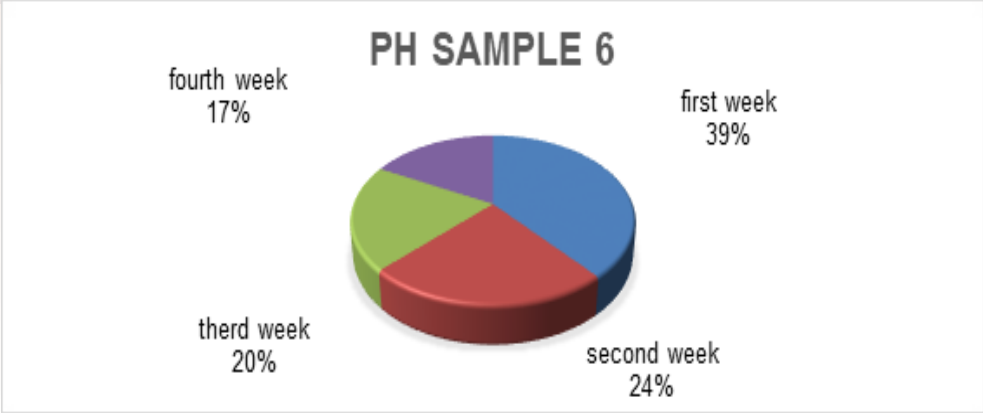

Figure (15): Statistical bacteria activity E-Coli results of pH for Trigonella Foenum Graecum seeds dissolved by water.

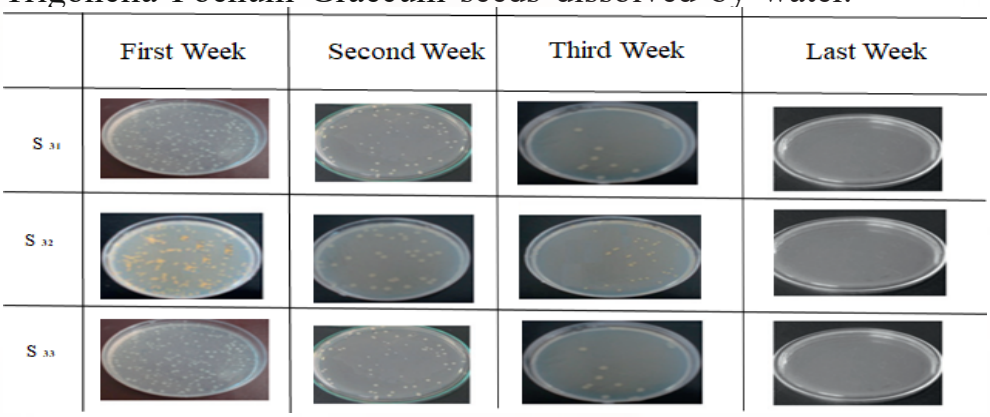

Figure (16): Antibacterial activities ofthe Negella sativa seeds against of E-Coli.

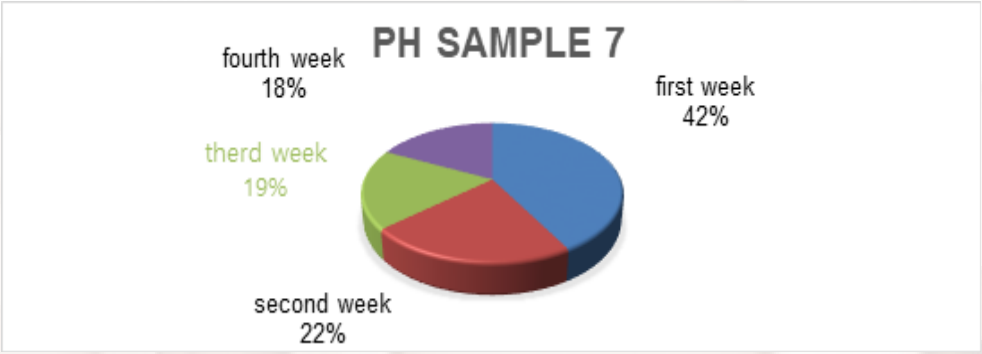

Figure (17): Statistical bacteria activity E-Coli results of pH for Negella sativa seedsdissolved by ethanol

