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Preparation Avocado Powder

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Introduction

- Avocado is a green fruit with large and dark leathery skin.
- Its unique fruit.
- There are a 30 type of avocado all around the world. in this study I used the Hass type(*Persea americana*) .

Figure 1. avocado types



Healthy benefits

- 1- High nutrition value in avocado(1).**
- 2- They contain high level of potassium (2).**
- 3- Avocado have a healthy fats known monounsaturated fatty acid (3).**
- 4-Avocado have a high level of fiber(4).**

Drying

There are a several drying method:

- **Freeze drying**
- **Oven drying**
- **Spray drying**
- **....Etc**

Why I use freeze drying method ?

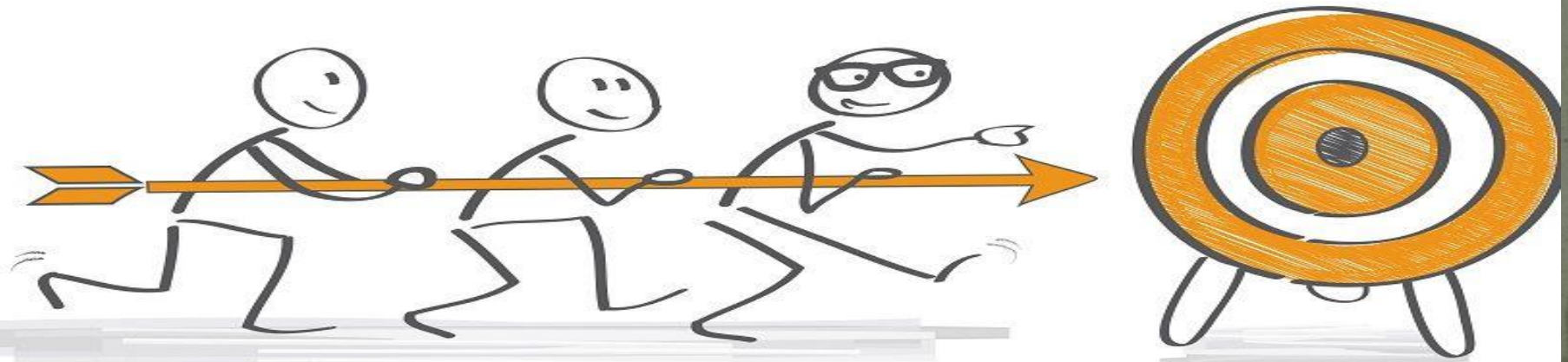
- In avocado not all method for dry it give us the same quality.
- Material structure is maintained.
- Superior quality.
- Suitable for heat sensitive materials.
- Less oxidation

Advantage and dis -Advantage of drying

Drying type	Advantage	Dis-advantage
Freeze drying	<ul style="list-style-type: none"> • high nutritional value • preserve the actual color and shape • suitable for heat sensitive materials 	<ul style="list-style-type: none"> • It took a long of time • High cost
Oven drying	<ul style="list-style-type: none"> • Large number of sample at same time • Large volume for sample • High accuracy 	<ul style="list-style-type: none"> • Sample may decompose • very high risk of error
Spray drying	<ul style="list-style-type: none"> • Short times • suitability for heat-sensitive and heat-resistant foods 	<ul style="list-style-type: none"> • the variations in particle shape and size distribution high temperatures • fast drying rates that normally do not allow for encapsulation of temperature-sensitive bioactive substances

Objectives

- To produce avocado powder by using freeze drying method
- to characterize the final product comparing with the raw and different drying method from the literature review

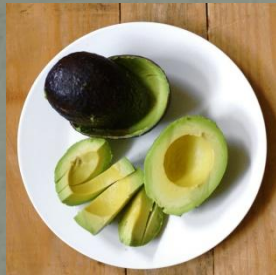


Materials & Methods

1-Avocado powder preparation :



Avocado



Cut it



Blend it



Add lemon



Freeze it



Dry it

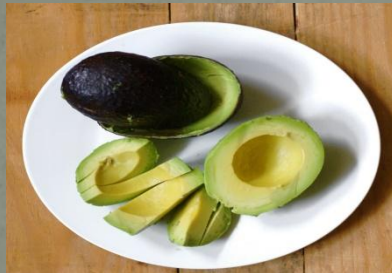


Avocado powder

Materials & Methods



Avocado



Cut it



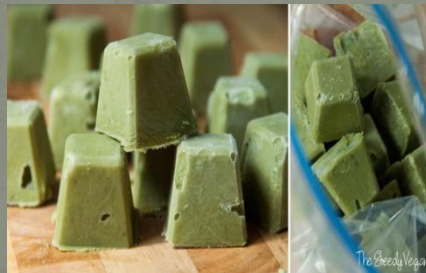
Blend it



Add lemon



Add Tahinia



Freeze it



Dry it



Avocado powder

2- Analysis on powder and raw



Moisture analysis



Protein analysis

$(\text{ml of acid} \times n \times 1.4007 / \text{weight of sample in g}) \times 6.25$



