



FORMULATION AND STANDARDIZATION CIPSE DIAMONDS

¹DU. Janani ²Dr.K.U. Pavitra Krishna

¹ UG Student, ²Head & Assistant Professor, Department of Food Science and Processing Management, Subbalakshmi Lakshmi pathy College of Science, Madurai. Email id: dk24081971@gmail.com,

Contact no: 9245406521

Abstract: Nowadays people are with low immune health which leads to weakness in body metabolism resulting in several health issues. Among that heart diseases, diabetics, osteoporosis, cholesterol, anemia and cancer are diseases that builds inside our body without any symptoms on its primary levels. Its presence inside the body can be identified only when it reaches its secondary stage at which total curing is impossible. So, nutrients that are needed for our body to fight against these diseases are Vitamin C, Magnesium and Iron. To give this altogether in a form of snack makes people healthy. Cipse diamonds, chips made of citron rich in vitamin c, pumpkin seeds rich in magnesium and white sesame rich in iron. As it is oven baked the possibility of nutrient loss is also less. The materials, methods and results are discussed in detailed.

Index Terms - vitamin c, magnesium, iron, immune health, oven baked and CIPSE

INTRODUCTION

Nowadays people are with low immune health which leads to weakness in body metabolism resulting in several health issues. Among that heart diseases, diabetics, osteoporosis, cholesterol, anemia and cancer are diseases that builds inside our body without any symptoms on its primary levels. Its presence inside the body can be identified only when it reaches its secondary stage at which total curing is impossible.

Citron is a fruit that's a native to India, at the foothills of the eastern Himalayas. It comes under the genus citrus and species citrus medica. It's one of the primary species of cultivated citrus, and a parent or ancestor of the commercially important acid citrus fruits. (Manuel Talon et., al, 2020)

Eight taxa belonging to the genus Citrus (Rutaceae) have been traditionally cultivated in the Mediterranean region. Citrus medica is a fruit that's from ancient times of Europe lemon (Citrus limon), Lime (Citrus × auantiifolia (Christm.) Swingle), Pomelo (Citrus maxes (Burm.) Merr.) and Bitter Orange (Citrus × aurantium L.) Bitter orange are introduced to Europe by Muslims. Real (Beatriz Alvarez Ariaset., at, 2004)

Pumpkin seeds: Cucurbita maxima, commonly known as pumpkin belongs to the Cucurbitaceae family. Pumpkin seed refers seed of a Cucurbita maxima (Pumpkin). The seeds are flat, light green and oval in shape, it is present inside a white hull and are used for comestible as well as medicinal purposes. Pumpkin seeds are also used in southern parts of Austria, Slovenia, and Hungary as culinary practices (Murkovic et al., 1996). Roasted pumpkin seeds are a popular snack in many African countries, especially in Tunisia (Leila Rezig et al., 2012)

The pumpkin seeds contain crude protein (39.25%), crude oil (27.83%), ash (4.59%), and crude fiber (16.84%); the corresponding values for the kernels were 39.22, 43.69, 5.14, and 2.13%, respectively. Pumpkin seeds contain moderate level of Phosphorous, Magnesium, and Potassium. The amino acid profiles indicate that methionine and tryptophan were present in low level, at the same time arginine, glutamic, and aspartic acids were in high trace amino acids. The saturated fatty acid content was 27.73% and comprises of 16.41% palmitic acid and 11.14% stearic acid. It has 73.03% of unsaturated fatty acids and consisting mainly: oleic acid (18.14

%) and linoleic acid (52.69%). Level of polyunsaturated fatty acids in pumpkin seeds is high. In antioxidants selenium and beta carotene are found in high level. They are also high source of iron. One bowl of pumpkin seeds contains 9.52 mg of iron, a significant portion of the 18 mg recommended daily allowance (RDA) Trusted Source for premenopausal females and 8 mg for males and postmenopausal females. Pumpkin seeds also contain: zinc, phosphorus, manganese, protein, fiber. (Mohammed A. Alfawaz 2004)

Pumpkin seeds help in anti-inflammatory effects, Lowering the risk of diabetes, anti-cancer properties, healthy heart function, lowers sleeplessness, helps immune system to fight against bacteria and virus, reduces the risk of osteoporosis in females, Pumpkinseed is a good source of phytoestrogens.

