



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 7, Issue 1, April 2024



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.521



6381 907 438



6381 907 438



ijmrset@gmail.com



www.ijmrset.com



Mitigating Cancer Risks: Fortification of Green Coffee Beans with Avocado Seed Powder for the Production of a Functional Beverage with Enhanced Health Benefits

Amal Fayaz KT, Alshan PV, Fairuse K, Habeeb Rahman P

UG Student, Dept. of Food Technology, Dhaanish Ahmed Institute of Technology, Coimbatore, India

ABSTRACT This study investigated fortifying green coffee bean powder with avocado seed powder to create a functional beverage targeting cancer risk mitigation. The blending process was methodically executed to ensure optimal preservation of bioactive compounds. Analytical techniques confirmed successful integration and quantified key antioxidants. The resulting beverage exhibited a harmonious flavor profile. This research contributes to the development of innovative functional beverages with dual health-enhancing properties. The findings underscore the potential of green coffee bean and avocado seed synergy in formulating products that not only offer a delightful sensory experience but also provide a proactive approach to reducing cancer risks. The sensory evaluation of the functional beverage fortified with avocado seed powder revealed promising results, particularly with Trial 2 (100:10) scoring highest (8.25) in overall acceptance. The addition of avocado seed powder not only enhanced the nutritional profile of the beverage but also contributed to its sensory attributes, elevating taste, aroma, and overall consumer satisfaction. Moreover, shelf-life testing demonstrated the significance of refrigeration in preserving the quality and freshness of the fortified beverage, suggesting optimal storage conditions for maintaining consumer enjoyment over an extended period (2 months). By addressing these considerations, the fortified green coffee bean with avocado powder holds promise as a nutritious and flavorful option in the functional beverage market, catering to consumer preferences for both health and taste.

KEYWORDS: Green coffee beans, Avocado seed powder, Functional beverage, Cancer risk mitigation, Antioxidants, Polyphenols.

I. INTRODUCTION

General Introduction The cancer burden is alarmingly rising worldwide, causing significant pressure on the general population and health systems at all economic levels. Globally, cancer is the leading cause of morbidity and mortality regardless of geographical diversity and the level of human development (Bray F et al 2018). The Globocan database compiled by International Agency for Research on Cancer (IARC), estimated that 18.1 million new cancer cases and 9.6 million cancer deaths occurred globally in 2018. The global burden of cancer is projected to increase from 13.3 to 21.4 million incident cases between 2010 and 2030 due to demographic changes alone, dominated by a growing burden in low- and middle-income countries. This escalation in cancer burden is due to various factors, especially increasing ageing population and exposure to cancer risk factors related to lifestyle changes associated with rapid socioeconomic developments [1]. Asia accounts for nearly half of the new cancer cases and more than half of cancer deaths. The IARC also estimates that Asia and Africa have a higher proportion of cancer deaths (7.3% and 57.3% respectively) compared with their incidence (5.8% and 48.4% respectively). In low income countries late patient presentation and delay in diagnosis of cancer is common, with many patients presenting only when the disease has reached an advanced or metastatic stage. However, the leading causes of cancer incidence and deaths substantially vary across countries and within each country depending on the degree of socioeconomic development and associated lifestyle factors [2]. For this reason, it is important to search for new cytotoxic compounds more selective and aggressive towards cancer cells. The major ways of cancer treatment are chemotherapy and radiotherapy, which unfortunately proved toxic to other



living cells of the body. Therefore, numerous studies have focused on application of natural products to prevent and to treat cancer. In this sense, plants have been historically used for the treatment of a great variety of diseases. [3].

