

## SENSORY EVALUATION AND PHYTOCHEMICAL PROPERTIES OF BEVERAGE (TEABAGS) PRODUCED FROM AVOCADO SEED POWDER

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### Abstract

This research was carried out to evaluate the sensory properties and phytochemical composition of beverage from teabag produced from avocado seed powder, sample (A1). Commercial Lipton teabag sample (LT2) was used as a control. The pH of both samples determined were 6.98 sample A1 while sample LT2 had 6.61. From the results obtained from the sensory evaluation carried out on the avocado seed, the mean scores for sample A1 was 6.80 and 8.30 for LT2 for taste, A1 had 7.40 while LT2 had 7.30 for flavor A1 had 6.70 while LT2 had 8.00 the overall acceptability for A1 7.00, while for LT2 7.80. From the result above, Avocado seed tea could be said to have comparable value with commercial Lipton (LT2). The phytochemical analysis carried out on A1 (avocado seed powder), the results obtained showed these values; for flavonoid 3.01%, saponin 11.64%, polyphenol 13.4452mg/L, Tannin has 5.18%, Alkaloid 5.66%, then phenolic compound 6.62mg/L. The results obtained showed that avocado seed powder could be said to have considerable amount of phytochemicals which are good for human health, hence can be recommended for consumption. Also packaging in teabags, can make for easy consumption as well as commercialization.

**Keywords:** Avocado, seeds, teabags, sensory, phytochemicals

### INTRODUCTION

The avocado (*Persea americana*) is a large drupe and has one of the highest oil content of all fruits, with the possible exception of the oil palm, olive and coconut. The Avocado fruits are rich in nutrients high in protein and vitamins. Studies have shown that avocados are rich in macro nutrients like carbohydrate, vitamin and proteins (Whitney & Rolfes, 2005). Avocado fruits vary from round to pear shaped with a long, slender neck, but sometimes

completely round shapes, and the colour ranges from green to dark purple. Avocados are one of the great cancer fighting foods, rich in a multiplicity of nutrients including many protein antioxidants and phytochemicals as well as vitamins, minerals, fiber and monounsaturated healthy fats (Chen *et al*; 2008). Consumption of avocado fruits in Nigeria communities is very widely; this is due to the availabilities of avocado fruits in Nigeria.

A good number of people eat avocado due its taste, documented medicinal and nutritional values and its cheap availability in the region. Apparently the commonly consumed part of avocado remains to be the edible soft part (Mesocarp), the layer between the skin and the seed. The seed part (Endocarp) of the fruit is commonly not consumed due its hardness and poor taste, little information on its medicinal

/ nutritional value and also difficult processing to taste. Therefore, most people discard the avocado seed after consuming the soft flesh mainly because they are not informed of the nutrient and phytochemical compositions in the seed parts.

The avocado seed represents 13-8% of the fruits, and it is a byproduct generally not utilized and normally discarded. During the processing of the pulp the seed waste may represent a severe ecological problem (Ortiz, 2004). However, at the same time, it may be of interest to industry as a source of bioactive compounds. Its chemical composition is comprised of phytosterols, triterpenes, fatty acids (Ramos, 2004). Avocado seed is underutilized and represents large portion of the fruits, thus its use can be an alternative to reduce the production cost of edible oil. Avocado seed oil is normally used in healing skin eruptions while the edible flesh is low in sugar content and thus serves as high energy source for diabetes. Several biological activities of the avocado seed have been reported such as antioxidant, antihypertensive, larvicidal, fungicidal, hypolipidemic, and recently amoebicidal activities (Rodriguez *et al*, 2011). Dry avocado seeds are used locally as a relief drink, in treating diarrhea or dysentery, teeth aches as well as skin diseases. Studies have shown that saponin found in the seeds can be used for monogastric animals after extraction of the substance with ethanol. Avocado seeds have pharmaceutical ingredients widely used in extracts for therapeutic purposes, and also as beverages in folk medicine. The extract may present antioxidant activity, the phenolic level in seed vary from 2.3 to 3.7% in addition to the starch and fiber, there are other non-nitrogenous substance present in seeds ranging from 5.1 to 13.2%. The seeds are rich in tannins and carotenoids and tocopherols from the fruit were shown to inhibit the in-vitro growth of prostate cancer cell lines and "persin" from avocado leaves was shown to have antifungal properties and to be toxic to silkworms.