White Sesame seeds are seeds that are yielded from hulling of the sesame plant, an annual plant botanically known as Sesamum indicum. The sesame seeds grow within the plants fruit and pop open when ripe, scattering of seeds happens after maturity stage.

Among the many plant species consumed as nutritional and medicinal purposes it is identified that, *Sesamum indicum* L. is an important plant. It is commonly known internationally as sesame, and as benniseed or simsim in Africa. (S.O. Amoo et., al 2017)

Various research endeavors on sesame plant have generated closely related opinions regarding the origin of the crop. The origin of the crop have been mostly inclined with the use of plants collected from the wild in the African and Asian continents, which triggered its cultivation. (S.O. Amoo et., al 2017)

Sesame seeds come from the *Sesamum Indicum* plant. Indigenous to the Sunda Islands in Indonesia and the oldest known oilseed plant in history, the plant has been cultivated for over 4,000 years. The crop is grown in almost all parts of the country. More than 85% production of sesame comes from West Bengal, Madhya Pradesh, Rajasthan, Uttar Pradesh, Gujarat, Andhra Pradesh and Telangana.

Mineral composition of *S. indicum* L. 100 g⁻¹ of *S. indicum* seed is Sodium 122.50 mg, Calcium 415.38mg, Magnesium 579.53mg, Phosphorus 647.25mg, Potassium 851.35mg. (S.O. Amoo et., al 2017)

OBJECTIVES:

- To formulate baked chips from citron, pumpkin seeds and white sesame.
- To evaluate the acceptability of chips through sensory evaluation.
- To estimate the nutrient content present in citron, pumpkin seeds and white sesame and give awareness.
- To decide the suitable packaging material

MATERIALS AND METHOD: -

PROCUREMENTS OF RAW MATERIALS:

The raw materials such as corn flour, wheat flour, citron powder, pumpkin seed powder, roasted white sesame, chilli powder, salt and butter.

CHEMICALS:

The chemicals and reagents used for study were Laboratory reagents (LR), Analytical reagent (AR) or Guarantee reagent (GR) grades.

UTENSILS:

Stainless steel vessels, mixing bowls, rowing pin, baking tray, microwave oven and plate were used for preparing and serving the developed products.

ENERGY SOURCE:

Electric current and Liquid Petroleum gas were used as heat source

EQUIPMENTS USED:

- Weighing balance
- Electronic balance
- Hot plate
- Mixer
- Hot air oven
- Infrared moisture analyzer
- Magnetic stirrer
- Muffle furnace
- Kel Plus-Digestion & Distillation
- Socs Plus apparatus
- Fibro plus apparatus

PREPARATION OF CIPSE Diamonds:

Outline procedure of CIPSE Diamonds is depicted in Figure 1

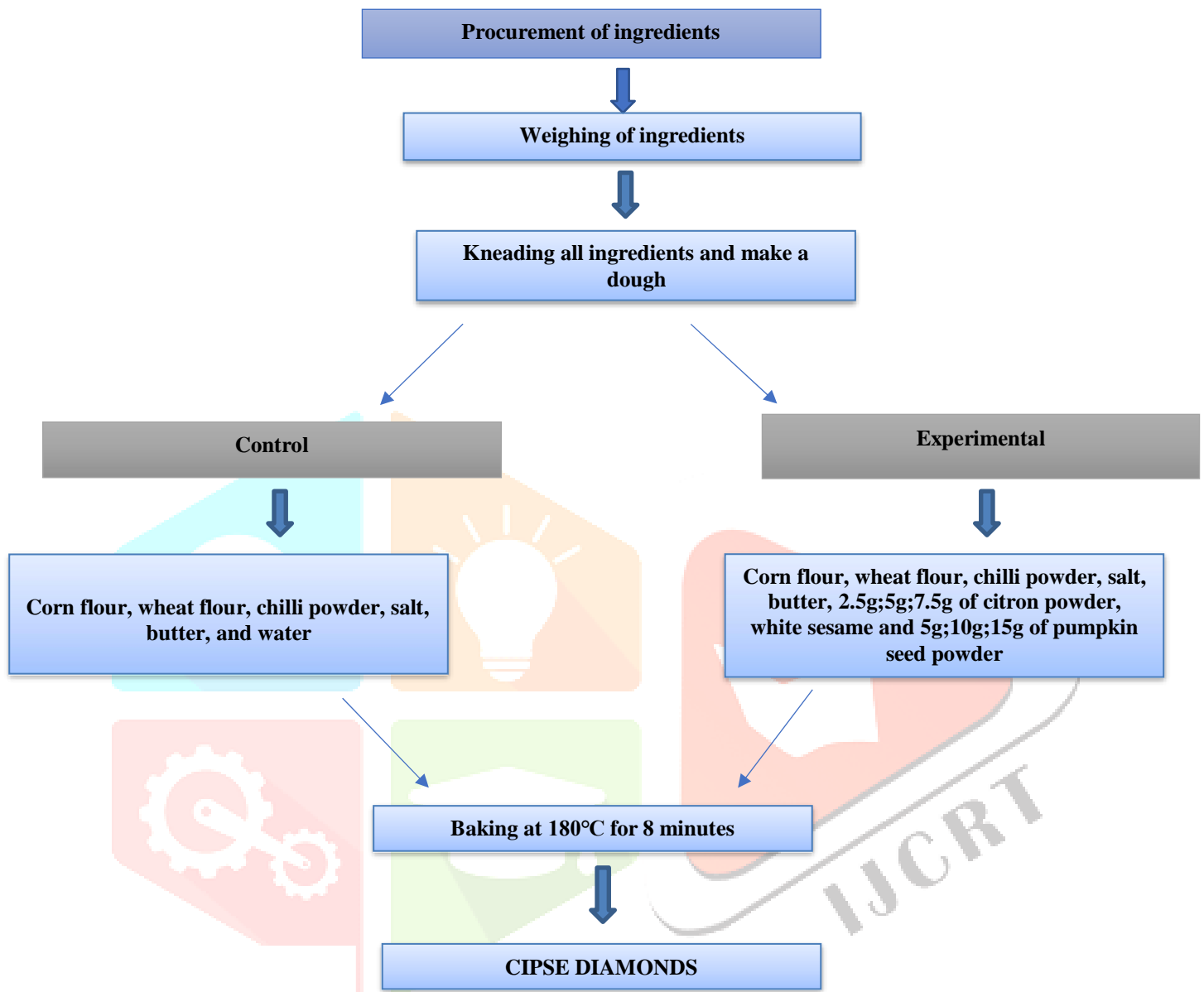


Figure 1

*CIPSE- Citron, pumpkin seed and sesame

FORMULATION OF CIPSE DIAMONDS:

PRELIMINARY PREPARATION OF SELECTIVE INGREDIENTS: -

- The procured raw materials such as corn flour, wheat flour, citron powder, pumpkin seed powder, roasted white sesame, chilli powder and salt are cleaned to remove dirt, dust, stones and other foreign materials.
- Citron unripe fruit is cut into pieces and sun dried for 2 days. Then the pulp of the fruit is separated and grinded into powder.
- Pumpkin seeds are taken and grinded into powder
- White sesame is roasted at 50°C for 3 minutes to make it eatable and to get a present aroma

VARIATIONS OF CIPSE DIAMONDS: -

- Citron powder, pumpkin seed powder and white sesame have high nutritive value and enormous health benefits, the prepared products were made into 3 variations. It is shown in Plate-1, Plate-2 and Plate-3.
- Standardized procedure was followed for all formulated recipes.