Avocado Seed The avocado seed may represent about 30% of the total weight of the fruit and is an underutilized resource and commonly considered as waste for avocado processors. Abuse of this neglected part of fruits is in developing patterns that might demonstrate a chance to be precise gainful in the future. Using the remaining parts in fruits diminished the number of wastes and explore new active compounds in these parts especially anti-oxidants. [2] Phytochemical compounds present in avocado seed may affect cell cycle arrest, retard development and activate apoptosis in some cancer cell lines. The bioactive compounds present in avocado seed have a role in scavenging very active radicals. Essential antioxidants extracted from *P. americana* pith are the oxygenated carotenoids. Also, avocado seed possess perispermic A and B vitamins which prevent inflammation and carcinogenesis. Avocado seed has cytotoxic compounds and many health related bioactive properties, such as anticancer, antioxidant, anti-inflammatory and anti-neurodegenerative effects [1]. The avocado seed contains alkaloids, flavonoids, saponins, terpenoids, tannins, and essential oils. These compounds are included in the anti-cancer properties of avocados. The active compounds in the avocado seed have been proven to be capable of destroying cancer cells. 3 The anti-cancer activities of avocados have been associated with more than 20 groups of bioactive compounds. Among them are long-chain lipid molecules, such as long-chain fatty acids and their derivatives (avocatinins, pahuatins, perispermicins, and polyhydroxylated fatty alcohols). These compounds have independently shown anti-cancer effects. **Green Coffee Beans** In the other hand, unroasted coffee seeds, popularly known as Green Coffee Beans (GCB), attracted people due to its health properties. In particular, some evidence suggests that Green coffee consumption is associated with a reduced risk of inflammation, various types of cancers, and certain diseases. Green coffee contains macro nutrients such as carbohydrates, protein, fat, as well as minor components such as caffeine, trigonellin and chlorogenic acid. Phenolics, chlorogenic acids and brown pigments are sources of natural antioxidants. High polyphenolic materials found in green coffee and especially chlorogenic acid in it have an important place. It is considered that; green coffee has effects on body mass, blood glucose and lipid levels, blood pressure, prevention from cardiovascular diseases which is based on chlorogenic acid consisting of antioxidant activity. [4] Chlorogenic acid, a polyphenolic compound, is the major bioactive compound in coffee beans which contributes most to the medicinal activities and helpful for cancer prevention and therapy. There is growing evidence that green coffee beans can potentially prevent cancer and other health disorders due to their high concentration of bioactive polyphenolic-rich compounds [5].

Enhanced Health Benefits: Avocado seed powder is rich in antioxidants, including polyphenols and flavonoids, which can help reduce oxidative stress and inflammation in the body, potentially lowering the risk of chronic diseases like cancer. Green coffee beans contain chlorogenic acid, which has been studied for its potential anti-cancer properties, including inhibiting tumor growth and preventing DNA damage. Combining avocado seed powder with green coffee beans may synergistically enhance the anti-cancer effects due to the complementary antioxidant properties of both ingredients. Additionally, the functional beverage fortified with avocado seed powder and green coffee beans may provide other health benefits such as improved metabolism, cardiovascular health, and immune function, contributing to overall well-being. **Comparison of Avocado Seed and Date Seed:** Avocado seeds are rich in antioxidants, fiber, and healthy fats, while date seeds contain mainly fiber and some antioxidants. Avocado seeds have been studied for their potential health benefits, including anti-inflammatory, antimicrobial, and anticancer properties, which may be attributed to their higher antioxidant content compared to date seeds. Date seeds may not provide the same level of antioxidant protection and health benefits as avocado seeds, making them less suitable for fortification in functional beverages aimed at mitigating cancer risks. **Choice of Green Coffee Beans:** Green coffee beans are unroasted coffee beans that retain higher levels of chlorogenic acid compared to roasted coffee beans. Chlorogenic acid has been associated with various health benefits, including antioxidant and anti-cancer properties, making green coffee beans a suitable choice for fortification. Other 5 types of coffee beans, such as roasted coffee beans, may have lower chlorogenic acid content due to the roasting process, which could diminish the potential health benefits. **Theoretical RDA Value:** The Recommended Dietary Allowance (RDA) value for avocado seed powder and green coffee beans in the functional beverage would depend on various factors such as the bioavailability of active compounds, individual health status, and intended health benefits. To determine the theoretical RDA value, it would be necessary to conduct studies to assess the optimal dosage of avocado seed powder and green coffee beans needed to achieve the desired health effects, including cancer risk reduction. Theoretical RDA values can vary based on factors such as age, gender, and specific health conditions, and would need to be established through clinical trials and research studies to ensure safety and efficacy. In summary, fortifying green coffee beans with avocado seed powder in a functional beverage holds the potential to provide



enhanced health benefits, including mitigating cancer risks.

