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# Pharmacological Updation View on Antioxidant Activity and Quality Assessment of Natural and Synthetic Oil Of Groundnut and Coconut Source

G. Ragupathi, M.Vishnupriya, S.A. Abith, R. Vidya,
*Department Of Pharmacology, Ssm College Of Pharmacy, Jambai, Bhavani Taluk, Erode District, Tamilnadu-638312*

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**ABSTRACT**
Definition of antioxidant, mechanism of action, coconut oil and groundnut oil are the major source of cooking oil in south India and it contains antioxidants. Which has various benefits for the body. The natural sources of groundnut and coconut oil were extracted by the wooden press and synthetic sources of groundnut and coconut oil were brought from the local market, phytochemicals analysis of the oils was done for the presents of flavonoids, phenol, tannins, saponins, alkaloids, steroids, terpenoids, both the natural and synthetic groundnut oil has all the components, but in coconut oil doesn't have phenol and tannins. The natural and synthetic oil was compounded by the DPPH and hydrogen peroxide scavenging assay for the presence of antioxidants. In both tests, the antioxidants were more present in the natural source of oil.

**Keywords:** antioxidant, coconut oil, groundnut oil, phytochemicals

## I. INTRODUCTION

Antioxidants are man-made or natural substances that may prevent or delay some types of cell damage. diets high in vegetables and fruits, which are good sources of antioxidants, are healthy; however, research has not shown antioxidant supplements to be beneficial in preventing diseases.[1] Examples: Vitamin C and E, Selenium, and Carotenoids (beta-carotene, lycopene, lutein, and zeaxanthin).Free radicals generate due to exposure to radiation, environmental pollutants, and by-products of metabolized drugs. These free radicals are antagonized by molecules that are antioxidant in nature. Antioxidants are substances that inhibit oxidation. They are moreover acknowledged as "free radical scavengers" as they form minor reactive species via radicals. Based on origin, they are categorized into two types: exogenous antioxidants and endogenous antioxidants. An anti-oxidant reduces the occurrence of different disorders like aging, cancer, diabetes, inflammation, liver diseases, cardiovascular disease, cataract and nephrotoxicity, and neurodegenerative disorders. Dietary antioxidants are thought to have the potential capacity to avert oxidative anxiety-induced diseases. This review figures the various research on the hematological activity of natural along with synthetic antioxidant molecules.[2]

### Coconut oil

Coconut oil is a hot topic these days and for good reason. Some pretty amazing benefits of coconut oil come from using it on your skin, hair, and especially in your food. The fats from coconut oil convert more easily to energy than other fat, helping boost metabolism curb appetite, and aid weight loss.

### Peanut oil

peanut oil has a bold nutty-sweet taste that is high in calories but low in saturated fats. It's made up of mostly monounsaturated fatty acid content that helps lower bad cholesterol and up the good cholesterol. Don't go too heavy on this cooking oil; it's high in omega-6 and can mess up the omega-3:6 ratio, causing health problems. Stick with the unrefined, cold-pressed versions as opposed to the commercial peanut oils you typically find in grocery stores and fast-food joints that are refined, bleached, and deodorized. The price might be higher, but your health with thank you later.

## II. MATERIALS AND METHODS

### COLLECTION OF MATERIAL

The synthetic oil was collected from the local supermarket, in Erode, Tamil Nādu, India, and the natural oil from the seeds (coconut,

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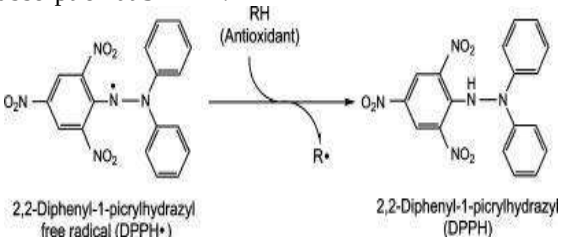
groundnut) were collected from the agricultural land of Nagercoil and Dharmapuri, Tamil Nādu, India, and the oil was extracted through wooden cold press method and deposited to the SSM College of Pharmacy for the required quantity of the project work.

**DPPH Radical scavenging activity**

**Principle**

The DPPH assay is popular in natural product antioxidant studies. One of the reasons is that this method is simple and sensitive. This assay is based on the theory that a hydrogen donor is an antioxidant. It measures compounds that are radical scavengers. Figure 1, below, shows the mechanism by which DPPH accepts hydrogen from an antioxidant. DPPH is one of the few stable and commercially available organic nitrogen radicals [1]. The antioxidant effect is proportional to the disappearance of DPPH in test samples. Monitoring DPPH with a UV spectrometer has become the most commonly used method because of its simplicity and accuracy. DPPH shows a strong absorption maximum at 517 nm (purple). The color turns from purple to yellow followed by the formation of DPPH upon absorption of hydrogen from an antioxidant. This reaction is stoichiometric concerning the number of hydrogen atoms absorbed. Therefore, the antioxidant effect can be easily evaluated by following the decrease of UV absorption at 517 nm.




