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The Impact of Extraction Conditions on the Trend of the Type of Red Onion and the Characteristics of Oil Harvest for the Use of Constraints

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Abstract

The therapeutic potential of plant-derived medicinal products, including essential oils, has not yet been fully exploited. Many medicinal plants have been studied to provide the biologically active compounds on which most modern drugs are based. However, much more remains to be learned about their precise pharmacology. This is particularly important for essential oils which have such a concentrated but complex composition. This is the reason for the interest they generate and, therefore, systematic research is carried out on these species so that their use can be safely assured. This research covers extraction of the essential oil from onions (allium cepa), the characterisation of the oil and conservation measures for economic exploitation. The steam distillation process was used to extract the oil. Three types of bulbs were collected for the research work. The following analysis was made of the physical properties of the produced basic oil, which includes the refractive index of red onion as {1.35322}, Density as (1.1140g/cm^3) for red, 'viscosity of the red onion specie of, 1. and chemical properties of the essential oil which also comprises of Iodine value as 15.2802%, Peroxide value as Saponification value 3.927%, and Free fatty acid of the red onion specie as 23.04%. The result is compared to the commercial oil. It was found that the commercial oil is a synthetic oil and its composition is completely different from that of natural oil and therefore synthetic oils are not therapeutically useful or can be substituted for natural essential oils. Onion (Allium cepa) belong to the family (Amaryllidaceae) often used as recipe for cooking baking and traditional pharmacopoeia for internal treatment.

Key words: Effect, extraction, operational, conditions, red onion species, oil, pharmaceutical

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INTRODUCTION

New forms of disease are increasingly influenced by those who live in modern society with high pressure, and these diseases are less reacts to general drug treatment. Many people who are disappointed with the state medicine have turned into additional therapies. Additional therapies do not depend on scientific data, but do not depend on historical and observation data [1–3], and modern research has greatly confirmed the traditional use of certain plants in relation to treatment applications [4].

The treatment potential of the processed processing plant, including essential oils, must still be completely detected [5]. Many pharmaceutical plants have been examined to provide biological active compounds based on most modern drugs [6].

Nevertheless, there are much more to learn about the exact pharmacology. This is especially true in terms of essential oils with concentrated but complex compositions. However, according to some researchers, the essential oil encyclopedia, which was studied only by the small part of the flower color for the pharmacologically activated compound, was recorded, but as the risk of extinction of plants continued to increase, there is a practical risk that many important botanical gardens can be lost [7–10]. Therefore, it is important to study and preserve the environment. Because they can provide important potential customers to treat many diseases such as cancer, infections and others faced today.

Certain plants with a lot of treatment are allium cepa, which is rich in nutrition and pharmaceutical purposes [12]. They are known as excellent sources of chrome fiber, biotin, vitamins B6 and C. Onions are also known to have high content of vitamins K and B1 as well as folic acid [13]. Various advantages to the health of onion extract or all onions are in the calculation of several organic compounds and flavonoids, which are distinguished when onions are flooded or even cut [14–15]. This is almost all of the world, but found in northern Nigeria.

Onions are usually provided in three main colors: red, brown and white. Red onions are used for cooking in most areas of the world, which includes charcoal and grills [17–20]. On the other hand, white onions are in principle give a sweet fragrance when they are fried on a plate and are the main ingredients of most Mexican preparations [16].

MATERIALS AND METHODS

Materials and Equipment

The following materials and equipment are used for the performance of this study as shown below.

Sample Collection

Allum CEPA was purchased from the fruit garden market located in D-Line Port Harcourt and was transferred to the faculty of the chemical/petrochemical laboratory for analysis.

Experimental Set-Up

The experiment was conducted by means of steam distillation. Steam distillation is the most widely used method for extracting and isolating essential oils from plants for use as a natural product. The oil was obtained on the basis of the boiling point properties of the steam distillation process. This occurs when the steam vaporises the volatile compounds in the plant material, which then undergoes a process of condensation and precipitation.