**PLATE-1****PLATE-2****PLATE-3****DEVELOPMENT OF CIPSE DIAMONDS: -**

The proportion of ingredients used to prepare Cipse Diamonds, and its variations are given in Table

no. 3 First all the dry ingredients are mixed together to get equal taste and after through mixing butter and water are added gradually. And made into dough consistency. Then the dough is left to rest for 2 mins. After that the dough is rolled using a rolling pin and it is cut into diamond shapes. The baking tray is greased using butter and the product is baked at 180°C for 8 minutes. When it reaches the crispy stage, the tray is kept at room temperature and stored in airtight container. In this control procedure, variation of 2.5g of citron powder, roasted white sesame and 5g of pumpkin seed powder; 5g of citron powder, roasted white sesame and 10g of pumpkin seed powder; 7.5g of citron powder, roasted white sesame and 15g of pumpkin seed powder are incorporated and developed into Cipse diamonds and evaluated for acceptability. Ingredients are shown in Plate 5. The preparation process is shown in Plate 6,7,8 &9.

S.no	Ingredients	Quantity (g)			
		Control	CIPSE 1	CIPSE 2	CIPSE 3
1.	Corn flour	25g	25g	25g	25g
2.	Wheat flour	25g	25g	25g	25g
3.	Water	20g	20g	20g	20g
4.	Citron powder	-	2.5g	5g	7.5g
5.	Pumpkin seed powder	-	5g	10g	15g
6.	Roasted white sesame	-	2.5g	5g	7.5g
7.	Butter	5g	5g	5g	5g
8.	Salt	2.5g	2.5g	2.5g	2.5g
9.	Chilli powder	2g	2g	3g	4g

Table 3**PLATE-6****PLATE-7****PLATE-8****PLATE-9**

ORGANOLEPTIC OR SENSORY EVALUATION: -

The Institute of Food Technologies (IFT) defines sensory evaluation as, “The Scientific discipline used to evoke measure, analysis and interpret those reaction to characteristics of food and materials as perceived through the senses of light, smell taste, touch and hearing (Murana and Siva Lingam, 2005)

The sensory evaluation was conducted to analyze the acceptability of the developed products. The developed Cipse diamonds was assessed by 20 panel members.

The developed food product along with its 3 variations was evaluated by the panel members using score card with 5 points Hedonic scale rating by mentioning the product variations as Sample A, Sample B, Sample C and Sample D. Sensory evaluation is depicted in Picture.1



Picture 1

Overall mean score of the sensory evaluation is depicted in Table 4

S.no	Variations	Sensory attributes					Overall mean score
		Appearance	Colour	Flavour	Texture	Taste	
1.	CIPSE 1	4.45	4.05	3.95	4.45	3.85	4.15
2.	CIPSE 2	4.5	4.4	4.45	4.4	4.45	4.44
3.	CIPSE 3	3.9	3.9	3.35	3.65	3.4	3.64

*CIPSE- Citron, pumpkin seed and sesame

Table 4

Among the developed products, the overall mean score in CIPSE 2 was highly acceptable. The result revealed that CIPSE 2 secured highest score and the sensory attributes this sample got more preference than other developed products.

NUTRIENT ANALYSIS

- Nutritional quality can be assessed by chemical or instrumental analysis for specific nutrients (Norman et al., 2005)
- Nutrient analysis refers to the process of determining the nutrient content of food and food products
- The formulated Cipse diamonds with 5% of citron powder, roasted white sesame and 10% of pumpkin seeds were subjected to nutrient analysis of Energy, Carbohydrates, Protein, Fat, Crude fiber, Moisture, Total ash & Acis insoluble ash.