**Material Required**

0.1mM DPPH solution, Ascorbic acid, Methanol

**0.1mM DPPH Solution**

Dissolve 39 mg of DPPH in 100 ml of methanol and store at -20$^{o}$ C until needed.

**Ascorbic acid (Standard)**

1mg/ ml of Ascorbic acid

**Procedure**

1 Briefly, prepare 0.1 mM of DPPH solution in methanol and add 100 µl of this solution to 300 µl of the solution of samples at different concentrations (500, 250, 100, 50, and 10 µg/mL).
2 The mixtures have to be shaken vigorously and allowed to stand at room temperature for 30 minutes.
3 Then the absorbance has to be measured at 517 nm using a UV-VIS spectrophotometer. (Ascorbic acid can be used as the reference).
4 Lower absorbance values of the reaction mixture indicated higher free radical scavenging activity.
5 The capability of scavenging the DPPH radical can be calculated by using the following formula.

6. DPPH scavenging effect

**(% inhibition) = [(absorbance of control-absorbance of reaction mixture)/absorbance of control] X 100**

**Hydrogen peroxide scavenging assay**

**Principle**

Hydrogen peroxide is a weak oxidizing agent and can inactivate a few enzymes directly, usually by oxidation of essential thiol (-SH) groups. Hydrogen peroxide can cross cell membranes rapidly, once inside the cell, $H_2O_2$ can probably react with $Fe^{2+}$, and possibly $Cu^{2+}$ ions to form hydroxyl radicals and this may be the origin of many of its toxic effects. Therefore, it is biologically advantageous for cells to control the amount of hydrogen peroxide they allowed, to accumulate.

**Material Required**

Hydrogen peroxide solution and Sodium phosphate buffer.

**Procedure**

The ability of plant extracts to scavenge hydrogen peroxide was estimated according to the method reported by Ruch et al. with minor modifications. A solution of hydrogen peroxide (43 mM) is prepared in phosphate buffer (1 M pH 7.4). Different samples (500, 250, 100, 50, and 10 µg/ml) were added to a hydrogen peroxide solution (0.6 ml, 43 mM). The absorbance of hydrogen peroxide at 230 nm was determined after 10 minutes against a blank solution containing phosphate buffer without hydrogen peroxide. Ascorbic acid was used as standard. The free radical scavenging activity was determined by evaluating % inhibition as above.

**% inhibition = [(Control- Test)/control] ×100.**

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## III. RESULTS

**Preliminary phytochemical analysis**

The phytochemical testing of coconut oil and groundnut oil

**Phytochemical Composition of Coconut Oil and ground nut oil**

| Phytochemical | Observations | | Concentrations (mg/g) | |
|---|---|---|---|---|
| | Coconut oil | Groundnut oil | Coconut oil | Groundnut oil |
| Flavonoids | + | + | 0.23±0.08 | 2.49 ±0.14 |
| Phenols | - | + | - | 0.76 ±0.16 |
| Tannins | - | + | - | 1.34 ± 0.03 |
| Saponins | + | + | 0.03±0.01 | 1.46 ±0.24 |
| Alkaloids | + | + | 0.11±0.01 | 0.79 ±0.10 |
| Steroids | + | + | NQ | 0.44 ±0.11 |
| Terpenoids | + | + | NQ | 0.27 ± 0.07 |

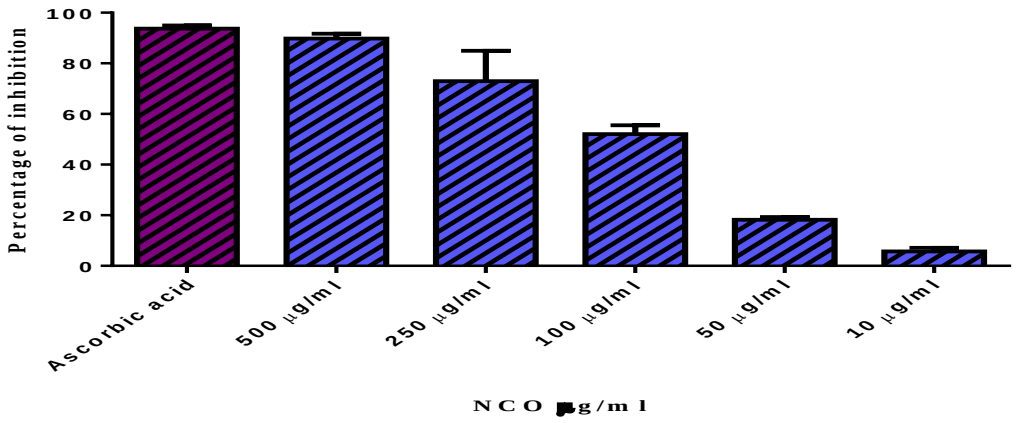
+ = Present, _ = Not Detected, NQ = Not Quantified