Ash analysis

$[(\text{Wt of crucible and ash} - \text{wt of crucible}) / (\text{wt of crucible and sample} - \text{wt of crucible})] \times 100$

2- Analysis on powder and raw



Fat analysis
 $(W_2 - W_3) / W_1 \times 100$



Fiber analysis
 $100 \times (w_3 - (w_1 \times c_1)) / w_2$

3- preparation for sensory test

Figure 1. Sensory evaluation by hedonic scale

	Like a lot 5	Like a little 4	Neither like nor dislike 3	Dislike a little 2	Dislike a lot 1
Colour					
Viscosity					
Flavour					
Taste					
Smoothness					
Overall acceptability					
Notes about the product					

Result

The following table well describe the analysis that I make, I took the average form the 3 sample for each raw and powder avocado.

Table 1.Analysis between powder and raw avocado

Product	Protein	Fat	Fiber	Ash	Moisture
Powder	2.30 ± 0.01	42.81 ± 1.2	8.1 ± 0.97	20.7 ± 0.17	2.28 ± 0.36
Powder with Tahinia	2.22 ± 0.01	55.22 ± 1.22	9.3 ± 0.84	21.3 ± 0.21	2.78 ± 0.07
Raw	0.81 ± 0.01	81.8 ± 0.29	6.7 ± 1.17	4.5 ± 0.4	78.98 ± 2.88

My result vs article

Table 2.comparison between my result and the article (5)

Product	protein	fat	Fiber	Ash
Powder	2.30 ± 0.01	42.81 ± 1.2	8.1 ± 0.97	20.7 ± 0.1
Raw	0.81 ± 0.01	81.8 ± 0.29	6.7 ± 1.17	4.5 ± 0.4
Powder *	6.87 ± 0.47	47.22 ± 0.55	8.6 ± 0.33	4.13 ± 0.65
Raw*	2	14.7	6.7	2.26

(*) Is the result from the article

Freeze vs oven analysis

Table 3: show the different in result between using oven drying and freeze drying (5).

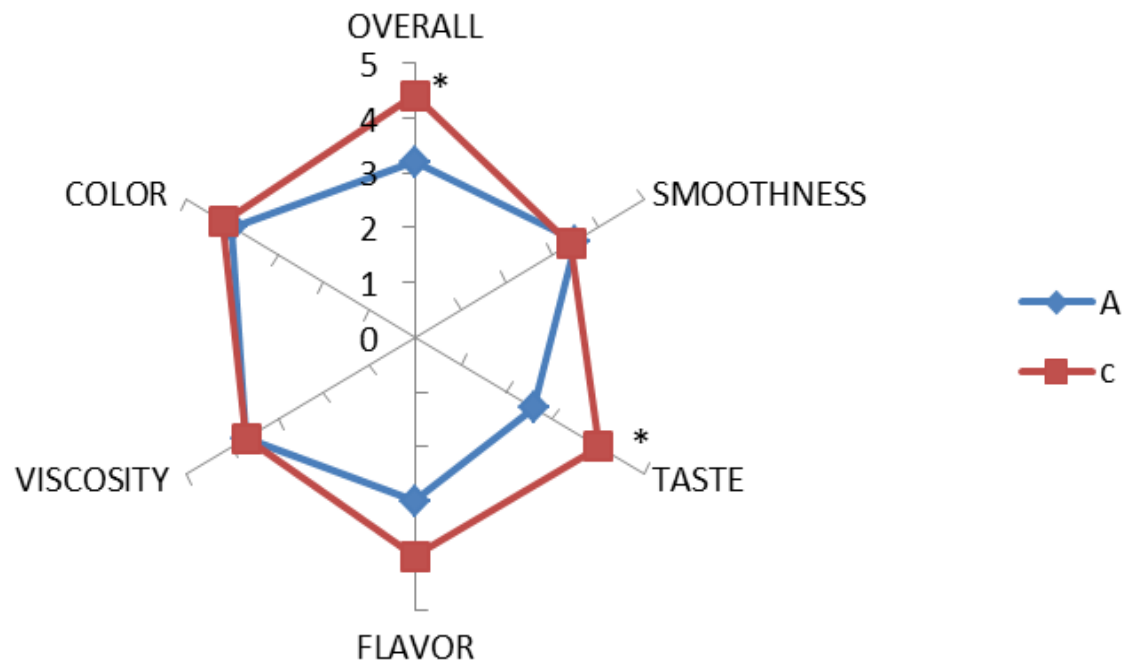
Drying method	protein	fat	fiber	ash
Freeze	2.30 ± 0.04	42.81 ± 1.21	8.1 ± 0.97	20.7 ± 0.17
Oven(*)	1.06 ± 0.07	40.66 ± 1.22	10.3 ± 0.80	7.1 ± 4.13

