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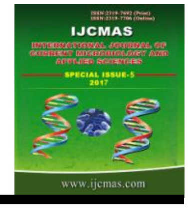



**Original Research Article**

# Mineral and Vitamin Compositions Contents in Watermelon Peel (Rind)

**G. Gladvin[1*], G. Sudhaakr[2], V. Swathi[1] and K. V. Santhisri[1]**

[1]Department of Foods and Nutritional Sciences, Acharya Nagarjuna University, Nagarjuna Nagar, Guntur, Andhra Pradesh, India
[2]Department of Environmental Sciences, Acharya Nagarjuna University, Nagarjuna Nagar, Guntur, Andhra Pradesh, India
**Corresponding author*

**A B S T R A C T**

Recently, it has taken a boom the use of fruit and vegetable waste to reduce environmental pollution. The aim of this work was to evaluate some physical and chemical properties of watermelon rind, the mineral and vitamin compositions of the rind of watermelon (*Citrullus lanatus*) were investigated, using standard methods. in the peel, Iron 1.29, manganese 1.42, phosphorous 135.24, calcium 29.15, sodium 12.65, copper 0.45, zinc 1.29, magnesium 1.48, potassium 1.37 are showed in table-1 and as shown in Table 2, composition of vitamin composition in mg/100 g, vitamin A -52.13, vitamin B1-1.23, vitamin B2-2.71, vitamin B3-4.25, vitamin B6- 5.34, and vitamin C-8.46, The preponderance of these nutrients in the, especially rind samples, may be of nutritional and physiological importance warranting further studies to increase the dietary use of these food wastes and reduce the attendant burden in the environment, The aim of this research work is to determine some functional properties of the rind and chemical properties of the dried power extract with a view of harnessing it for consumption and possible industrial usage.

**Keywords**

Watermelon, wastes, mineral, vitamin, rind, dietary use

## Introduction

Watermelon (family Cucurbitaceae and species *Citrullus lanatus*) is a major fruit widely distributed in the tropics and sub tropic regions (Yamaguchi, 2006). It is one of the most important vegetable crops and has large, round, oval or oblong fruit shape, the skin is smooth, with dark green rind or sometimes pale green stripes that turn yellowish green when ripe with very rich source of vitamins (Vitamin A 590 IU, Niacin 0.2 mg/100g and Vit. C 0.7-7.0 mg/100 g), and also serves as a good source of phyto-chemicals (Perkins-Veazie and Collins, 2004). It can be used for breakfast as appetizer or snack (Salk *et al.*, 2008), and (*Citrulus lanatus*) is a popular thirst-quencher during hot summer weather, it has source of carotenoid and lycopene, Lycopene has been found to be protective against a growing list of cancer (Cho, *et al.*, 2004), and is delectable, thirst-quencher which helps quench the inflammable that contributes to conditions like diabetes, atherosclerosis, arthritis, asthma, and colon cancer (Jian *et al.*, 2007). Cucurbit seeds are source of food particularly protein and oil (Hassan *et al.*, 2008). Watermelon is also expectedly high in citrulline, an amino acid the body make use of to make another amino acid, arginine (used in the urea cycle to remove ammoniacal from the body) (Collins *et al.*, 2007), and contained many smooth compressed seeds that thickened at the margin and of black or yellow-white colour (Sodeke, 2005 & Achu, *et al.*, 2005), reported high lipid level seeds from different regions.

The therapeutic effect of watermelon has been reported and has been ascribed to antioxidant compounds (Leong and Shui, 2002; Lewinsohn *et al.*, 2005).

The studies on watermelon fruits have focused on the anti-nutritional (Johnson *et al.*, 2012), phyto-chemical and anti-oxidant properties (Oseni *et al.*, 2013), also to increase shelf-life (Hanan *et al.*, 2013) and the fruit juice having the nutritional/quality (proximate) contents (Fila *et al.*, 2013), the rind (peels) which could encourage their consumptions or further use. The aim of this research work is to determine some functional properties of the peel (rind) dried power extract with a view of harnessing it for consumption and possible industrial usage.