**Antioxidant test**

The antioxidant test of DPPH

| s.no | Tested sample concentration (µg/ml) | The mean value for NCO | The mean value for SCO | The mean value for NGO | The mean value for SGO |
|---|---|---|---|---|---|
| 1. | Ascorbic acid | 93.6683 | 92.73835 | 93.87473 | 93.52142 |
| 2. | 500 µg/ml | 89.78758 | 88.10026 | 86.03043 | 90.57471 |
| 3. | 250 µg/ml | 72.99837 | 86.29656 | 81.36732 | 87.628 |
| 4. | 100 µg/ml | 52.06291 | 71.28133 | 73.56254 | 82.50784 |
| 5. | 50 µg/ml | 18.19853 | 22.83907 | 18.07943 | 69.67607 |
| 6. | 10 µg/ml | 5.698529 | 10.93933 | 12.05295 | 15.48589 |

Percentage of inhibition of natural coconut oil




Percentage of inhibition of synthetic coconut oil

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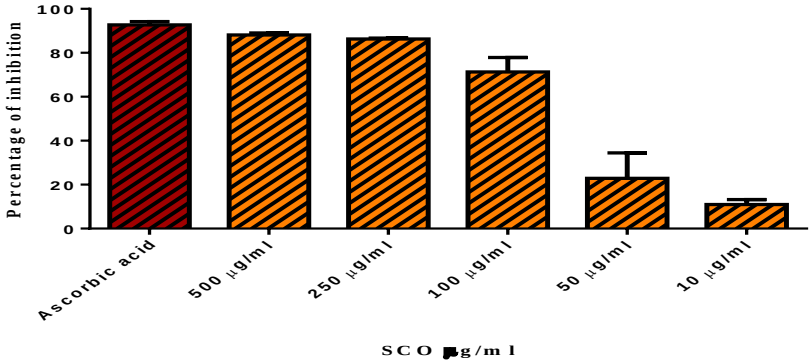
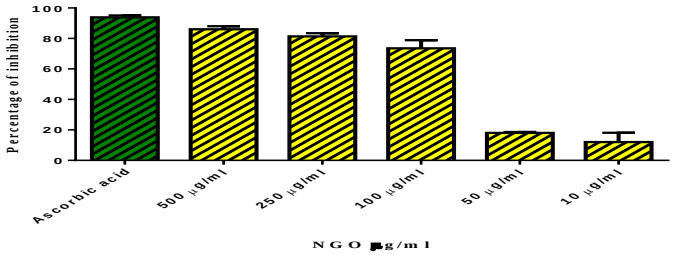
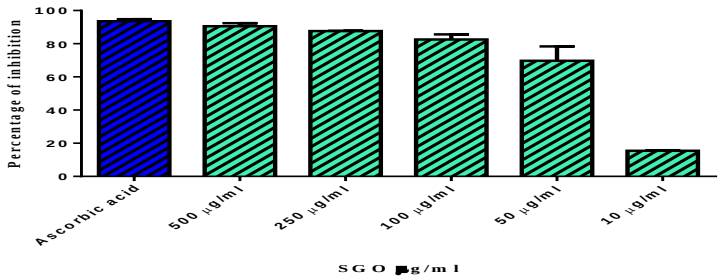



Percentage of inhibition of natural ground nut oil




Percentage of inhibition of synthetic groundnut oil




3.2.2. Antioxidant test of hydrogen peroxide scavenging assay

| s.no | Tested sample concentration (µg/ml) | The mean value of NCO | The mean value of SCO | The mean value of NGO | The mean value of SGO |
|---|---|---|---|---|---|
| 1. | Ascorbic acid | 72.31638 | 78.34646 | 76.09075 | 68.97881 |
| 2. | 500 µg/ml | 59.88701 | 56.29921 | 68.76091 | 64.35453 |
| 3. | 250 µg/ml | 55.46139 | 52.23097 | 67.27749 | 56.55106 |
| 4. | 100 µg/ml | 48.68173 | 49.6063 | 63.87435 | 50.09634 |
| 5. | 50 µg/ml | 37.28814 | 44.09449 | 58.81326 | 39.21002 |
| 6. | 10 µg/ml | 26.93032 | 38.97638 | 34.55497 | 14.64355 |

