STUDY ON THE MOST EFFECTIVE CONDITIONS AND ENVIRONMENT THAT EXERT INFLUENCES ON EXTENDING LIFE OF YEAST CELLS

* Sakuntala Rodrak, Phatsasi Tewkul and Tipyaporn Tewkul
Princess Chulabhorn Science High School Trang, Thailand

DOI: http://dx.doi.org/10.24327/ijrscr.2020.1104.5266

ABSTRACT

Yeast is a kind of microbes that people always use for daily life benefits. But the most common problems for all the yeast users is the limited storage times and it’s very wasteful to throw away the expired yeast and buy the new one continuously. The purpose of this research was to find the conditions that can best prolong yeast life. By setting up the experiments for two sets that are temperatures and light colors and use Saccharomyces cerevisiae in this experiment. In the first experiment, raise the yeast in the three different temperature that are 2 Celsius with 28% humidity, 20 Celsius with 70% humidity and 40 Celsius with 55% humidity. The result shows that 25 Celsius is the temperature with the most yeast left in it and cell’s most average density is 118,083,333.33 cell/ml. The results are different in the same 0.05 significance level. And in another experiment, raise the yeast in three different light colors that are red, blue and white. The result shows that red is the color with the most yeast left in it and cell’s most average density is 115,333,333.33 cell/ml. The results are different in the same 0.05 significance level.

INTRODUCTION

Yeast is a microbe that has been used by humans from the past to the present. Which is utilized in daily life And many industrial benefits, such as making bread, wine, liquor, beer, alcohol, etc. Today, yeast has also been used to make a variety of dermatology. In which each baker will have yeast left over from use Therefore it is necessary to store the yeast for the next use A popular method of storage today is to store in the purchased container. May keep in the refrigerator Cabinets for storing food or placing in a general kitchen. As a result, the problem of yeast storage in this form is that the yeast will deteriorate quickly. Makes it unable to be used next time Therefore causing waste if having to discard the deteriorated yeast before expiration And must buy again every time you want to use From the environment of the location where yeast is stored, each temperature Humidity and exposure to different The researcher is interested to study the optimum conditions that can maintain the best yeast conditions. The factors in the study of yeast preservation are temperature, humidity, and color. For the benefit of people who want to extend the shelf life of yeast as much as possible and to help reduce the cost for entrepreneurs in many industries that need to use yeast as the main component. Including the invention of packaging for yeast storage

Objectives

1. In order to study the optimum conditions for storage and preservation of yeast.

Hypothesis

1. Different temperatures Has different effects on storage and preservation of yeast.
2. Different colors of light Affecting the storage and preservation of yeast differently.

Scope of study

In conducting studies it is used Saccharomyces cerevisiae which is a specie of yeast used for making bread and other bakery items.

Study variables

Independent variable Temperature used to store yeast , Light colors used in yeast storage
Dependent variable Remaining yeast amount
Controlled variable Storage time for yeast ,Light intensity

*Corresponding author: Sakuntala Rodrak
Princess Chulabhorn Science High School Trang, Thailand
Yeast