➤ Results of nutrient analysis is depicted in Table 5

S.NO	NUTRIENT	VALUE
1.	MOISTURE	6.8376 g
2.	TOTAL ASH	5.1278 g
3.	TOTAL INSOLUBLE ASH	0.2136 g
4.	PROTEIN	7.6917 g
5.	FAT	17.5201 g
6.	CRUDE FIBER	2.5191 g
7.	CARBOHYDRATES	62.8228 g
8.	ENERGY	439.8 kcal

Table 5

SHELF-LIFE ANALYSIS:

The standardized CIPSE Diamonds are subjected to shelf-life study by placing it in room temperature from the day of development till the physical and chemical composition of product changes. The product is crispy texture, good aroma and citrus and chilli taste. The nature of the product is observed in daily basis. As per observation after 3 weeks change in nature is observed. It is stored in air tight container exactly 21 days the product can sustain its composition.



PACKAGING AND LABELLING

A product whether it is factory made or farm produce has to reach its destination, the ultimate consumer in the same condition without any deviations from the original characteristics, one requires packaging.

As the product is baked and crispy, the packaging material should be moisture resistant and airtight. Most of the chips are packed using plastic called "Biaxially oriented polypropylene". To ensure that the chips remain crispy and crunchy, the bag has to be tightly packed by sealing air entering and moisture.

RESULTS AND DISCUSSION:

SENSORY EVALUATION:

Among the developed products, the overall mean score in CIPSE 2 was highly acceptable. The result revealed that CIPSE 2 secured highest score and the sensory attributes this sample got more preference than other developed products. The appearance, color, taste, texture and flavor of CIPSE 2 was highly acceptable.