Percentage of inhibition of natural coconut oil

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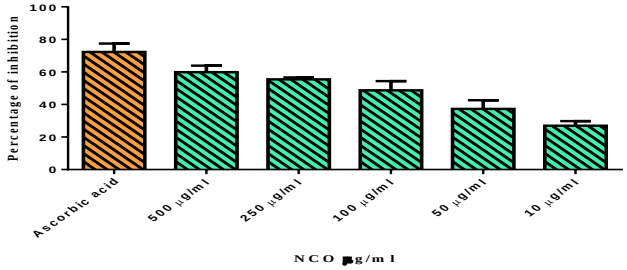
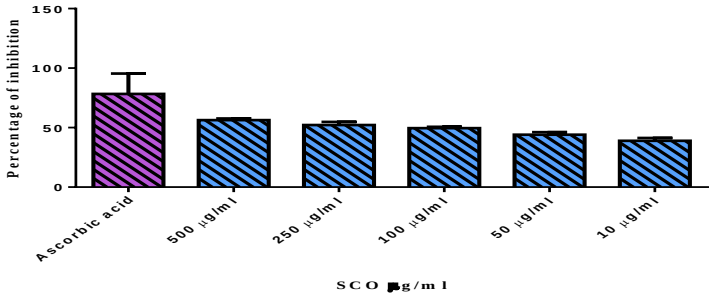
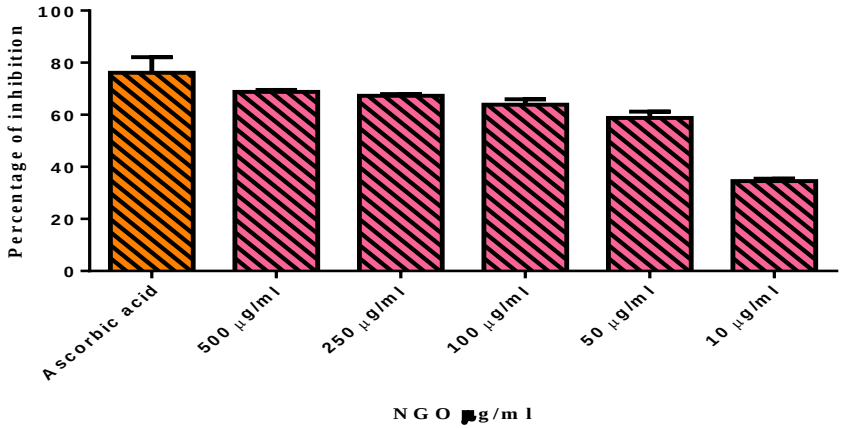


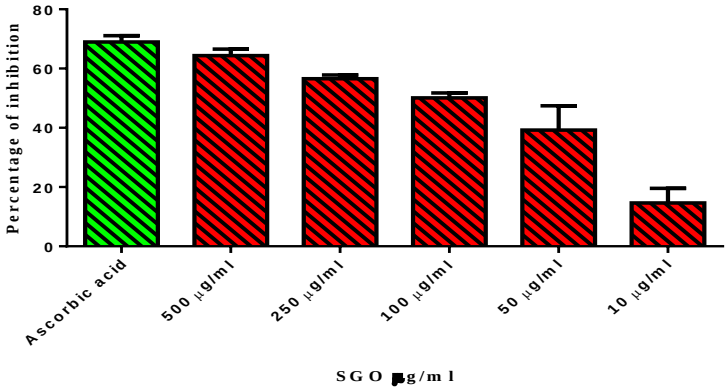

Percentage of inhibition of synthetic coconut oil




Percentage inhibition of natural groundnut oil




Percentage inhibition of synthetic groundnut oil



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## IV. DISCUSSION

Natural products are resources for medicinal sources as there are a variety of chemical compounds in terms of secondary metabolites with strong pharmacological properties owing to a diverse group of natural and synthetic edible oils products. The groundnut and coconut source are merely utilized as consumable materials that were subjected to evaluate their phytochemical composition & antioxidant activity and revealed their efficacy in terms of in-vitro studies. The present research revealed the difference in pertaining- potential secondary metabolites and relevant antioxidant efficacy for secondary metabolites screening parameters groundnut oil was found to possess flavonoids, phenols, tannins, saponins, alkaloids, steroids & terpenoids than coconut oils resembling the previous research. The phenol and tannins were identified in the groundnut. whereas coconut oil it was not modern recent research showed that groundnut oil possesses many therapeutic and efficacy activities in animal models.[35] In free radical scavenging activity, the natural sources oils showed the highest activity in a dose-dependent manner. When compared to synthetic sources because shows always stay less content of therapeutic constituents, because of incorporating chemicals to increase the yield.