Very few individual, know and use avocado seed as food supplement, food fortification and for its medicinal uses mainly by using the powdered seed on foods or dissolving in water as drinks. Hence this research, which is going to evaluate the phytochemical properties of avocado seed powder and also explore a different way of taking this powder by packaging avocado seed powder into teabags which can be taken conveniently as tea by individual and can as well open possibility of commercialization.

Therefore the aim and objectives of this research, which is to produce flour from avocado seeds, produce teabags using the avocado seed flour, evaluate the sensory properties and phytochemicals properties of avocado teabags in comparison to already existing and accepted products in the market (Lipton).

## LITERATURE REVIEW

## AVOCADO SEED

The avocado seeds represents up to 16% of the total weight of the fruits, has a rich phytochemical profile and a long history of ethnobotanical use. In spite of this, the avocado seed is largely considered a waste product and is an underutilized resource modern scientific research into the potential bioactivities of avocado seeds remains in the early stages. Avacado seed have been found to have higher antioxidant activity than the pulp and this activity has been attributed to the high content of the phenolic compounds. The antioxidant capacity of avacado seed has been studied , (Soong and Barlow, 2004) found that an ethanol water extract of avcado seed contained 1160ml/g and 1484ml/g ascorbic acid equivalent antioxidant capacity (AEAC) and the fenic reducing antioxidant power assay, respectively. These values were 55 and 155 times greater than that of the pulp, respectively.

Avacado seed extract is used traditionally in Nigeria for the treatment of hypertension. An aqueous seed extract from avocado significantly reduced the blood pressure in hypertensive rat after 4 weeks of treatment. Recent research has suggested that avcado seeds can reduce cholesterol in laboratory animal models. Avacado seed flour (125,250 and 500mg/kg bw) significantly reduced TC and LDLC in mixafter 6 days. (Nwaoguikpe and Braddi 2011) observed similar effect in Rabbits after treatment with an aqueous seed extract.

### Antimicrobial Activity

The antimicrobial activity of an ethanolic avocado seed extract was tested in select gram negative bacteria. The extract was found to be effective against salmonella enteritidis, citrobacter freundii, pseudomonas aeruginosa and enterobacter aerogenes(minimum inhibitory concentration(MIC)=125 to 250µg/mL). The antimicrobial activity of crude terpenoid fractions and crude alkaloid fractions obtained using solvent extraction was assessed and both the fractions were found to inhibit the growth of staphylococcus aureus and Bacillus subtilis (Rodrigue *et al* 2011)

### Colorant Effects EF

Historical reports indicate that the Spanish conquistadors used a colored exudates from exudates from avocado seed as an indelible ink. Studies in our laboratory have reported the development of a stable orange pigment with avocado seeds are crushed in air (Wang and Bostic, 2010), this development in colour was dependent on the action of the enzyme polyphenol oxidase indicating that the resulting pigment is polyphenolic compound.

### **Safety of avocado seed extract**

Crucial to its use in various application including as potential medical agents is the safety of an avocado seed powder. Contrary to the popular held opinion, the fact avocado seed are derived from natural source implies nothing about their inherent safety to date. There have been a limited number of studies in this topic about oral administration. A single dose of aqueous avocado seed extract (2-10kgbw) was found to result in no significant toxic effect in rats within two subsequent weeks of observation. (Ozolua *et al*; 2009) this suggest relative safety of avocado seed.

### **The phytochemical composition of avocado seed**

The phytochemical compounds in avocado seeds are responsible for colour and organoleptic properties and for prevention and treatment of many health conditions including cancer, heart disease, hypertension and diabetes (Kushi et al 2006).

