

“Effect of Ultrasonic Penetration in the Aqueous Beet Root Juice with Respect to Constant Temperature and Pressure”

Dr. Archana H. Bhapkar¹, Dr. M. P. Ghatule², Dr. D. H. Bobade³, Dr. H. R. Bhapkar⁴

¹Dattakala Group of Institution, Bhigwan, Pune

²Sinhgad College of Science, Vadgaon, Pune

³Chandmal Tarachand Bora College, Shirur, Pune

⁴MIT ADTU, MIT School of Engineering, Loni- Kalbhor, Pune

Abstract – In process of neutralization of aqueous solution, pH value control has significance in Chemical industry. Neutralization process depends upon factors such as nature of acid and base, stirring, temperature etc. In view of control theory, this process is found to be highly non-linear with respect to pH value. Proper control of pH ensures good quality products. In fact, some products of process industries depend upon pH only. Optimizing pH value is difficult task mainly due to uncertain and non-linear nature of pH control.

The penetration of ultrasonic waves found to be affect on pH value at constant temperature and pressure along with total recovery of the sample. The same protocol has been scrutinized for different electrolytes at different concentration studies and it is found to be extremely efficient with high integrity with respect to cost effectiveness in the present industrial scenario.

Hence in the present innovative study the measurement and change in the pH value of beet root juice using ultrasonic waves of specific wavelength has been carried out by using single prototype.

Finally paper concludes the comparison of results of change in pH between traditional methods and this innovative method of ultrasonic wave treatment. Beet is useful for us in our everyday life. It is a piece of eating regimen nourishment moreover. Beet root juice is set up in blender and after that it is separated appropriately to frame liquid arrangement.

KEYWORDS: Ultrasonic waves, pH solution, Cavitation

1. INTRODUCTION

Ultrasonic pH controller for consistent state process show has been produced to ponder recognizable proof change in pH esteem for various synthetic compounds and squeezes which are in watery frame.

At the point when ultrasonic waves enter in this specific example of juice or synthetic substances, at that point change in pH is towards level of nonpartisan which bolsters high action of chemical (protein) for detoxification in digestion process.

Be that as it may, it is worthwhile to expend ultrasonically treated juices or synthetic substances as opposed to typical juice or synthetic compounds. Hence this particular research work demonstrates noteworthiness of ultrasonic waves to change and control pH valuably.

This examination work fundamentally contrasts conventional control and ultrasonic control of pH, correlation thought processes in further research work for more prominent mechanical application. Entrance vitality of ultrasonic gives measure change in pH esteem. This magnificent outcome is unquestionably helpful to control pH esteem which is fundamental need in synthetic industry. In this manner it is presumed that this examination work demonstrates created model ultra sonopentrator gadget is extremely helpful than conventional strategies to control pH esteem. Beet pull is gainful for us in all angles. It is taproot bit of beet plant. In Hindi it is likewise called as chukandar. Beet root juice is typically part of solid eating routine. It is likewise utilized as nourishment, other than that beet pull is utilized for sustenance shading and in therapeutic field.

Beetroot is utilized as treatment for assortment of conditions, particularly sicknesses identifying with assimilation and blood. Glass of beet juice gives your heart strong lift. Individuals with hypertension brought down their pulse for up to 24 hours who some gritty purple mix juice.

Change in pH esteem was seen after infiltration of ultrasonic waves. In present research work for test work we utilized synthetic concoctions and juices which are effortlessly accessible and furthermore utilized routinely. Utilizing ultrasonic wave's pH esteem was diminished after infiltration of ultrasonic waves.

Examination work centers on change in pH esteem by utilizing ultrasonic waves. In our test work we seen that when ultrasonic waves are infiltrating through watery arrangement i.e. synthetic compounds or some organic product squeezes then pH esteem is diminished. Be that as it may, when pH estimation of that arrangement or juice was checked after half hour or following 60 minutes, pH esteem was same as we recorded that after penetration of ultrasonic waves.

1.1 MATERIALS AND METHODS

Raw material

Volume of beet root juice for penetration used was 500ml. Juice was prepared and then filtered properly.

1.2 Materials and Methods

For the evaluation of basic idea of effect of ultrasonic waves on pH can be studied by laboratory scale prototype ultrasonic pH controller. This method uses the physical material to build up an experimental set up and also uses basic laws of physics and chemistry.

1.3 PH determination:

PH of the alkaline solution before and after ultrasound was determined by pH meter. The measurements were carried out by placing ph electrode in the beet root juice solution.

1.4 Statistical analysis

The effect of the ultrasound treatment on the properties investigated and determined. pH values for different periods were noted when ultrasonic waves are passed through the solution.