Result of sensory evaluation is depicted in Figure 2

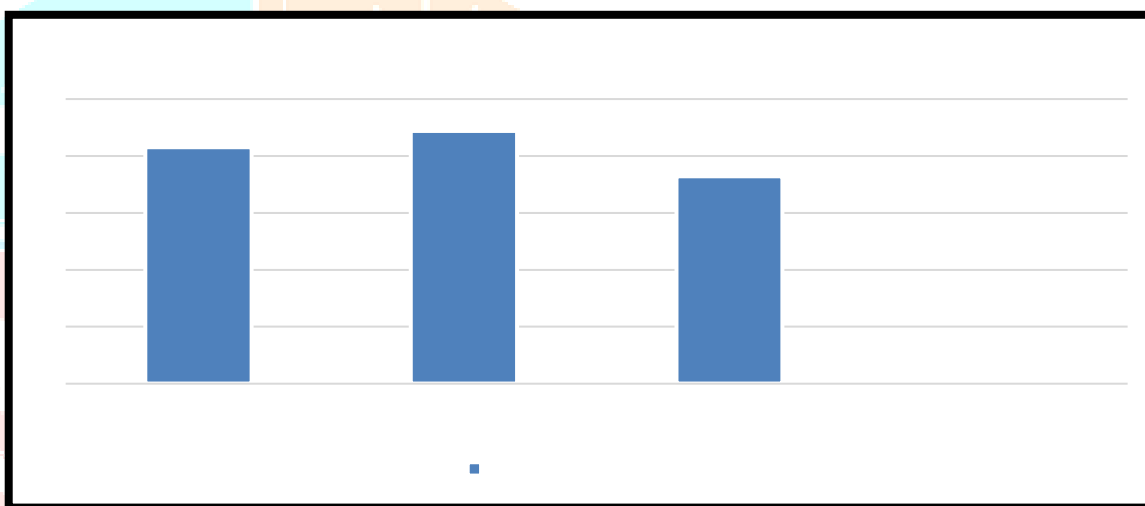


Figure 2

NUTRIENT ANALYSIS: Results of nutrient analysis is depicted in Figure 3,4 & 5

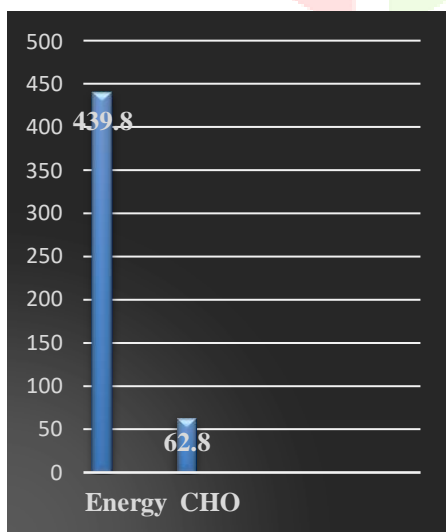


Figure 3

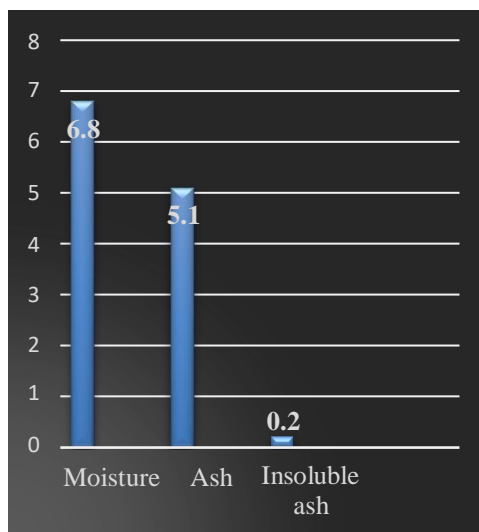


Figure 4

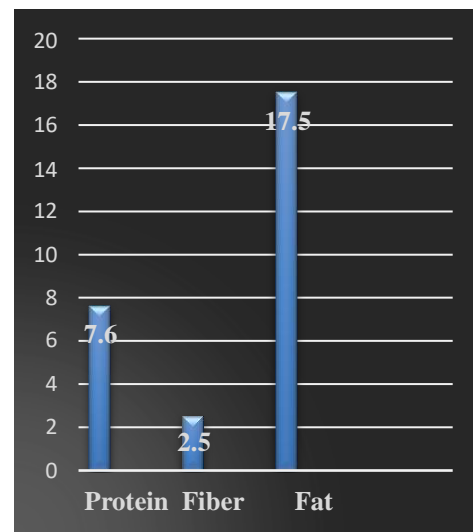


Figure 5

COMPARITIVE STUDY WITH RDA OF CHILDREN 3-6 YEARS:

Comparative study of nutrient analysis with the RDA of Children 3-6 years is depicted in Figure 6 & 7