The presence of saponin in avocado seed makes this fruit very important because saponin has both hypertensive and cardiac depressant properties. Saonin binds to cholesterol to form Insoluble complexes; dietary saponins in the gut of monogastric, combines with endogenous cholesterol excreted via bile. This prevents cholesterol reabsorbtion and resulting to reduction of serum cholesterol. Tannins are polyphenols of high molecular weight which are water soluble and capable of precipitating protein. Tannins are strong astringents because of their binding properties. This astringency appears to be major cause of reduced food intake in mammals. Tannins have high influence in organoleptic properties and reduced with ripening. The presence of Tannin in the body can improve the appetite and reduce respiratory problem and improve circulating disorder thereby lowering blood pressure and reduction of cholesterol in blood (Checke *et al*; 2006).

The Flavonoids, have diverse beneficial biochemical and antioxidant effects (Donald and Miranda, 2000). Their dietary intake is quite high compared to other antioxidants like vitamin C. the antioxidant activity of flavonoid depends on their molecular structure and is different from other phytochemicals especially in their reactivity nature. Antioxidants are compound that protects cells against damaging effects of reactive oxygen species such singlet oxygens, superoxide, peroxy radicals, hydroxyl radicals and peroxy nitrates (Donald and Miranda, 2000). The Flavonoids have aroused considerable interest recently because of their potential beneficial effects on human health and have been reported to have anti - viral, anti- allergic, anti platelet, anti inflammatory, anti tumor and antioxidant activities (Donald and Miranda 2000).

## MATERIALS AND METHODS

### Production of Avocado Pear Seed flour

The avocado pear fruits were washed, cut into halves and the seeds (endocarp) were gently separated from the succulent flesh (mesocarp). The seeds were washed and sliced into bits and boiled for 10mins. The seeds were then drained of water, sun dried for seven days and milled to obtain coarse flour. The coarse particles were filled into tea bags and sealed.