Experimental Procedure

Steam Distillation Process

The sample was placed in a large container called a still, which is made of stainless steel and the steam was added to the container. The steam was injected through the valve into the sample containing the required oil, releasing the aromatic molecules of the sample and converting them into steam. The vapour sample went into a condenser, called a condenser; it had two openings (an entrance and an exit) through which hot and cold water could flow into the condenser. This caused the vapour to cool and transform into a liquid substance. popular belief popular religion. A by-product of the aromatic liquid is discharged from the condenser and collected in a container under the surface of which is called a separator. Since water and oil do not mix, the essential oil, floating on top of the steam, was drained into the recipient vessel.

Sample Analysis

The analysis was conducted in two parts, such as: Physical properties of the essential oil analysis. This comprises of the following: Viscosity, flash point, refractive index, specific gravity of the oil and Chemical properties of the oil analysis, comprising of the following: saponification value, peroxide value, free fatty acid value, iodine value.

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RESULTS AND DISCUSSION

Results

The results and the analysis of the essential oil yield from the red onion was outlined as presented in Figures 1–7.

Extraction Yield of the onion Species

From Figures 1–7, it is observed that the greater the quantity of onion charged, the more oil can be recovered. It can be concluded that 300g of red onion yielded the highest quantity. The research further revealed that the best quantity to use for the extraction of red onion *(Allum cepa)* using the steam distillation concept shows 300 g of red onion at operating temperature of 160°C for 70 minutes.

Figure 1 Illustrates the relationship between the functional parameters of the sacred candle in different concentrations. The functional parameters of the extracted extract appear to vary with the weight of the sacred relic. An increase in extract recovered from the 50-100 g was observed, which decreased to 150 g before a sudden increase in extract volume at 200 g. The variation in extract volume recovered may be attributed to variations in the mass charge and to the influence of time and temperature. The equation of the FTE and FTI is given by $y = 0.2x + 100$ and $y = 0.2x + 10$ for the temperature and time effects respectively, and the square root of the best fit is given by $R^2 = 1$ for the temperature and time effects. The linear regression equation for the volume absorbed by the red onion is given by $y = -0.000x2 + 0.363x + 5.5$ and the square root of the best fit is given by $r = 0.986$.

Figure 2 shows that the functional parameter of extract recovered varies with time for the sacred root of the red onion, at a constant weight of 50 g. An increase in extract recovered was observed in the range 110 to 130 °C with an increase in time from >0 to <40 minutes prior to a sudden drop in extract volume. The variation in extract thickness can be attributed to the variability of the thickness of the extract. The equation of the curve is given by $y = 1x + 90$, whereas the square root of the best fit is given by $r = 1$ for the temperature effect. The line curve equation for the volume absorbed by the red onion is given by $y = -0.011x2 + 1.036x + 7.342$ and the square root of the best fit is given by $r = 0.877$.

Figure 3 shows the relationship between the severity and the functional parameter of the extracted extract. severity depends on the severity of the extract. From Figure 3 it appears that the extract obtained varies with time for the sacred root of the sacred martyrs of 100 grams. An increase in extract recovered in the temperature range 110 to 130 °C was observed, with an increase in time from >0 to <40 minutes. And a decrease in the extractuable mass was observed at the recommended daily average. The variation in extract volume can be attributed to the variability of the thickness of the extract. The equation for the line is given by $y = 1x + 90$, while the square root of the best fit is given by $r = 1$. The line curve equation for the volume absorbed by the red onion is given by $y = -0.010x2 + 0.833x + 27.21$ and the square root of the best fit is given by $r = 0.853$.