Yeast is a group of molds that are mostly single cells. There are many shapes, such as round shape, ret triangle. Lemon Shape Guava, etc. Most of them are non-sexual reproduction by way of sprouting. It is commonly found in soil nature, in the soil, in different parts of the plant, some yeast is found in insects, and in the stomach of some animals, the source of yeast is commonly sourced with high concentrations of sugar, such as sweet juices, natural yeast, often contaminated into food. Yeast is a very small creature. The eukaryotic micro-organisms are arranged in fungi, both useful and punishable for food. Yeast has been used for a long time ago, especially in the production of alcoholic foods from very small properties, can be cultured in a timely manner and a hassle-free approach. As a result, yeast begins to play an important role in aquaculture. It can be used as one of the most important natural foods, such as red mites. Rotifer and Artemia Yeast is a microorganism known since ancient times, although it is said that yeast is the first microorganism that humans use. The first report on the use of yeast was a type of beer called Heineken, about 6,000 BC. Thais have known to take advantage of yeast for a long time, such as in some fermented cooking, namely rice mak. Jaew, pickled of many types of drunken ness such as o, sato and apotion, etc. Yeast is currently used in many industries, such as alcohol production. Various types include beer, wine and whiskey. Ethyl alcohol production for chemical and fuel use. The production of yeast cells is used as bread yeast and is a single protein. Some types of mold can be used to produce liquor, but some molds are specially cultivated. It is a mold that is manufactured for commercial and exclusive copyright, such as mold. KalsbergNogensis is a copyright educator who used to produce a Kalsburg beer. The quality yeast production must be certified by leco institutions to be able to be sold in European supermarkets such as Hermes and Struers. Baker yeast is made to furbread, as the yeast is inserted with sugar in bread flour, also known as "dough", and while it eats food, it will be breathing anaerobic breathing. Glucose breakdown has adenosine triphosphate and spitting out carbon dioxide. The gas that spits out pops up between the meat, the bread, creating porous until it swells. The brewer yeast, a yeast that is fermented, made of beer and wine. It has a relatively severe flavor, yeast brewers, consisting of a lot of nutrients, contains 16 amino acids. 14 types of vitamins 17 types. There are also high minerals such as chrome, zinc, iron, phosphorus and selenium, and yeast brewers are also an important source of protein of 16 grams per 30 grams of yeast volume, up to 50%-55%.

Saccharomyces cerevisiae

This is a type of yeast derived from the Greek that is Latinized, meaning sugar mold. Saccharo- means sugar and myces means mold. Cerevisiae comes from Latin, meaning beer, used for fermentation. (Fermentation) to get the main product is ethyl alcohol. This type of yeast will change Sugar gives ethyl alcohol and carbon dioxide. Used in the production of alcoholic beverages. There are many types of beer, which are called Brewer's yeast, which are used to produce beer. Ale is also known as Ale yeast. Its characteristics are Produce high alcohol at a temperature of 16 to 24 degrees Celsius after fermentation. The yeast cells float on the surface of the beer. Make it known as Top-fermenting yeast or top yeast or surface yeast, wine, sake, brandy, whiskey, rum. Cerevisiae may be used in combination with other microbes such as mold bacteria for fermentation of protein foods such as soy fermented foods. To give the aroma of alcohol, such as fermented soy sauce (fermented soy sauce) used as a leavening agent (leavening agent) to produce bakery products that may be called Saccharomyces cerevisiae says Baker's yeast is used for the production of bread, donuts, yeast. Bread that is fluffed up with yeast is called yeast leavening bread. Yeast used for bakeries. May use the form of fresh yeast or dry yeast, mixed with wheat flour and sugar. In the first step in bread production, yeast uses sugar as food and then produces carbon dioxide. Make wheat flour, which has gluten proteins that are sticky and flexible, expand into air holes in small spaces. In the texture of the bread. Causing the structure of the bread to rise s yeast is used for the production of bread. Yeast donuts, yeast-shaped breads are called yeast leavening bread yeast used for bakeries. May use the form of fresh yeast or dry yeast, mixed with wheat flour and sugar. In the first step in bread production, yeast uses sugar as food and then produces carbon dioxide. Make wheat flour, which has gluten proteins that are sticky and flexible, expand into air holes in small spaces. In the texture of the bread. Causing the structure of the bread to rise.