II. RELATED WORK

3.1 Here the theory [1] “developing new health material: the utilization of spray drying technology on avocado (persea americana mill.) Seed powder.” Investigated the potential utilization of avocado seed as a very important, high phenolic content, climacteric fruit with unique characteristics and high nutritional properties. As such, the antioxidative test is conducted, then spray drying is used to produce avocado seed powder. The objective of this study was to develop an avocado seed powder using the spray drying technique by investigating the solution stability with different avocado seed extract concentrations, and to determine the physical properties of spray dried avocado powder that consists of powder yield, moisture, water activity, solubility, and color. The avocado seed extract was mixed with maltodextrin and water and homogenized for 10 min at 8000 rpm. The avocado seed solution was then spray dried with different inlet temperatures and feed flow rates. The spray dried avocado seed powder was analyzed for its yield, moisture content, water activity, solubility, and color. It was reported that the solution with the least avocado extract concentration (10 g) had the best stability in terms of presence of solute particles and color.

In the research paper “utilization of avocado seed powder (persea americana mill.) [2]. As a mixture of modified cassava flour in making cookies” says that avocado seed is one of underutilized food waste that contains starch, monounsaturated fatty acids, and has high antioxidant activity and the effect of the ratio of modified cassava flour (mocaf) and avocado seed powder (persea americana mill) on the characteristic of cookies. The treatment is the ratio of mocaf with avocado seed powder (asp). The data were analyzed by using anova 8 and continued with dnmrt at 5% level. The observation was done to sensory properties (color, aroma, taste and texture), hardness, proximate compositions, and antioxidant activity. The result confirmed that the asp ratio of 10% has acceptable sensory characteristic.

One of the research “avocado seed discoveries: chemical composition, biological properties, and industrial food applications.[4]. This research explains that avocado-seed extracts also have many health-related bioactive properties, such as anti-hyperglycemic, anticancer, anti-hypercholesterolemia, antioxidant, anti-inflammatory, and anti-neurogenerative effects are clearly demonstrated how these properties can be used to formulate or fortify food. The health-promoting properties of avocado seeds have been studied. These properties are attributed to various phytochemicals, such as acetogenin, catechin, epicatechin, procyanidin b1, estragole, etc. Additionally, items made from valorized avocado seeds that people can consume have been explored. The best applications of valorized by-products have been created for the pharmaceutical, functional food, and nutraceutical sectors while considering quality and safety. More clinical testing and product development research are required to prove the effectiveness of avocado seeds.

As a research in this paper “antioxidant and sensory properties of raw and cooked pork meat burgers formulated with extract from non-compliant green coffee beans” declared that the effects of polyphenol-rich extract obtained from non-compliant defatted green coffee beans (dgcbs) on physicochemical and antioxidant properties, as well as on the sensory profile of vacuum-packed pork burgers stored at 4 °c for 14 days 9 and after cooking were assessed says that the dgcb extract obtained by means of supercritical water extraction was analysed for its polyphenol profile, total phenolic content, radical scavenging, and ferric-reducing antioxidant activities (dpph and frap), Fe2+-chelating capacity, and total iron. The most abundant polyphenol component observed in the dgcb extract was chlorogenic acid, and the alkaloid caffeine was also present.[7]

Boerdery, a. (2021) [6] in this theory “one of sa's biggest avocado growers is on a coffee high” says that with some areas of south africa having the ideal conditions for growing coffee, the country has the potential to produce a world-class product only a few farmers are planting the crop, as it is highly labour-intensive. Zander



ernst of allesbeste boerdery is one of a handful of farmers who want to change the perception of coffeeproduction in south africa. Magda du toit reports.

IV. METHODOLOGY

4.1 Materials

1. Fresh Green Coffee Beans were procured from Saara Herbal Fresh
2. Avocado Seeds were procured from fruit market
3. Stevia - Natural Plant Sweetener which was procured from local supermarket
4. Cocoa powder - Selenium in cocoa powder has anti-cancer properties and enhance the taste which was procured from local supermarket
5. Nutmeg Powder - gives pleasant sweet-smelling aroma which was procured from local supermarket

4.2 Methodology

1. Preparation of Green Coffee Beans Powder
2. Preparation of Avocado Seeds Powder
3. Fortification of Avocado seed in Green Coffee Powder
4. Addition of other ingredients
5. Formulation of Functional Beverage

V. METHODS & TEST

5.1 Preparation of Green Coffee Beans Powder

1. 100 g of green coffee beans were roasted to the desired level and allowed to cool.
2. The roasted beans were blended and sieved through a mesh to obtain a fine powder.



Fig.1.Preparation method of Green coffee beans powder.

5.2 Preparation of Avocado Seeds Powder

- Avocado Fruit was taken and deseeded
- Peeled the skin and cut into small pieces
- Blended the seeds into fine powder and sieved to obtain Avocado seed powder



Fig.2 Preparation of Avocado seeds powder.