## Materials and Methods

Collection and preparation of samples: Watermelon fruits were bought from market. The watermelon was thoroughly washed to remove sand particles after which it was sliced using a home choice knife. The pulp was carefully scraped off to obtain the rind which was chopped into pieces with a chipping machine. The rind chips were weighed. The rind (wet weight = 200 g) and sundried to obtain the corresponding dry weight for the rind (100 g).

Chemicals and reagents: All chemicals used, including those used in the preparation of reagents, were of analytical grade and products of reputable companies.

### Determination of the vitamin, mineral and amino acid compositions

Vitamin A, B1 (thiamine), B2, B3 (niacin) and B6 were variously determined by the spectrophotometric methods reported by Onwuka (2005) whereas; vitamin C (ascorbic acid) was determined by the method described by Okwu and Josiah (2006).

Mineral content viz: phosphorous, iron, zinc, manganese, copper, potassium, sodium, calcium and magnesium were determined by the spectrophotometric method described by James (1995), using Jenway Digital Spectrophotometer, Model 6320D, manufactured by Jenway Equipment Company, France. Potassium and sodium were determined by the flame photometric method, using Jaway Digital Flame Photometer.

## Results and Discussion

Generally, Minerals and vitamins are essential, but in small amounts, for the regulation of normal metabolism and as an antioxidant (Barminas *et al.*, 1998), the ability of watermelon rind powder and synthetic antioxidants (BHA) to prevent the bleaching of b-carotene (Keyvan *et al.*, (2007), and the watermelon rind and seed flours study were composed of the various minerals determined, concurring with that reported by Hafiza *et al.*, 2002, the mineral composition (mg/100 g) in the peel, Iron 1.29, manganese 1.42, phosphorous 135.24, calcium 29.15, sodium 12.65, copper 0.45, zinc 1.29, magnesium 1.48, potassium 1.37 are showed in table-1 and as shown in Table 2, composition of vitamin composition in mg/100 g, retinol (vitamin A) -52.13, Thiamine (vitamin B1)1.23, Riboflavin (vitamin B2) 2.71, Niacin (vitamin B3) - 4.25, Pyridoxine (vitamin B6)- 5.34, Ascorbic acid (vitamin C) -8.46, Similar higher nutrient composition in the seed than in the rind was reported in a similar studies by Koocheki *et al.*, 2007 and Egbuonu, 2015), In the present study, mineral contents for human diet and some important physical properties such as design of equipments for sowing, processing, transportation, sorting, separation and packaging of watermelon is very important (Mustafa *et al.*, 2010).

**Table.1** Some mineral composition of water melon peel

| S.No | Mineral | Rind mg/100g |
|---|---|---|
| 1 | Iron | 1.29 |
| 2 | Manganese | 1.42 |
| 3 | Phosphorous | 135.24 |
| 4 | Calcium | 29.15 |
| 5 | sodium | 12.65 |
| 6 | Copper | 0.45 |
| 7 | Zinc | 1.29 |
| 8 | magnesium | 1.48 |
| 9 | Potassium | 1.37 |

**Table.2** Vitamins composition in water melon peel

| S.No | Vitamins | Rind mg/100g |
|---|---|---|
| 1 | Retinol (vitamin A) | 52.13 |
| 2 | Thiamine (vitamin B1) | 1.23 |
| 3 | Riboflavin (vitamin B2) | 2.71 |
| 4 | Niacin (vitamin B3) | 4.25 |
| 5 | Pyridoxine (vitamin B6) | 5.34 |
| 6 | Ascorbic acid (vitamin C) | 8.46 |