Light colors

Light is radiation energy that recognizes and reacts with the process of analyzing the brain's distinguished analysis. The eye can analyze light energy by acknowledging the object, relative to position, direction, distance. The intensity of light and visible wavelengths, colors, is the color-of-light intensity that appears to be colored by visual lye, looking through the eye-based perception process, where the eye has already passed through the nerve, touching vision through the center of the brain switching to the visual center. The data was analyzed to distinguish us from the fact that the light wave measurement scan began in the 19th century in 1928. It was presented in 1931 by analyzing colors from spectrum light relative to light wavelengths. It shows the white light in the midst of a spectacle around horseshoe-shaped horseshoe shape, showing wavelengths of 400-700 mu cie-colored triangles built on the X and Y-Carltonties. 0 mu green about 520 mu and red about 700 mu is the color of the light, mixed and produces different colors, the red light has the highest wavelength, but the minimum wave frequency is refracted to the slightest, and the purple light will have the lowest wavelength, but the maximum frequency of waves and refractable as much as in the last year. 1666 Sir Isaac Newton has shown that the color is part of the nature of the sun, with the beam shining through the prism glass bar. The light is refracted because the prism glass bar is more dense than the air when the beam refracts through the prism, it appears the spectrum, also known as Rainbow, is purple, indigo, blue, yellow, yellow, red when the light falls on the molecules of matter. Some of the energy absorbs the color from some light and reflects some colors. The surface of the object we see is red because the object absorbs the light, others reflect only the red light. White objects reflect all colors, and black objects absorb all colors.
absorb all colors from Newton's refractive theory, and from the CIE-colored triangle, the light is the only energy that appears from all three sides of the CIE color triangle. When it comes to projection, the colors will be formed, the structure of this CIE triangle is not based on one theory, but due to scientific research experiments, industrial printing systems. Photography, movies, televisions use this color structure primarily. In the printing system, the color from the 3 sides of the horseshoe is yellow, blue, magenta and black. Section to shoot movies, television, computer monitors The color from the three corners is red, green, blue.

Temperature

Temperature is a measure of the average kinetic energy of a particle in any substance that corresponds to the heat or cold of that substance. In the past, there were two ways of thinking about temperature: following the principles of thermodynamics. And according to the micro-description in statistical physics That concept of thermodynamics Was developed by Lord Kelvin In relation to the measurement in the macro Therefore, the definition of temperature in the first thermodynamics. Therefore specifying the various variable values that can be measured from the observation The statistical physics approach provides more in-depth understanding than thermodynamics. By explaining the accumulation of large particles And interpret the parameters in thermodynamics (macroeconomic) as the statistical mean of the parameters of the particles in the micro In the study of statistical physics Can interpret the definition of temperature in thermodynamics as Is a measure of the average energy of each particle in degrees of freedom in a thermodynamic system Which the temperature can be viewed as a statistical property Therefore, the system must consist of a large amount of particles in order to be able to provide meaningful temperature values that can be utilized in solids. This energy is found in the vibrations of matter atoms in a balanced state. In ideal gas This energy is found in the movement of gas molecules.Thermometer is an instrument to measure the amount of heat or cold Temperature measuring instruments are called thermometers. Made from glass tubes inside containing liquid or mercury The liquid inside the glass tube shrinks when it gets cold and expands when exposed to heat. There is a scale on the glass tube indicating temperature. When measuring, immerse the bulb at the end of the glass tube and make contact with the object you wish to measure.In addition to the thermometer, there are other types of temperature instruments such as thermocouples, infrared rays, thermistors, etc.

There are 3 units of temperature measurement commonly used

Celsius or ° Celsius (° C) sets the absolute zero point to -273 ° C, the freezing point is 0 ° C and the boiling point is 100 ° C degree.

° F Fahrenheit (° F) sets the zero point to absolute zero - 459.67 ° F, the freezing point is 32 ° F and the boiling point is 212 ° F

Kelvin (Kel) sets the zero point The absolute degrees are 0K, the freezing point is 273K and the point is The 373K

There are many methods developed to measure temperature. It is mainly a measure of the physical characteristics of materials that vary with temperature. Caution in the measurement of temperature is to choose the measuring tool that is suitable for the material to be measured. In some situations, the heat from the measuring instrument causes the temperature value to deviate from reality.