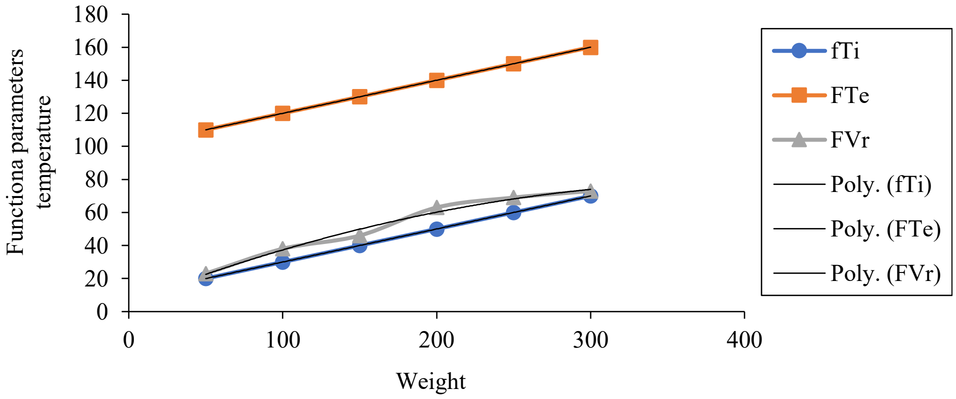

Figure 1. Plot of functional parameters of red onion versus various concentrations (varied weight, time and temperature).

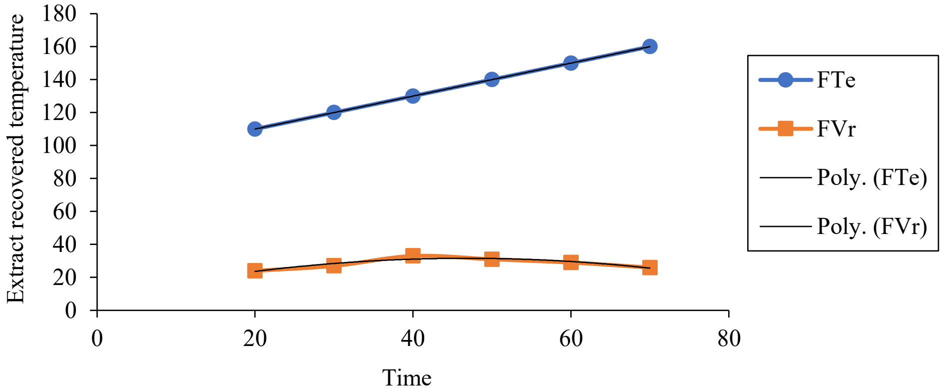

Figure 2. Plot of functional parameter versus time for red onion at constant weight of 50 g.

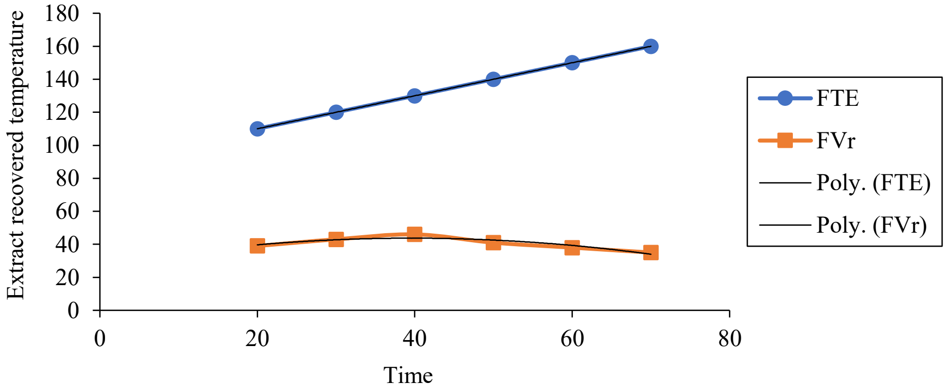

Figure 3. Plot of functional parameter versus time for red onion at constant weight of 100 g.