5.3 Fortification of Avocado Seed in Green Coffee Beans Powder

- Avocado seed powder (prepared by grinding 10 g of avocado seeds) was fortified with the roasted green coffeebeans.
- Stevia (5 g) was added to the mixture for sweetness and binding.
- Cocoa powder (5 g) was introduced to enhance flavor and add depth to the blend.
- Nutmeg powder (2 g) was incorporated to complement the overall taste profile.
- The green coffee blend was thoroughly mixed to achieve a uniform composition.
- The resulting green coffee powder was stored in an airtight container to preserve freshness.
-



Fig.3 Fortification of Avocado seed in Green Coffee beans powder

5.4 Formulation of Functional Beverage

- 5g of Green Coffee Bean Powder was added to 100ml boiling water at 100°C for 5-10 minutes.
- 1g of Stevia was added if sweetness was required. 27
- The mixture was filtered to remove any strains.
- The functional beverage was ready to serve.



Fig.4 Formulation of Functional Beverage.

5.5 Avocado Seed Fortified Green Coffee Beans Powder Addition in Milk

The green coffee powder was added to milk to enhance its nutritional properties and evaluate the sensory attributes.

Avocado Seed Fortified Green Coffee Beans Powder Addition in Milk

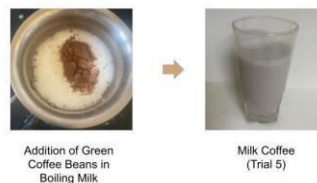


Fig.5.Addition of milk with avocado seed powder with coffee beans powder,

5.6 Estimation methods of nutritional values

Energy qsl/sop/ch/01, issue no.1, dated 16.09.2015: this method involves determining the caloric value of a food product by measuring the amount of Energy it provides per unit weight. To estimate the energy content of green Coffee, the sample is first weighed and then burned in a calorimeter to Determine the heat of combustion. The heat of combustion is then converted into Energy content using a conversion factor. Fat dghs manual: the dghs manual is a manual published by the Directorate general of health services in India. The manual provides guidelines For the analysis of food products, including green coffee, for their fat content. The fat content of green coffee can be determined using a variety of methods, including the gerber method and the soxhlet method.

Carbohydrate qsl/sop/ch/01, issue no.1, dated 16.09.2015: this method involves the determination of the total carbohydrate content of a food product, Including both simple and complex carbohydrates. To estimate the carbohydrate Content of green coffee, the sample is first weighed and then treated with Various reagents to break down the carbohydrates into simpler sugars. The Resulting sugars are then quantified using a colorimetric method. Protein is 1797:1983 (reaff 2003): this method involves determining the Protein content of a food product by measuring the nitrogen content. To estimate The protein content of green coffee, the sample is first weighed and then Digested in acid to release the nitrogen. The nitrogen content is then determined Using the kjeldahl method, and the protein content is calculated based on the Nitrogen content. Total sugar is 6287-1985: this method involves determining the total sugar Content of a food product, including green coffee. The sample is first weighed Experimental results and then treated with various reagents to break down the sugars into simpler forms. The resulting sugars are then quantified using a colorimetric method. Fiber Lab SOP: This method involves the determination of the dietary fiber content of a food product, including Green Coffee. The sample is first treated with various reagents to remove non-fibrous components, and the remaining fiber is then quantified using a gravimetric method.

5.7 Sensory Analysis

The most widely used scale for measuring food acceptability is the 9-point hedonic scale. A panel of 4 panelists were



used for the evaluation of the sensory attributes of the food samples. The samples were assessed based on the following attributes: Flavour, Texture, Aroma, Smell, Taste and overall acceptability. Assessors rating were based on a 9-point hedonic scale with the degree of likeness expressed as:

Table: 1. Sensory Analysis

1	dislike extremely
2	dislike very much
3	dislike moderately,
4	dislike slightly,
5	neither like or dislike
6	like slightly
7	Like moderately
8	Like very much
9	Like extremely.