Cell counting

Counting slides on a counting chamber.Slides with a counting chamber
- Petroff - Hauser counting chamber. Bacteria are counted.
- Haemacytometer uses a large eucaryotic microbe.

These slides have a chamber which knows the depth of the chamber and the floor of the chamber is a square which knows the width and length of the square. Therefore, when microbes are dripped into a chamber with a cover glass closed, microbes are counted using a 400X magnification microscope in a small cube. It will be able to calculate the number of cells per ml of the sample. For the pros and cons of the counting chamber, it is the same as stained film.
Calculation of cell density derived from counting

Each side of the hemoglobin consists of 9 large tables, each side having an area of 1 mm and a depth of 0.1 mm in volume. Total \(1 \times 1 \times 0.1 \times 9 = 0.9\) cubic millimeters Before counting the cells, the magnification of the camera must be selected to suit the type of cells. If the cells are large, count the cells in the four corners and the middle of the big table. If the cells are small, count the cells in the middle of the big square of the sub-grid by counting the cells at the four corners and the middle of the sub-grid. Each sub-square has an area of 1/25 square millimeters. For cells that overlap between the tables, count the cells at the top and left. The cells on the bottom and the right do not count the cells in 5 sub-tables. Each sub-area has an area of 1/25 square millimeters, representing 0.04. The millimeter table has a depth of 0.1 millimeters. Therefore, each sub-table has a volume. 0.04x0.1 = 0.004 Cubic millimeters, the volume of 10 sub-tables is 0.04x10 = 0. 04 cubic millimeter Divide the number of cells counted by the sub-square volume Will get the density in cells per cubic millimeter Then multiply by 1000 Will get the value in units Cells per milliliter When the cells are too dense Must dilute the cells for easy counting Must be multiplied by dilution factor, dilute the solution by 10 times, when obtaining the final density, then multiply by 10

Hygrometer

A hygrometer is a tool used to measure the amount of steam that is in the air. Relative humidity can be measured in the range 0 to 100% RH. However, most measuring tools, the measuring range depends on the type of sensor. Relative humidity is expressed as a ratio of the amount of steam present in the air or the gas reaching the saturation point 100%

There are two popular instruments for measuring air humidity as follows

Wet and dry hygrometer is a dark instrument to measure humidity by evaporation of water to absorb heat as well. Where the evaporation is more or less depends on the freshness of the air at the time, it consists of two pairs of thermometers, one for measuring temperature Bulbous The other is used to measure moisture. Finding the relative humidity can be done by reading the attached humidity table with the instrument.

How to use It is to tie the cloth and dip it in a glass of water and the water will evaporate until the lowest temperature is called a wet bulb. And then compare and contrast between them in the humidity table There is also a digital hygrometer that is easy to use and can measure humidity in a wider range.

<table>
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<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
<th>25-29</th>
<th>30-34</th>
<th>35-39</th>
<th>40-44</th>
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<tr>
<td>1.5</td>
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<tr>
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<td>86</td>
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<td>65</td>
<td>68</td>
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<td>7.0</td>
<td>26</td>
<td>38</td>
<td>46</td>
<td>51</td>
<td>57</td>
<td>60</td>
<td>63</td>
</tr>
</tbody>
</table>
windows is a simple form of use Because there is a dialog menu system that is a Dialog box and a window system to choose the type of Check box or Option button. In addition, the user can save the work process that the user chooses as a set of commands (Syntax) similar to the operation as Programs like the SPSS / PC. As for using SPSS for Windows, users should already have some basic usage of Microsoft Windows applications. This will make SPSS for windows more streamlined. SPSS for Windows Program Currently, SPSS programs are developing new versions of programs on a regular basis. And have a scope for statistical analysis That covers more Whether it is business data analysis, marketing, production control Including scientific data analysis Industrial The meaning of SPSS has been changed to Statistical Product and Service Solutions. Advantages of the SPSS program