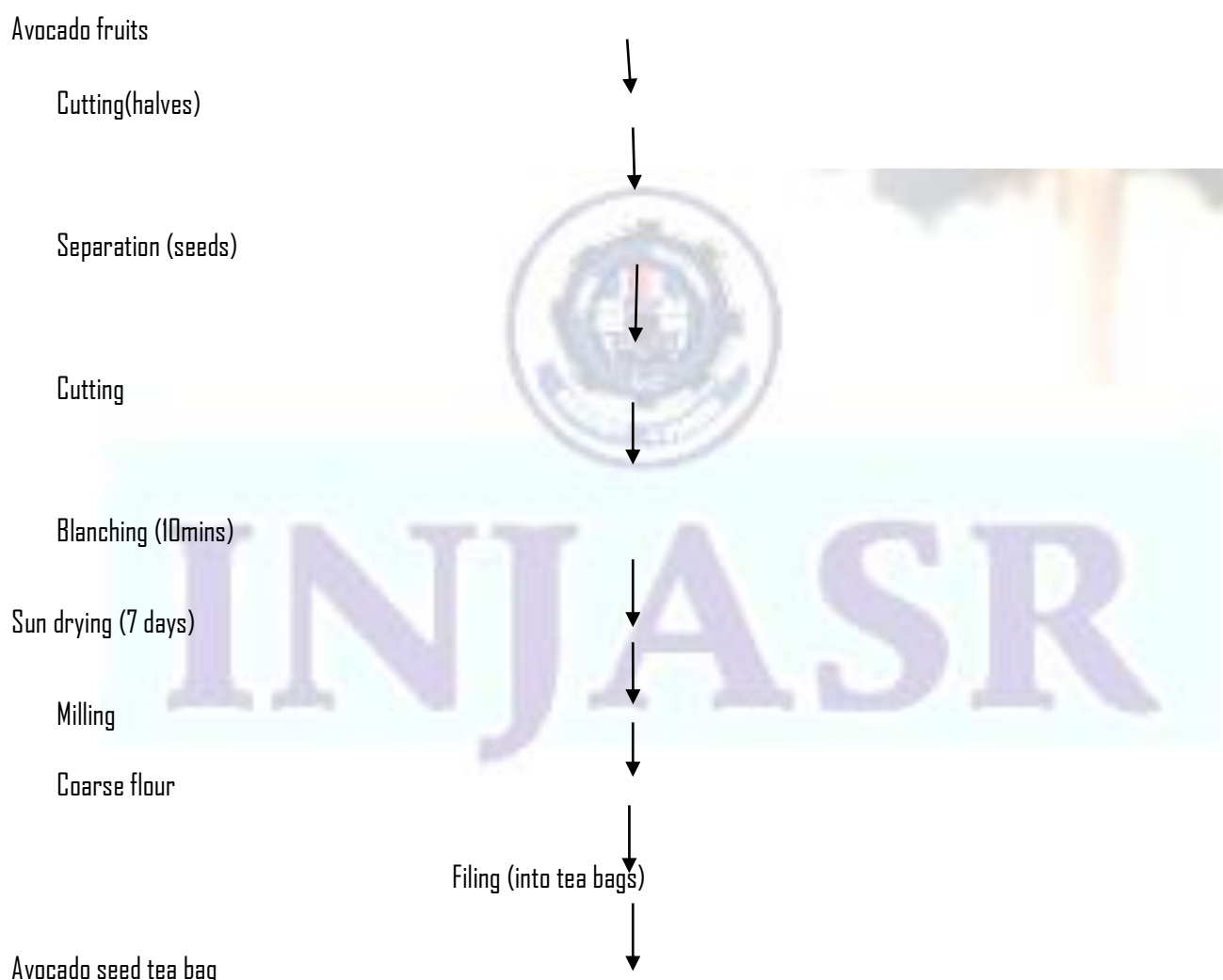


Fig1; Flow chart for production of Avacado seed powder and Teabag.

### Sensory Evaluation

The sample teabags were soaked in hot water to extract the nutrients and color from the seeds, and sensory evaluation was conducted using Lipton Teabags (LT2) as control. Taste, flavor, color, aroma and overall acceptability were tested using 9 point hedonic scale and results were calculated and evaluated as; Dislike extremely, Dislike very much, Dislike moderately, Dislike slightly, Neither like or dislike, Like very much, Like slightly, Like moderately, Like extremely according to 9 point hedonic scale.

**Phytochemical composition**

The phytochemical composition of Avocado seed was evaluated using the standard analytical method.

**RESULTS AND DISCUSSION**

**Result**

The sensory evaluation on the sample showed the following results for sample LT2; 8.30±0.823 for color, 7.60±1.349 for taste, 7.30±1.159 for aroma, 8.00±1.155 for flavour and 7.80±0.695 for overall acceptability. For sample ALI; 6.80±1.135 for color, 7.40±0.843 for taste, 7.10±0.875 for aroma, 6.70±1.590 for flavor and 7.00±0.312 for overall acceptability (Table 4.1)

**Table 4.1:** Mean sensory score of Avocado seed tea and Lipton

Sample	Color	Taste	Aroma	Flavor	Overall Acceptability
LT2	8.30±0.823	7.60±1.349	7.30±1.159	8.00±1.155	7.80±0.695
ALI	6.80±1.135	7.40±0.843	7.10±0.875	6.70±1.590	7.00±0.312

**Discussion**

Table 4.1 above showed the result of the sensory evaluation of the avocado seed tea (ALI) and Lipton tea (commercial) (LT2). The result showed that Lipton (LT2) showed the best rating (8.30) in color than avocado seed tea (ALI) (6.80), this was also observed by

Madukwe et al(2013) who also reported a higher acceptability rating of color in Lipton than Moringa leaf tea. The sparkling golden color of Lipton was acceptable over a slight brown colour of avocado seed tea.

Taste of the Lipton tea sample was again more accepted by panelist with the value of (7.60) while the avocado seed tea with the value (7.40) was lower but with very little difference. Taste is a major determinant of consumer acceptability of a food product hence the "like moderately" rating of avocado seed tea makes it a consumer acceptable product.

Aroma is the sensation obtained from the of factory lobe when the air surrounding the essential oil present in food comes in contact with the nose. Aroma is again higher in Lipton (7.30) than avocado seed tea (7.10) but compares favorably as both could be rated as "like very much". This shows that the aromatic composition of avocado seed is similar to that of Lipton.

Flavor is a combined effect of taste and aroma of food therefore higher taste and aroma value obtained for Lipton may have lead to higher flavor (8.00) of the commercial product than avocado seed tea (6.70). This could be attributed to the strong rooty aroma of Avacado seed.