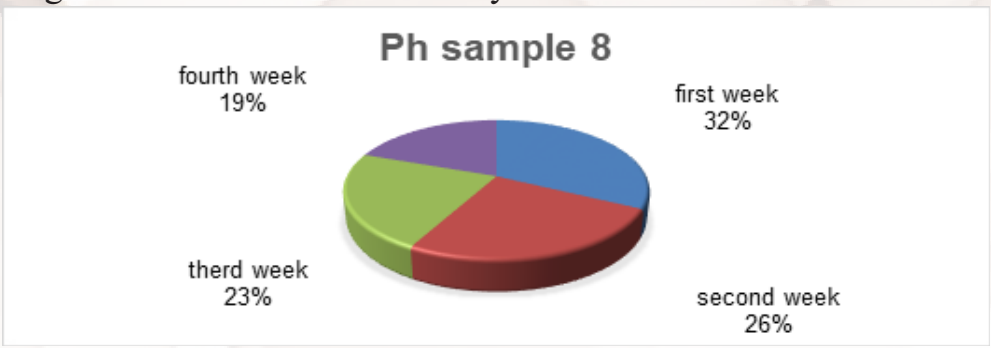

Figure (18): Statistical bacteria activity E-Coli results of pH for Negella sativa seeds dissolved by methanol

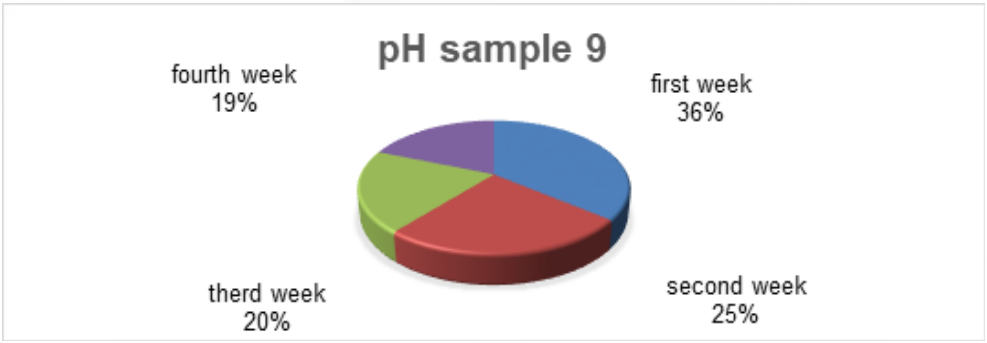

Figure (19): Statistical bacteria activity E-Coli results of pH for Negella sativa seeds dissolved by water.

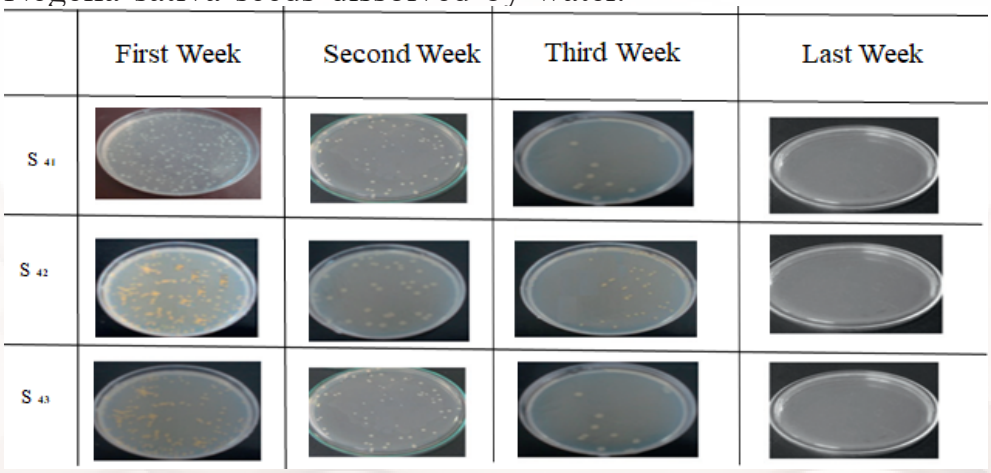

Figure (20): Antibacterial activities oftheElettaria Cardamomum seeds against of E-Coli.