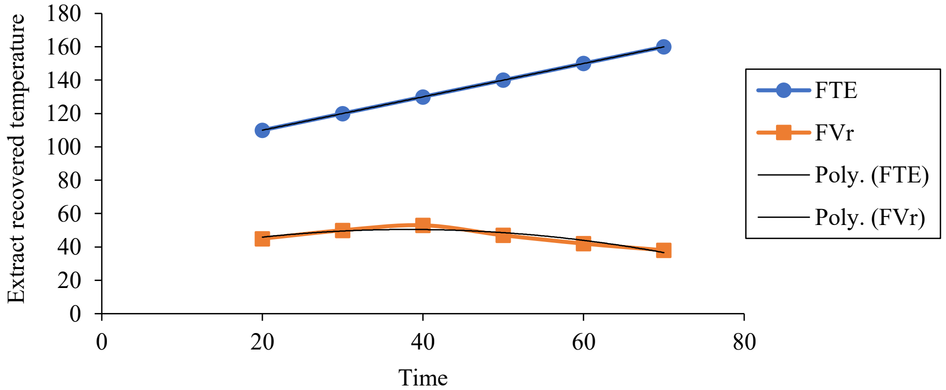

Figure 4. Plot of functional parameter versus time for red onion at constant weight of 150 g.

From Figure 4, the relationship between the secretiveness and the functional parameter of extractuable water is illustrated. The graph shows that the extract recovered varies with the time of the harvest of the sacred martyrs of the saint. An increase in extract recovered in the temperature range 110 to 130 °C was observed, with an increase in time from >0 to <40 minutes, and a sudden drop in extract volume. The change in extract volume recovered may result from a change in extraction time. The equation of the line is given by y = 1x + 90, while the square root of the best fit is given by r = 1 for the effect of temperature on the system. The line curve equation for the volume absorbed by the red onion is given by y = -0.013x2 + 1.051x + 30.35 and the square root of the best fit is given by r = 0.891.

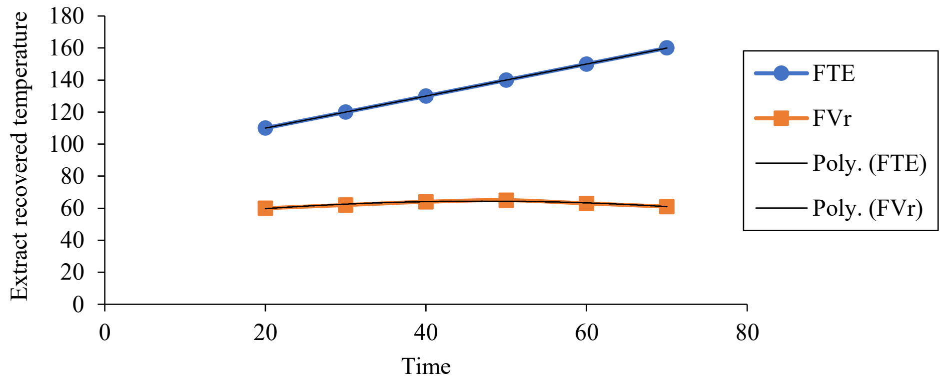

Figure 5. Plot of functional parameter versus time for red onion at constant weight of 200 g.

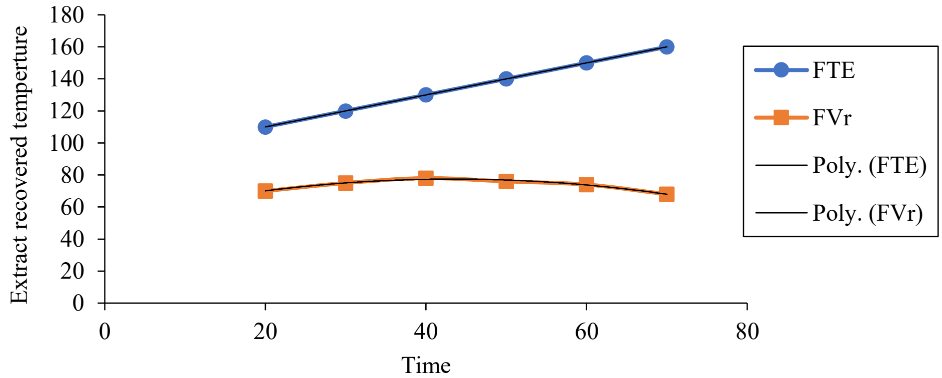

Figure 6. Plot of functional parameter versus time for red onion at constant weight of 250 g.