The overall acceptability of a food product is majorly influenced by other sensory parameters. The higher values of Lipton in other sensory parameters may have led to the high value (7.80) obtained for overall acceptability of the commercial tea samples (7.00). The "like moderately" obtained for avocado seed tea has shown hat the seeds is an acceptable raw material for tea production.

Result of the phytochemical analysis carried out on sample AI showed the following results; 3.70% for flavonoid, 11.64% for saponin, 13.45mg/l for polyphenol, 5.18% for tannin, 5.66% for alkaloid, 6.62 for phenolic compound And pH value obtained from the liquid was 6.98. (Table 4.2)

**Table 4.2; Phytochemical composition of avocado seed tea**

Parameters	Values
Flavonoid	3.07%
Saponin	11.64%
Polyphenol	13.45mg/l
Tannin	5.18%



Alkaloid	5.66%
Phenolic compound	6.62mg/l
pH	6.98

### Phytochemical composition

The results of the phytochemical composition of avocado seed tea were presented in the Table above. The result showed that the beverage samples have a flavonoid content of (3.01%) this was slightly watery than the avocado seed extract content (4.7%) reported by Rodrigue *et al*/(2011) while lower flavonoid content of 0.02% was reported for avocado seed by Arokwu *et al*/(2012). This result is significantly different from the result obtained by Arokwu *et al*/(2012).

The saponin content of the avocado seed extract recorded to be (11.64%) was higher than the value(1.921%)reported for avocado seed extract by Arokwu *et al*/(2012). Saponins are known for their role in haemolytic activity, cholesterol binding.

Polyphenol of the avocado seed extract was found to be (13.4452mg/L) which compared favorably to an ethanolic extract of Garnatxa seed by which ranged from 19.7-140.5ppm. Polyphenols are structural class of mainly natural but also synthetic or semisynthetic, organic chemicals characterized by presence of large multiples of phenol structural units. They give plant their characteristic color, they help lower cholesterol, blood pressure, decrease the risk of diabetes and cancer (Shereum and Richard, 2018).

Tannin showed a content of (5.18%) in the avocado seed tea. This was quite higher than the value (0.020%) reported by Arokwu *et al*/(2012) for avocado seed extract. Tannins are noted for their astringency and bitter taste they hasten the healing of wounds and inflamed mucus membrane. Alkaloids which was recorded to be (5.66%) was also reported (0.072%) for avocado seed extract by Arokwu *et al*/(2012) but compared. Alkaloids are important therapeutically and used basic medicinal agents for their analgesic bactericidal effects.

Phenolic content of the avocado seed extract (6.62ml/L) was low when compared to the value (7.04%) reported for avocado seed by other researchers. Arokwu *et al*/(2012) reported a much lower phenol content (0.614%) for avocado seed extract. Phenols have been extensively researched as disease preventive which can also serve as immune enhancers, antioxidants etc.



The pH value of avocado seed beverage was 6.78 which is slightly acidic and the pH of Lipton is 6.61 also slightly acidic which shows that they are not harmful to health. Some of the phytochemical compound found in Lipton, like tannin is also present in avocado seed, while saponin and flavonoid are present in avocado but absent in Lipton.

## CONCLUSION AND RECOMMENDATION

### Conclusion

The results have shown that organoleptically, avocado seed beverage can be used too as an acceptable drink/ beverage drink just like Lipton and other acceptable commercial drink as comparative values were obtained in their sensory evaluation test conducted in the study. A considerable amount of phytochemicals were obtained from the evaluation carried out which, suggest that avocado seed(mesocarp) is a good source of phytochemical compounds hence a good antioxidant which could be very beneficial for human consumption.

### Recommendation

Considering the quality of phytochemical found in avocado seed beverage, its consumption is recommended since phytochemicals are considered important in control of heart diseases, serves as antioxidant, anti cancer, anti inflammation and also improve the characteristics sensory properties of food.

Further studies on the mineral, physiochemical and proximate composition of the avocado seed beverage should also be carried out in order to ascertain the level of other nutrients in the tea product.

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