**Fig.1** Graphical representation of mineral composition in watermelon peel

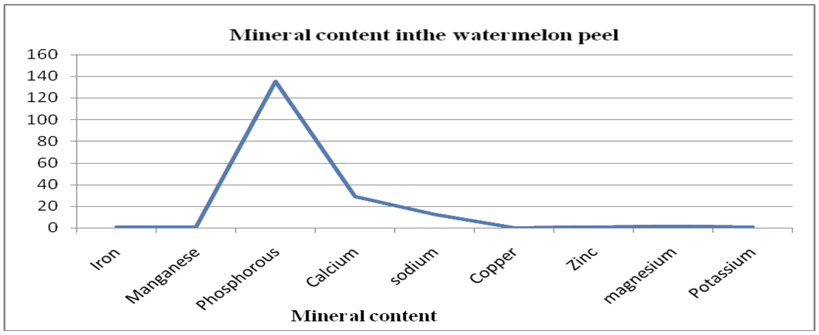
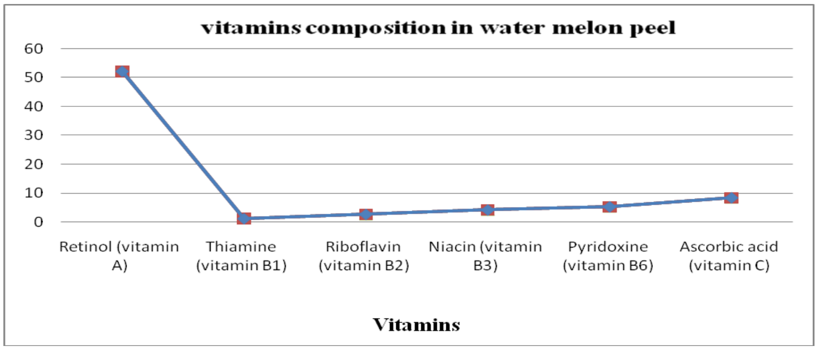


**Fig.2** Graphical representation of vitamin composition in water melon peel




Minerals in adequate amount ensure the normal physiological functions, including iron utilization (Adeyeye, 2000), in the graphical representation phosphorous is very high content and followed Calcium and sodium table-1, and the vitamin A is very high, and the abundance of these minerals and vitamins in the sample is nutritionally and physiologically noteworthy

Table 1: Some mineral composition of watermelon (Citrullus lanatus) rind and seed flours Rind Seed Difference Minerals

The result shows that the peel (rind) is a better source for the minerals and vitamins Phosphorous, Calcium, vitamin A and vitamin C are reported that waste material have had valuable contents it may be of nutritional and physiological importance. Further studies, aimed at exploiting the finding of this study to increase the dietary use of these fruit wastes thereby use to various purposes by making as powder and decrease the solid waste in the environment.

## References

Adeyeye, E.I., 2000. Bio-concentration of macro and trace minerals in four prawns living in Lagos Lagoon. Pak. J. Scient. Ind. Res., Vol-43, pp- 367-373.

Barminas, J.T., M. Charles and D. Emmanuel, 1998. Mineral composition of non-conventional leafy vegetables. Plant Foods Hum. Nutr., Vol- 53, pp-29-36.

E. Cho, J.M. Seddon, B. Roser, E.C. Willet and S.E. Hankinson, (2004), Prospective study of intake of fruits, vegetables, vitamins and carotenoids and risk of age, *Maculopathy*, *6*, pp- 883-892.

Egbuonu, A.C.C., 2015. Assessment of some antinutrient properties of the watermelon (*Citrullus lanatus*) rind and seed. Research Journal of Environ. Sci., Vol-9, pp- 225-232.

Fila, W.A., Ifam, E.H, Johnson, J.T, Odey, M.O., Effiong, E.E., Dasofunjo, K., and Ambo, E.E (2013). Comparative proximate compositions of watermelon Citrullus Lanatus, Squash cucurbita pepol and Rambutan, Nephelium Lappaceun. *International Journal of Science and Technology, Vol*-2(1), pp-81-88.

Hafiza, M.A., B. Parveen, R. Ahmad and K. Hamid, 2002. Phytochemical and antifungal screening of *Medicago sativa* and *Zinnia elegans*. Online J. Biol. Sci., Vol-2, pp- 130-132.

Hanan M.A. Al-Sayed, Abdelrahman R. Ahmed, (2013), Utilization of watermelon rinds and sharlyn melon peels as a natural source of dietary fiber and antioxidants in cake, Elsevier, Annals of Agricultural Science,vol-58(1), pp-83–95.