(*) the result from the article

Sensory test result :

Figure 1. the result from sensory test

SENSE TEST RESULT

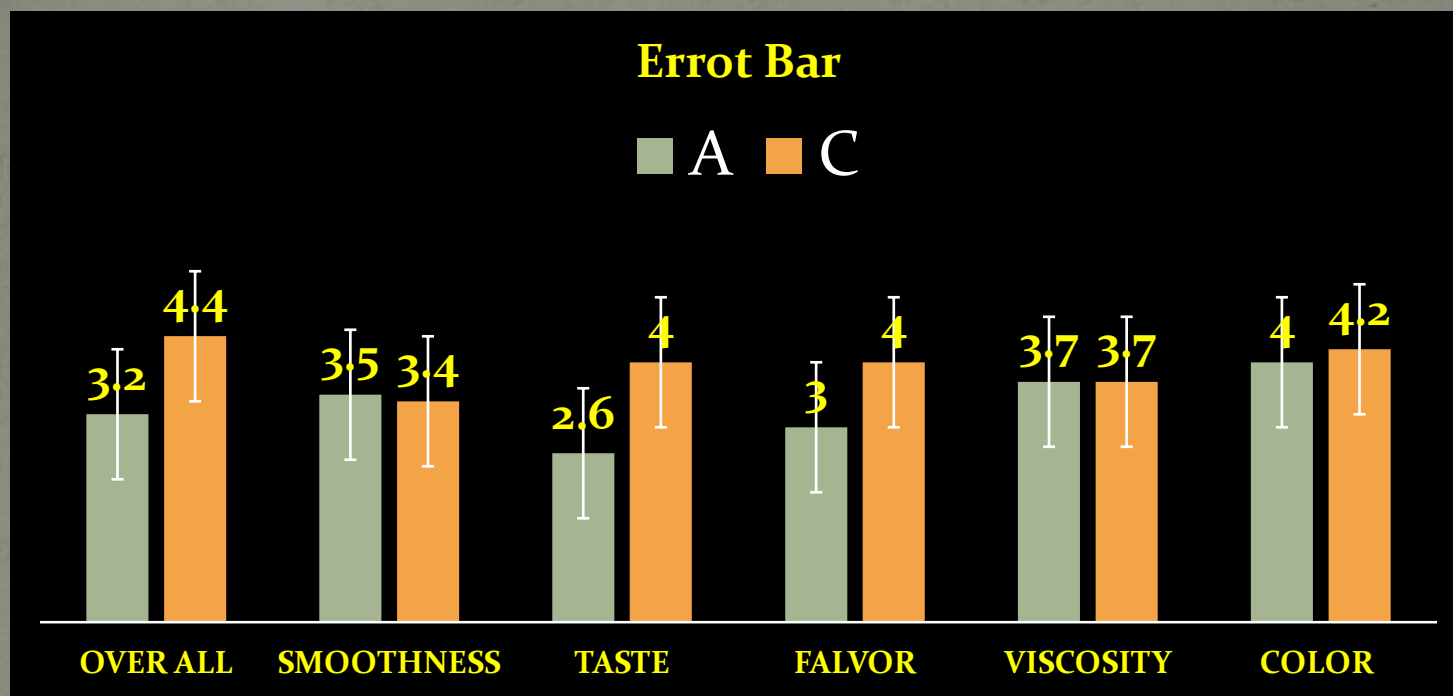


A is the freeze dry Avocado powder , C is the raw Avocado.



Sensory test result :

Figure 2.



Conclusion

- The avocado powder were very good from analysis that made for it, were freeze dry moisture very low .
- Compared with oven drying , freeze drying were higher in fat content.
- Freeze drying powder resembled fresh avocado pure when rehydration however slight putter taste was detected.
- The result from this study is make a new product with high nutritional value, with a perfect method to save this benefits using a freeze dryer.

Recommendation

- **I recommended the manufacturing companies to use this product , because the health benefits that have .**
- **It can use in the baby food due to the high nutritional value .**
- **It can use for protein pars.**

References

- 1-https://www.healthline.com/nutrition/12-proven-benefits-of-avocado#TOC_TITLE_HDR_5),
- 2-(<https://pubmed.ncbi.nlm.nih.gov/23558164/>)
- 3-<https://pubmed.ncbi.nlm.nih.gov/16484595/>
- 4-<https://pubmed.ncbi.nlm.nih.gov/10721886/>
- 5-<https://fdc.nal.usda.gov/fdc-app.html#/food-details/1102652/nutrients>
- 6https://www.researchgate.net/publication/345344043_THE_PRODUCTI
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