The program is widely known and is used mostly in social sciences and is used in medicine and public health in the absence of statistics. Advanced Can find books easier to read than STATA

Program easy to use You can select commands from the menu. Especially those who do not Expertise in statistics And can be saved as a syntax for storing words Can be ordered later

The dataset in SPSS does not restrict which version it is made from because it can Can open all versions, such as creating dataset from version 12, able to use the dataset to open version 10. The disadvantage of SPSS program

In the case of advanced statistics, SPSS will have problems that cannot be analyzed, such as Survival

May occur The problem of garbage in garbage out means that if you cannot clearly identify which one is the initial variable, the dependent variable, or the variable type Then input that variable, the program will calculate it according to the information we put in Causing the analysis results Data error Followed by another discussion of the wrong result.

Related research

Yuwaphin Dandusitaphan (2004) The objective of this research is to study how to increase the shelf life of dry yeast. And reduce mortality during storage By focusing on the study of various factors that will allow yeast to be stored for longer Usage in the form of fresh yeast or cream, yeast often has problems with shelf life. Therefore, the technique of dry bread yeast production has been developed which still has good fermentation activities. And keep longer This type of yeast is called Active Dry Yeast (ADY). A good dry yeast should have a high survival rate after the drying process. And can keep for a long time The survival rate of yeast depends on many factors such as how to produce dry yeast. Environmental factors during yeast culture And the preparation formula for formulation (Formulation) before the drying process, etc. In general, the formulas used in formulation Composition for formulation during yeast drying Such substances such as Stabilizer (stabilizer), Emulifier and anti-oxidant substances in the previous experiment, the research group Studies on the formulation of dry yeast with a survival rate of up to 43% when the stabilizer trial was 1.15% (weight / weight) guar gum mixed with emulsifying agent is 7.5. % (Weight / weight) span 60 and 1% (weight / weight) CaHPO4 mixed with yeast. During drying However, found that Although the yeast has a high number of surviving cells compared to the yeast without additives But cannot be kept for a long time and the survival rate decreases continuously, with only 1 week of life when stored at room temperature or about 6 weeks at 8 degrees Celsius

Wassana Kornrat (2018) Study on the use of LED lamps for the production of Isochrysisgalbana (Clone T. Iso) and Tetraselmis suecica in the laboratory (culture room temperature 250 C, light intensity at 3,000lux ) By counting photoplankton cells every 12 hours for a period of 10 days. The results showed That The rapid increase in the range of Isochrysis using fluorescent lamps (T1), white light (T1) and cool white (T2) LEDs is in the 36-96 hour period of culture by The growth rate of Isochrysis at T2 (0.38 ± 0.04 per day) is lower than at T1 (0.49 ± 0.03 per day) and Control set (0.46 ± 0.01 per day) (P0.05). This study shows that LED lamps can be applied to produce both types of photoplankton in the room.

Naphat Wachanathinthorn (2018) Light emitting diodes (LEDs) or LED is a semiconductor material that has a great influence on the changes in human life. Especially communication, housing, energy saving to conserve the environment. Because the lighting electrical devices and the electrical devices that have the display at present are all using the technology of light emitting diode This article presents the discovery and development of different types of light-emitting diodes. Working structure and circuit Including the technology of light-emitting diodes In addition to explaining the characteristics of light Light wavelength, color of light and light intensity That is necessary for the photosynthesis process of plants and plant growth Including research on documents related to the application of light-emitting diodes for artificial light sources for tissue culture and plant growth. Including a proposal to analyze the results of the use of light-emitting diodes in the crop cultivation process How those colors affect the growth of plants And if wanting to use light-emitting diodes as artificial light for growing plants How long should the light be chosen? Therefore will give the plants the best growth for the seedling period Growth period and flowering and propagation period.