J.K. Collins, G. Wu, P. Perkins-veazie, K. Spears, P.L. Claypool, R.A. Baker, B.A. Clevidence, (2007), Watermelon consumption increases plasma arginine concentrations in adult, *Nutr. Mar. 23(3)*, 2007, 261-266.

James, C.S., 1995. Analytical Chemistry of Foods. 1st Edn., Chapman and Hall, New York, ISBN: 978-1-4613-5905-0, Pages: 178

Johnson J.T., Iwang E.U., Hemen J.T., Odey, M.O., Effiong, E.E., and Eteng, O.E, (2012). Evaluation of anti-nutritional content of watermelon Citrullus lanatus. *Annals of Biological Research, Vo-*3(11), pp-5145-5150.

Keyvan, D.H.J., Damien, D., Into, L., Raimo, H., 2007. Chemical composition and antioxidative activity of Moldavian balm (Dracocephalum moldavica L.) extracts. LWT – Food Science and Technology, Vol- 40, pp-1655–1663

Koocheki, A., S.M.A. Razavi, E. Milani, T.M. Monghadam, S. Alamatiyan and S. Izadkhah. 2007. Physical properties of watermelon seed as a function of moisture content and variety. *Int. Agrophysics*, 21: 349-359

L. Jian, A.H. Lee, C.W Binns, (2007),Tean and lycopene protect against prostate cancer. *Asian pac. J. Nutr. 16 suppl*. 453-457.

L.G. Hassan, N.A. Sanni, S.M. Dangoggo, M.J. Ladan, (2008), Nutritional value of bottle gourd (*Lagenaria siceraria*) seeds. *Global J. Pure & Applied Sci., Vol.4 No. 3*, pp- 301-306.

Leong, L.P., Shui, G., 2002. An investigation of antioxidant capacity of fruits in Singapore markets. Food Chemistry 76, 69–75.

Lewinsohn, E., Sitrit, Y., Bar, E., Azulay, Y., Ibdah, M., Meir, A., Yosef, E., Zamir, D., Tadmor, Y., 2005. Not just colors–carotenoid degradation as a link between pigmentation and aroma in tomato and watermelon fruit. Trends in Food Science and Technology, vol-16,pp- 407–415.

M.B. Achu, E. Fokou, C. Tchiegang, M. Fotso, F.M. Techonanguep, (2005), Nutritive value of some *cucurbitaceae* oilseeds from different regions in Cameroon. *African J. Biotechnology, Vol. (4*), pp-1329-1334.

Mustafa Paksoy, Cevat Aydin, Önder Türkmen and Musa Seymen, (2010), Modeling of Some Physical Properties of Watermelon (*Citrullus Lanatus* (Thunb.) Mansf.) Seeds Depending on Moisture Contents and Mineral Compositions, *Pak. J. Bot*., Vol-42(4),pp- 2775-2783.

Okwu, D.E. and C. Josiah, 2006. Evaluation of the chemical composition of two Nigerian medicinal plants. Afr. J. Biotechnol., Vol-5, pp-357-361.

Onwuka, G.I., 2005. Food Analysis and Instrumentation: Theory and Practice. Naphthali Print, Lagos, Nigeria.

Oseni, O.A., and Okoye, V.I. (2013). Studies of phytochemical and anti-oxidant properties of the fruit of watermelon (Citrullis Lanatus), *Journal of Pharmaceutical and biomedical Science*, *Vol*-27(27), pp-508-514.

Perkins-Veazie, P., Collins, J.K., 2004. Flesh quality and lycopene stability of fresh-cut watermelon. Postharvest Biology and Technology 31, 159–166.

Şalk, A., L. Arin, M. Deveci and S. Polat. 2008. Özel Sebzecilik (In Turkish). *Namık Kemal* University Ziraat Fakiltesi bahge bitkleri bo *Bölümü*, Tekirdağ, Turkey

V.A. Sodeke, (2005), Extraction of oil from watermelon seed and analysis, *Ouarterly research service,* 2005, pp. 25-30.

Yamaguchi, M., 2006. World Vegetables: Principles, Production and Nutritive Values. AVI Publishing Co., Westport, USA.