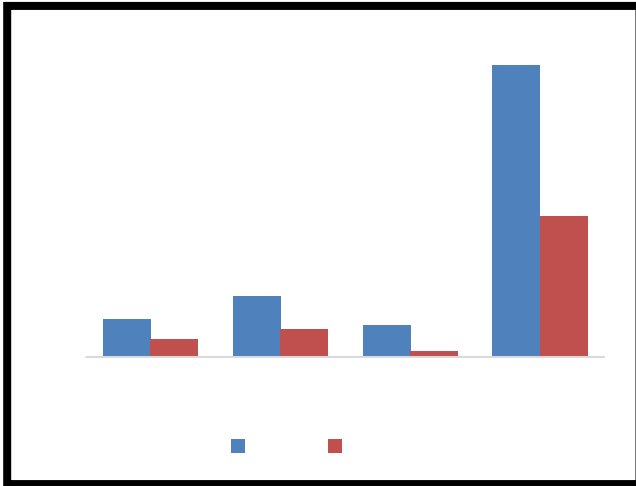


Figure 6

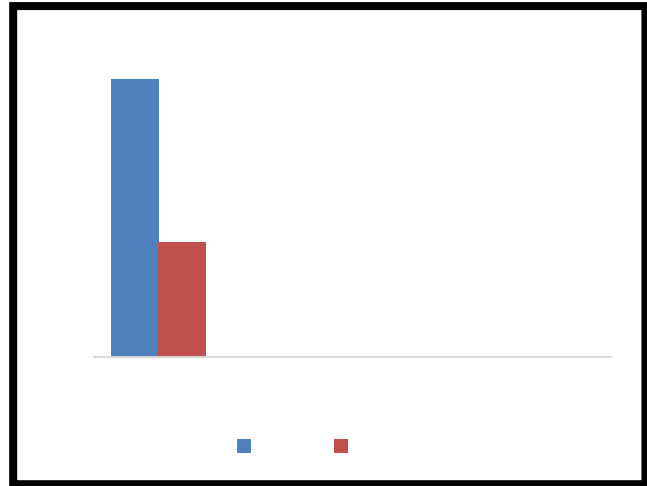


Figure 7

- This product can be consumed by School going children of 3-6 years, The RDA OF School going children is 50% satisfied by consuming CIPSE Diamonds.

RECOMMENDATION:

This product probably comes near to the RDA of the target group CHILDREN OF 3-6 YEARS. Children are fond of snacks, chips come under this category. Usually, chips are fried as these chips are baked the nutrients are retained. 100g of CIPSE diamonds comes near to the RDA if consuming more than 100g the RDA will be satisfied completely

SUMMARY & CONCLUSION:

Three different variations of products with different proportions of citron powder, pumpkin seed powder and white sesame were prepared. The sensory outcome relived that among the developed products the overall mean score in CIPSE-2 was highly acceptable. Nutrient analysis result showed the developed product is rich in Vitamin C, Iron and Magnesium. All age group people can consume it but the RDA nears for Children of 1-6 age. So, it can be recommended to them. Shelf life of product is BEST BEFORE 21 days from packing. Packaging material for commercial marketing "Biaxially oriented polypropylene" for small scale marketing "Aluminum silver pouches" can be used.

REFERENCE:

- Mohammed A. Al-Yahya *et. al*, 2004, *Citrus medica "Otroj": Attenuates Oxidative Stress and Cardiac Dysrhythmia in Isoproterenol-Induced, Nutrients*, Volume no: 5, ISSN 2072-6643, Pp: 4269&4270.
- Xiangyu Liu *et. al*, 2014, *Advances in Study of Carotenoids in Citrus Fruits, The Genus Citrus (2020)*, Nova Science Publishers, Chapter no: 4, ISBN 978-1-63117-985-3, Pp: 51,52,54 & 58.
- Beatriz Alvarez Arias *et. al*, 2005, *Pharmacological properties of citrus and their ancient and medieval uses in the Mediterranean region*, *Journal of Ethnopharmacology*, Elsevier Ireland Ltd, Volume no: 97, Issue no: 1, Pp: 89 & 90.
- Leila Rezig *et al.*, 2012, *Chemical composition and profile characterisation of pumpkin (Cucurbita maxima) seed oil*, *Industrial crops and products*, Elsevier Ireland Ltd, Volume no: 37, Issue no: 1, Pp:82.
- Murkovic, ´M., Hillebrand, A., Winkler, H., Pfannhauser, W., 1996. *Variability of vitamin E content in pumpkin seeds (Cucurbita pepo L.)*. *Z. Lebensm. Unters. Forsch.*202, 275–278
- S.O. Amoo *et. al* 2017, *Sesamum indicum, Medicinal Spices and Vegetables from Africa*, Elsevier Ireland Ltd Chapter no:26, ISBN :978-0-12-809286-6, Pp: 549&551.
- C.Gopalan, B.V. Rama Sastri & S.C. Balasubramanian, 1989, " *Nutritive Value of Indian Foods, National Institute of Nutrition*", ICMR, Hyderabad, Pp: on basis of ingredients.
- B. Sri Lakshmi *et. al* 2019, *Dietetics, New Age International (P) Ltd., Publisher*, ISBN: 978-93-86649-20-1, Pp: 85