5.8 Shelf Life Study

The Fortification of Green Coffee Beans with Avocado Seed Powder for the Production of a Functional Beverage underwent shelf life testing under Refrigerator Temperature and normal Room Temperature in sterile, airtight plastic containers

VI. RESULTS AND DISCUSSIONS

6.1 Four Combination of Final Product

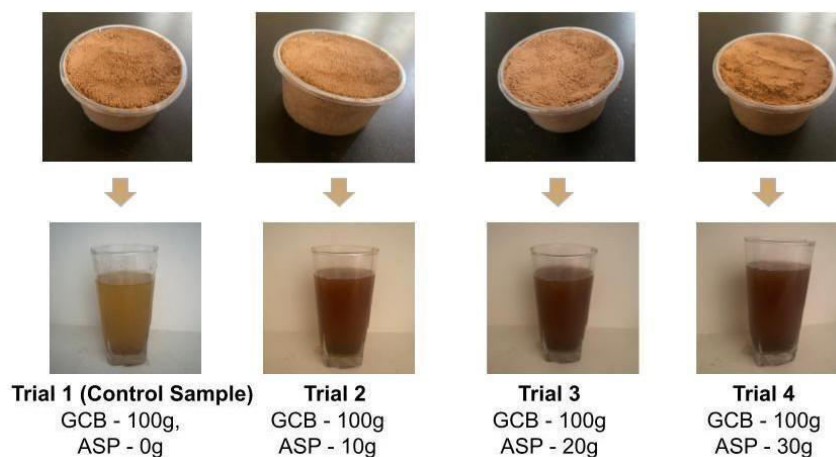


Fig.6.Different combination trial batches.



6.2 Avocado Seed was fortified with Green Coffee Powder by four different combinations.

Table .2. The four different combinations of Avocado powder and Coffee powder.

Sl No	Combinations	Avocado SeedPowder (g)	Green CoffeePowder (g)
1	Trial 1	0	100
2	Trial 2	10	100
3	Trial 3	20	100
4	Trial 4	30	100

6.3 Nutritional Analysis Result

Table.3. Nutritional Analysis of Avocado powder mixed with coffee powder.

Nutrient	Amount per Serving (Approx.)	RDA (Adult, Daily)
Energy (Calories)	95.7 kcal	2000-2500 kcal
Protein	2.3 grams	50 grams
Carbohydrates	19.8 grams	225-325 grams
Fat	0.9 grams	70 grams
Fiber	3.5 grams	25-38 grams
Sugar	14.6 grams	< 50 grams
Vitamin C	8.2 mg	75-90 mg
Calcium	16.9 mg	1000 mg
Iron	1.4 mg	8-18 mg

Green Coffee Beans with Avocado Seed Powder offer a superior nutritional profile compared to Normal GreenCoffee Bean Powder. With 95.7 kcal per serving, it provides substantial energy, alongside 2.3 grams of protein, 19.8 grams of carbohydrates, and 3.5 grams of fibre. The addition of avocado seed powder enriches the beverage with natural sugars, Vitamin C (8.2 mg), calcium (16.9 mg), and iron (1.4 mg). Avocado seed powderalso contributes antioxidants, fibre, and healthy fats, elevating both nutritional content and sensory experience.

In contrast, Normal Green Coffee Bean Powder lacks significant nutrients and primarily imparts the characteristic flavor and caffeine content of coffee beans. Thus, Green Coffee Beans with Avocado SeedPowder offer a more holistic approach to nutrient intake and beverage enjoyment.

6.4 Sensory Evaluation Result

Table.4 Sensory evaluation results.

Sensory Attributes	Panelist 1	Panelist 2	Panelist 3	Panelist 4
Flavor	7	6	8	6
Texture	6	6	7	7
Aroma	7	6	8	6
Smell	7	6	8	6
Taste	6	6	7	6
Overall Acceptability	7	6	8	6

The sensory attributes were evaluated using a 9-Point Hedonic Scale by 4 panelists

6.5 Shelf Life Testing

The Fortification of Green Coffee Beans with Avocado Seed Powder for the Production of a Functional Beverage underwent shelf life testing. It was stored for 30 days (from 06-02-2024 to 05-03-2024) under Refrigerator Temperature and normal Room Temperature in sterile, airtight plastic containers.



Fig.7. Refrigerator Temperature 4°C

The functional beverage fortified with avocado seed powder maintained its quality and freshness throughout the 30-day period under refrigeration. No significant changes in taste, aroma, or texture were observed. This suggests that refrigeration effectively preserves the functional beverage, extending its shelf life and ensuring consumer satisfaction.



Fig.8.Room Temperature 25°C

The beverage exhibited gradual degradation in quality when stored at room temperature. Over the 30-day period, there was a noticeable decline in taste and aroma, accompanied by slight changes in texture. Consumption within the initial



days is recommended to enjoy the beverage at its best. This indicates that room temperature storage may not be ideal for prolonging the shelf life of the fortified beverage.