Wannipa Phantikornkun (2014) The objective of this study was to study the effect of drying temperature on the quality of Sesbania flower and its use in sandwich bread products. By studying the effect of suitable temperature on drying Sesbania flower. And the effect of supplementing dried Sesbania flower on the quality of sandwich bread Study of the effect of drying temperature on the quality of Sesbania flower By changing the temperature and drying time at 50, 55, 60, 65 and 70 degrees Celsius for 0, 60, 120, 180, 240, 300 and 360 minutes, it was found that drying Sesbania flower at temperature 50 Celsius degree for 360 minutes, can maintain the appearance of yellow carotene and beta carotene content Most outstanding Which is equal to 5,709.12 IU / 100 grams or10,286.69 µg / 100 grams respectively and with moisture content of carbohydrates, fats, proteins, fibers and ash equal to 6.85, 63.55, 2.11, 1.28 20.06 and 6.15 respectively and the amount of calcium phosphorus is 468.18, micrograms / 100 grams and 336 micrograms / 100 grams. In order of results Shelf life by keeping in a laminate bag Aluminum foil at room temperature for 49 days, it was
found that it can be stored for 42 days with total amount of microorganisms, yeast and mold not exceeding the standard of community products.

Methods of experimentation

Materials, equipment and special tools

Materials and equipment

1.) Yeast bread making 18 sets, 1 gram each set
2.) 6 tiles cups
3.) 3 boxes of paper that is 5 inches wide, 5 inches long and 3 inches tall
4.) Red light bulb with 660-665 nm wavelength
5.) Blue light bulb, 455-470 nm wavelength
6.) White light bulb
7.) Warm water
8.) Newspaper
9.) Stopwatch
10.) Camera
11.) Freezer
i. 12) Incubators

Special tools
2.) Microscopes
3.) Hematomas
4.) Hygrometer

Methods of experimentation

Part 1: Study of temperature and humidity affecting yeast stability

Divide the experiment into 3 sets which are

Set 1, experiment at 2 degree celsius, humidity 28%
Set 2, experiment at 25 degree celsius, humidity 70%
Set 3, experiment at 40 degree celsius, humidity 55%

With the process of conducting the experiment as follows

1. Weighing yeast using digital scales for 3 experimental sets, 1 gram of each experiment
2. Place all 3 sets of yeast in the experiment and leave for 24 hours.
3. After 24 hours, dissolve 100 ml of each batch of yeast
4. Bring the solution in item 3 to 10 milliliters, add 100 milliliters of water
5. Count the yeast by using the hematocrit
6. Repeat the experiment 1-4 2 more times
7. Find the average yeast count.
8. Use the remaining amount of yeast to calculate the density of the yeast.

Part 2: Study of color light affecting yeast preservation

Divide the experiment into 3 sets which are

Set 1, experiment using a 3 watt red light bulb 660-665 nm wavelength
Set 2, experiment using 3 watt blue light bulb, 455-470 nm wavelength
Set 3, experiment using 3 watt white light bulbs

All three experiments were carried out at a temperature of 25 degrees Celsius with humidity, with the following experimental procedures.

1. Made from 3 boxes of 5 inches wide, 5 inches long and 5 inches high cardboard boxes.
2. Attach the light bulbs in separate boxes, each color is red, blue and white.
3. Scale the yeast using digital scales for 3 sets of experiments. Each set of 1 gram of experiment
4. Put the yeast into 3 sets of tile cups, place in 1 paper box per box, cover the lid and put all 3 boxes in a dark room.
5. Turn on the lights in all 3 boxes, leave for 24 hours.
6. After 24 hours, dissolve the yeast 100 ml.
7. Take 10 ml of yeast solution in item 8, add 100 ml of water.
8. Count the yeast by using the hematocrit
9. Repeat the experiment 1-9 2 more times
10. Find the average amount of yeast that can be counted.
11. Take the remaining yeast amount to calculate the density of the yeast.