DPPH inhibition by natural source have both the oils exhibited a reduction in DPPH absorbance and a high percentage at the dose of 500 mg/ ml from natural coconut oil is 89.78% which is relatively similar to the natural antioxidant reference standard vitamin C- ascorbic acid which produced 93% inhibition against DPPH free radicals and the synthetic source coconut oil had lesser inhibition 88.73%. Accordingly, the natural groundnut oil produced 86.03% at 500mg/ ml and the synthetic groundnut oil produced 90.57% at 500mg/ ml. The overall study showed coconut oil from natural & synthetic showed higher activity against DPPH. Hydrogen peroxide is an oxidizing agent. This oxidizes the cells of living leading to cell death and necrosis and along with producing many diseases& disorders. In this hydrogen peroxide scavenging activity both the sources of natural coconut oil and groundnut oil showed inhibition activity maximum of 59.88% and 68.76% respectively. This activity is comparable with that of a standard reference ascorbic acid which is produced against H2O2 as an antioxidant. The sources from the synthetic oils obtained delivered the inhibition at 56.29% and 64.35% of coconut and groundnut oil respectively.[38] Synthetic and natural groundnut represented their higher activity over coconut oil from a natural source. From these results, the groundnut oils possessed higher action over the free radicals, such as DPHH & $H_2O_2$ because of their specific and unique phytoconstituents on conclusion both the groundnut and coconut oils can be utilized and recommended in the therapeutic application by these research studies.

## V. CONCLUSION

In the present study, oils from the natural and synthetic sources of coconut and groundnut were evaluated for their phytochemical and antioxidant properties. Free radicals by DPPH and $H_2O_2$ were formed to be reduced their activities in terms of absorbance due to phytochemicals from coconut and groundnut oils. Groundnut oil is exposed to have much secondary metabolites than coconut oil as well as scavenging free radicals. So, these two oils from the natural source can be considered to emphasize in applicator of future research on their pharmacological basis studies to deal with molecular level determination in the field of hyphenated drug discovery dealing with vehicle our carrier oils. Froma comparative perspective view of synthetic and natural sources of oil evaluated for their potency in both phytochemical and free radical scanning ability, the natural ground nut oil was found to be the best as well as coconut oil with similar and relative activity to their synthetic derivatives…

## REFERENCE

[1]. National Centre for Complementary and integrative health., antioxidant: in depth., nov-2013.
[2]. Kumari Neha, Md Rafi Haider, Ankita Pathak, M Shahar Yar., Medicinal prospects of antioxidants: A review., DOI: 10.1016/j.ejmech.2019.06.010
[3]. Dr.U. Satyanarayana, Dr.Pinnamaneni Siddhartha Insnnde, Dr. U. Chakrapani, Biochemistry (with Clinical Concepts & Case Studies)., 6th edition., ISBN-10: 8131264351.,2021.
[4]. I.Sani, C. Owoade, A. Abdulhamid, Isah M. Fakai, F. Bello., Evaluation of physicochemical properties, phytochemicals, and mineral composition of Cocosnuciferal. Volume 1, issue 8., October 2014., pp 22-30.

[5]. Eze-steven peter. E., Chukwuezi Fabian O., Ebugozi Richard sonny, Dimejesi S.A., and NwamekweNgozika Gloria., Qualitative and Quantitative phytochemical analyses of the ethanolic extract of Arachis hypogaea L. seed. Pg: 1-8, 2020.

[6]. L. Manzocco, M. Anese, and M.C. Nicoli., Antioxidant properties of tea extract as affected by processing., Sep 8-1998.

[7]. James E Klaunig., prevention of cytotoxicity and inhibition of intercellular communication by antioxidant catechins isolated from Chinese green tea., DOI: 10.1093/Marcin/10(6):1003-8., July 1989.

[8]. Dilini, n. Perera, Geeth G. Hewavitharana, and S.B. Navarathe., Determination of physicochemical and functional properties of coconut oil by incorporating bioactive compounds in selected spices., 28 July 2020.

[9]. Udaya Prakash nyayiur Canadian a, jasmine brightly Edwin b, Vidhya Rajagopal c, Sri Priya nanny Shankar b, bhuvaneswari Srinivasan., Phytochemical composition and antioxidants activity of coconut cotyledon., 06-2020.