Figure 5 shows that the functional parameter of extract recovered varies with time for red onion, which is a constant weight of 200 g. An increase in extract recovered in the range 110 to 140 °C was observed with an increase in time between >0 to <50 minutes before the volume of extract decreased. The variation in extract volume is due to the variability of the extract thickness. The equation for the line is given by y = 1x + 90, whereas the square root of the best fit is given by r = 1 for the temperature effect. The line curve equation for the volume absorbed by the red onion is given by y = -0.006x2 + 0.604x + 50.2, and the square root of the best fit is given by r = 0.947.

Figure 6 illustrates the relationship between the sacred essence and the functional parameter extractivity. sacred essence. The graph shows that the extract obtained varies with time for the sacred root of the sacred martyr at a constant weight of 250 grams. An increase in extract recovered was observed in the range 110 to 140 °C, with an increase in time from >0 to <50 minutes, and the extract volume began to decline. The variation in extract volume can be attributed to the variability of the thickness of the extract. The equation for the line is given by y = 1x + 90, whereas the square root of the best fit is given by r = 1 for the temperature effect. The line curve equation for the volume absorbed by the red onion is given by y = -0.013x2 + 1.162x + 52.21 and the square root of the best fit is given by r^2 = 0.981.

Figure 7 shows that the functional parameter of extracted extract varies with time for red onion, with a constant weight of 300 g. An increase in recovered was observed in the range 110 to 130 °C, with an increase in time from >0 to <40 minutes before the volume of extract 50 °C decreased. The variation in extract volume recovered may be attributed to variability in the duration of the brainstorming. The equation for the line is given by y = 1x + 90, whereas the square root of the best fit is given by r = 1 for the temperature effect. The line curve equation for the volume absorbed by the red onion is given by y = -0.012x2 + 0.859x + 61.7 and the square root of the best fit is given by r = 0.802.

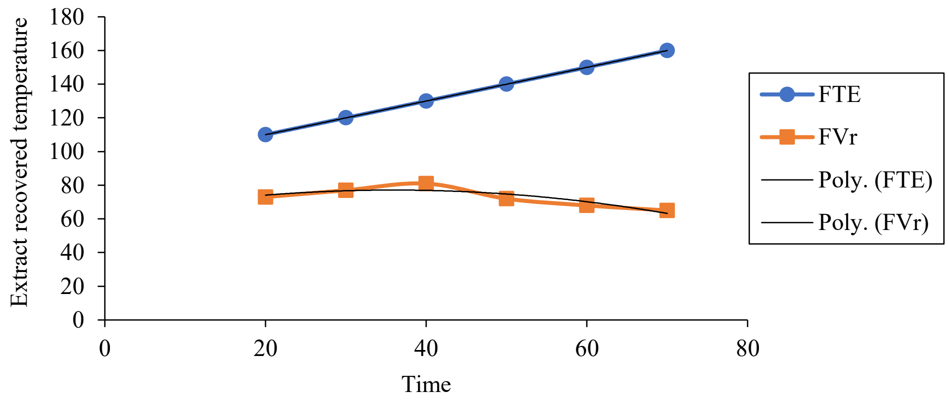

Figure 7. Plot of functional parameter versus time for red onion at constant weight of 300 g.

CONCLUSION

The revealed the following conclusion as illustrated below:

1. The trend of oil recovered is dependent of the function of initial weight of red onion mesh charged into the distillation column
2. The research was able to identify temperature, time and weight as controlling factors that determine the quality and the quantity of oil that is recovered from the distillation process in terms of the changed of the raw material for the purpose of the steam extraction.
3. This investigation was able to address the usefulness of steam extraction process in the covering of the red onion oil for the purpose of pharmaceutical utilization.
4. The physical and chemical data obtained as demonstrated in the abstract has revealed the quality of oil obtained and its medicinal value
5. The establishment of the liner line has revealed the reliability value of the functional parameters in terms of the acceptability of the process.

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