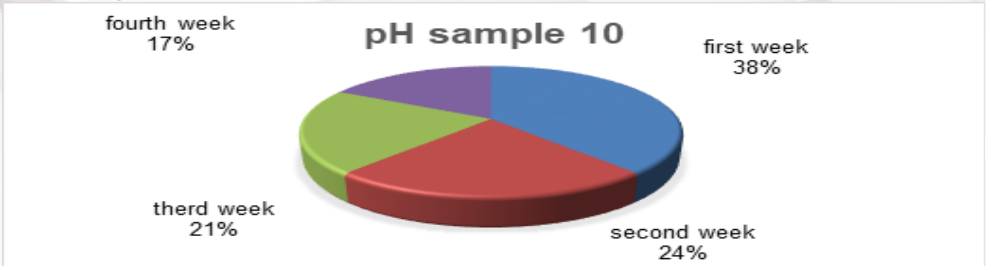

Figure (21): Statistical bacteria activity E-Coli results of pH for Elettaria Cardamomum seeds dissolved by ethanol.

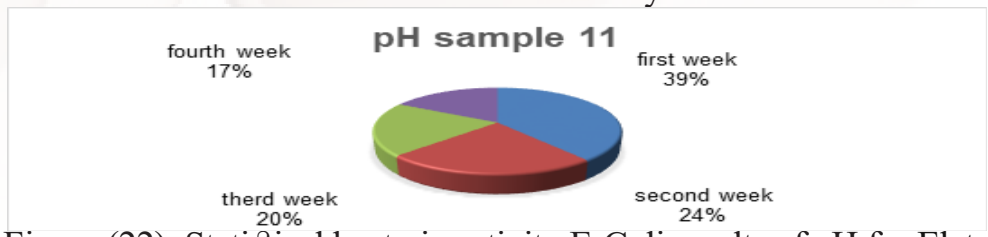

Figure (22): Statistical bacteria activity E-Coli results of pH for Elettaria Cardamomum seeds dissolved by methanol.

Discussion: The PH of water of for the 12 sample beside the control in which no seeds were added shows very intersecting results as shown by table (1) and figures (9), (10), (11), (13),(14), (15), (17), (18),(19),(21),(22) and (23) . The results show that the PH decreases in general for Ethanol, Methanol and Water respectively. It also decreases with time weakly where it attains maximum value in the first week than take minimum value in the fourth week.The E. coli counts decreases upon increasing the water PH.

The result of the study:

- The water PH decreases in general for Ethanol, Methanol and water respectively .
- The water PH decreases with time
- The E. coli counts decreases upon increasing water PH.

Conclusions: The PH and E.coli which reflects deionization and change of internal thermodynamic energy changes also with chemical bonds and solvents beside time. The change of this PH and E.coli counts due to the change of concentration of the nano powder indicate that the nano concentration may be reasonable for this change.

The recommendation of this study requires extending this work to include other seeds and student other physical properties.

References

(1) Drexler E (1986) Engines of Creation: The Coming Era of Nanotechnology, Doubleday.

(2) Drexler KE (1992) Nano systems: Molecular Machinery, Manufacturing, and Computatin. John Wiley & Sons Inc, New York, NY, USA.

(3) Bisen DP, Sharma R, Brahme N, Tamrakar R (2009) Effect of temperature on the synthesis of CdS: Mn doped nanoparticles, Volume 6, page 427-431.

(4) ngh A, Jain D, Upadhyay MK, Khandelwal N, Verma HN (2001) Green synthesis of silver nanoparticles using Argimonemexicana leaf extract and Evaluation of their antimicrobial activities. Digest J Nanomat and Biostruct volume 5 page: 483-489.

(5) Cristina B, Pacheco IIB, Robbie K (2007) Nanomaterials and Nanoparticles: Sources and Toxicity. Biointerphases 2: MR17-MR172.

(6) Niharika Nagar, University of kota, kota 2018,Synthesis of Metal Nanoparticles and Their Application in Degradation of Textile Dyes by Advanced Oxidation Process , Department of Chemistry J.D.B. Govt. Girls College, Kota