Data analysis

In this data analysis The data was analyzed by computer. Statistical Package for the Social Sciences / Personal Computer plus (SPSS / PC +) and EXCEL Program which has the following operations

Determine the average (x) and standard deviation (SD.) Amount of remaining yeast From the experiment on raising yeast at different temperatures and colors

Test statistical significance based on assumptions 1 and 2 using one-way ANOVA

RESULTS

Experiment 1: Experiment on raising yeast in various temperature and humidity

Table showing the density of yeast from culturing at various temperatures and humidity

<table>
<thead>
<tr>
<th>No</th>
<th>The density of yeast that can be counted at various temperatures. (cell/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 degrees celsius</td>
</tr>
<tr>
<td>----</td>
<td>------------------</td>
</tr>
<tr>
<td>1</td>
<td>98,000,000</td>
</tr>
<tr>
<td>2</td>
<td>101,250,000</td>
</tr>
<tr>
<td>3</td>
<td>81,750,000</td>
</tr>
<tr>
<td>Average</td>
<td>93,666,666.67</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>10,447,288.32</td>
</tr>
</tbody>
</table>

Experiment 2: Experiment on raising yeast in 3 different colors of light.

Table showing the density of yeast from culturing in different colors of light

<table>
<thead>
<tr>
<th>No</th>
<th>The density of yeast that can be counted at various temperatures. (cell/ml)</th>
</tr>
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<td></td>
<td>white</td>
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<tr>
<td>----</td>
<td>-------</td>
</tr>
<tr>
<td>1</td>
<td>74,750,000</td>
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<tr>
<td>2</td>
<td>84,750,000</td>
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<td>3</td>
<td>89,000,000</td>
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<tr>
<td>Average</td>
<td>82,833,333.33</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>7,315,793.42</td>
</tr>
</tbody>
</table>
DISCUSSION

From the experiment on raising yeast at 3 different temperatures, namely 2 degrees Celsius, 25 degrees Celsius, 40 degrees Celsius, and the experiment of raising yeast in 3 different colors namely red, blue, white light. Has the effect of extending the yeast life, allowing the yeast to be preserved and maintained the best. The optimum temperature is 25 degrees Celsius, as the density of the yeast obtained from culturing at 2 and 40 degrees Celsius causes the yeast to die. It may be because the temperature is too high and too low, not suitable for maintaining yeast. And the most suitable light is red light. Because it may be because red is the color that has the wavelength range suitable for yeast preservation of the most. And from the analysis of variance, density and yeast density of cultures at 3 different temperatures, 2 degrees Celsius, 25 degrees Celsius, and 40 degrees Celsius, it has a different effect significantly at the level of 0.05, which is in line with the hypothesis 1 and the analysis of variance. The density of yeast from culturing at 3 different colors of light, red, blue, and white, was found to be significantly different at the level of 0.05, which is in line with the hypothesis 2.

CONCLUSION

Experiment on raising yeast at 3 different temperatures, namely 2 degrees Celsius, 25 degrees Celsius, and 40 degrees Celsius. Each temperature has experiments. It is found that the temperature that the most yeast left is 25 degrees Celsius. Average 118,083,333.33 cell / ml

Experiment on raising yeast in 3 different color light, red, blue, and white. Each color has 3 experiments. It is found that the color that the most yeast left is red light. The density of yeast is Average 115,333,333.33 cell / ml

Suggestion

From this experiment can be used to store yeast by packaging the light into red and stored at 25 degrees Celsius, which is the condition that can extend the life of the yeast the best. The factors that affect the storage of yeast and maintain the yeast for as long as possible. In addition to the appropriate temperature and color light must still have clean packaging and safe as well.

References


How to cite this article: Sakuntala Rodrak, Phatsasi Tewkul and Tipyaporn Tewkul.2020, Study on the Most Effective Conditions and Environment that Exert Influences on Extending Life of Yeast Cells. Int J Recent Sci Res. 11(04), pp. 38229-38235. DOI: http://dx.doi.org/10.24327/ijrscr.2020.1104.5266

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