1.5 Instrumentation



Figure: Photo of experimental setup



Figure: Beet Root and its Juice

Instrumentation includes glass material reactor fitted with ultrasonic generator and pH measurement system which is as shown in figure. During research work amplitude is on one fixed range and also the penetration on and off time is set by controller button. To start penetration of ultrasonic waves the main important point is to set the buttons accordingly. The prototype design for the experimental work is shown in above figure.

2. EXPERIMENTAL PROCEDURE

In the present study, the pH value is calculated without change in temperature and pressure for beet root juice solution of 500ml. The experiment is carried out for beet root juice and after 5 minute and 10 minutes pH is measured successively. The value of pH is measured before penetration of ultrasonic waves and then after penetration of ultrasonic waves. When ultrasonic waves are penetrated through the aqueous solution i.e. beet root juice then we observe cavitation process which is shown in figure. Also pH value changes when we penetrate ultrasonic waves in the liquid.

Observations are shown in the observation table given below:

Table 4.5 pH values in presence of ultrasonic waves and in absence of ultrasonic waves for beet root juice

Name of Sample	pH Value of Sample		
	No Ultrasound	Ultrasound 30 kHz	
		5 Minutes	10 Minutes
Beet Root Juice	6.6	6.0	5.9

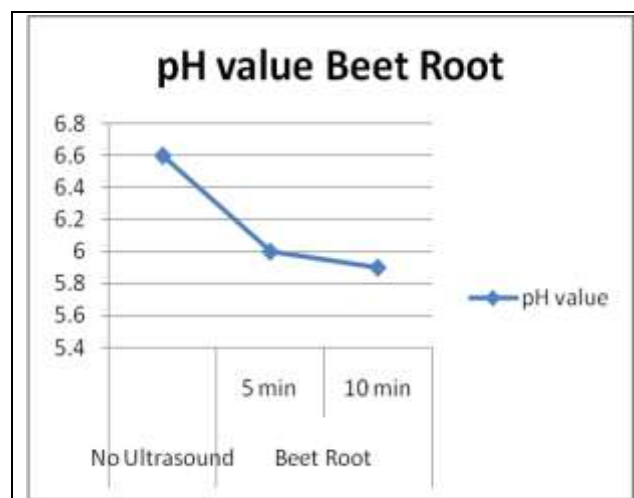


Chart -1: Variation of pH value with time

3. RESULTS AND DISCUSSION

Ultrasonic waves entered through watery arrangement with settled recurrence i.e. 30 kHz. For every 5 minutes and 10 min readings are recorded from time of infiltration of ultrasonic waves as portrayed in observation table. Infiltration of ultrasonic waves diminishes pH estimation of arrangements inside 10 min. In present examination, parameter i.e. pH changes are seen before penetration of ultrasonic wave and after penetration.

This examination work fundamentally contrasts conventional control and ultrasonic control of pH, correlation intentions in further research work for more noteworthy mechanical application. Entrance vitality of ultrasonic gives measure change in pH esteem. Penetration of ultrasonic waves alters pH value of beet root juice from 6.6 to 5.9 within 10 minutes. In the present study, the parameter i.e. pH changes are observed before penetration of ultrasonic wave and after penetration.

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AUTHORS



Dr. Archana H. Bhapkar, M. Sc. B. Ed. Ph. D., Assistant professor, Department of Physics, Dattakala Group Of Institution, Bhigwan, Pune, Maharashtra, India. She has 13 years teaching experience and published 10 research papers in National and International journals. She has authored 09 books of Engineering physics.



Dr. M. P. Ghatule, M. Sc., M. Tech. Ph. D., Professor and Principal, Department of Physics, Sinhgad college of Science Pune, Maharashtra, India. He has published 46 research papers in National and International journals. His research area is Digital Control Artificial Intelligence Fuzzy control, Internet of Things. He has received two awards for the excellent research work. He has authored 16 books of Electronics and Physics.



Dr. D. H. Bobade, M.Sc. Ph. D. He is working as Associate Professor in Physics at Chandmal Tarachand Bora College, Shirur, Pune. He has published 26 research papers in National and International journals. He is the member of board of studies in physics in JJTU, Rajasthan and Y.C.I.S. Satara. He has written books of Physics and approved research guide.



Dr. H. R. Bhapkar, M. Sc., SET, Ph. D., Associate Professor, Department of Mathematics, MIT College of Engineering, Pune, Maharashtra, India. He has published 22 research papers in national and international reputed journals. He has Authored 141 books of Engineering Mathematics for different universities of India. He is the member of board of studies at MITADT University, Pune and M.C.A.C.S. Pune.