5.5. Storage Condition

For the Production of a Functional Beverage, the following storage guidelines applied:

Hygienic, Cool, or Dry Place: The functional beverage was to be stored in a hygienic, cool, or dry environment to maintain its quality.

Avoided Direct Sunlight and Moisture: It was to be kept away from direct sunlight and moisture to prevent rapid deterioration of flavor and freshness.

Airtight Container for Longer Freshness: Storing the beverage in an airtight container helped preserve its freshness for an extended period.

Refrigerator Storage: When refrigerating the beverage, it was advisable to keep it in a full and sealed glass jar. This ensured maximum freshness and extended the shelf life of the fortified beverage. When stored in a refrigerator cabinet, the product could remain fresh for up to 2 months.

Exploration of Packaging: Materials and Techniques: Further research into packaging materials and techniques could have been explored to enhance the shelf life and storage conditions of the fortified beverage, ensuring optimal quality and consumer satisfaction.

VII. CONCLUSION AND FUTURE WORK

The sensory evaluation of the functional beverage fortified with avocado seed powder revealed promising results, particularly with Trial 2 (100:10) scoring highest (8.25) in overall acceptance.

The addition of avocado seed powder not only enhanced the nutritional profile of the beverage but also contributed to its sensory attributes, elevating taste, aroma, and overall consumer satisfaction.

Moreover, shelf life testing demonstrated the significance of refrigeration in preserving the quality and freshness of the fortified beverage, suggesting optimal storage conditions for maintaining consumer enjoyment over an extended period (2 months).

By addressing these considerations, the fortified green coffee bean with avocado powder holds promise as a nutritious and flavorful option in the functional beverage market, catering to consumer preferences for both health and taste.

REFERENCES

1. Alissa, K., Hung, Y. C., Hou, C. Y., Lim, G. C. W., Ciou, J. Y. Developing new health material: The utilization of spray drying technology on avocado (*Persea americana* Mill.) seed powder. *Foods*, 9(2), 139, 2020
2. Asben, A., Nerishwari, K., Hapsari, S., Hari, P. D. Utilization of Avocado Seed Powder (*Persea americana* Mill.) as a Mixture of Modified Cassava Flour in Making Cookies. In *IOP Conference Series: Earth and Environmental Science*, Vol. 1059, No. 1, p. 012060, 2022.
3. Bangar, S. P., Dunno, K., Dhull, S. B., Siroha, A. K., Changan, S., Maqsood, S., Rusu, A. V. Avocado seed discoveries: Chemical composition, biological properties, and industrial food applications. *Food Chemistry*: X, 100507, 2022.
4. Bergamaschi, M., Simoncini, N., Spezzano, V. M., Ferri, M., & Tassoni, A.. Antioxidant and Sensory Properties of Raw and Cooked Pork Meat Burgers Formulated with Extract from Non-Compliant Green Coffee Beans. *Foods*, 12(6), 1264, 2023
5. Boerdery, A. One of SA's biggest avocado growers is on a coffee high. *Farmer's Weekly*, 2021(21030), 44-47. 2021.
6. Coutinho, I. B., Quezadas, M. B., de Souza, L. F. G., Nitz, M., Andreola, K. Spray drying of avocado pulp using the seed as an adjuvant. *Powder Technology*, 408, 117738, 2022
7. Dias, L. D., Carbinatto, F. M., Almeida, I. D. S., Blanco, K. C., Marquele-Oliveira, F., Munari, C. C., Bagnato, V. S. Eco-Friendly Extraction of Green Coffee Oil for Industrial Applications: Its Antioxidant, Cytotoxic, Clonogenic, and Wound Healing Properties. *Fermentation*, 9(4), 370. 43, 2023.
8. Di Stefano, V., Buzzanca, C., Ruvutuso, F., Scuderi, D., Palazzolo, E., Gugliuzza, G., Farina, V. Chemical composition and anti-radical properties of coffee cherry cultivated in Mediterranean climate. *Food Bioscience*, 56,



103349, 2023.

9. El-Idreesy, T. T., Khoshala, O., Firouzi, A., Elazab, H. A. Equilibrium and kinetic study on the biosorption of trypan blue from aqueous solutions using avocado seed powder. 2021.
10. El-Sayed, H.A., Tawfek, M.A. Ibrahim, O.A., Quality characteristics of processed cheese with avocado (Persea americana) seed powder. Journal of Food & Nutrition Research, 62(3), 2023.



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com