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Research Article

Tender Coconut Water Powder with Fortified Vitamins

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ABSTRACT

The coconut water is the refreshing beverage with low calories. It is high in nutrients with protein, vitamins, minerals such as potassium, iron, calcium, sodium. This coconut water is made from the coconut water and coconut pulp and these have the nutrients like antioxidants and phenolic contents like tocopherols. These coconut water also used to help in rehydration. It will be recommended for patients and also for sports person for rehydration. The main object of this paper is to develop the coconut water with the drying process such as spray drying, freeze drying and to fortify with some vitamins such as vitamin D.

Keywords: Freeze dried; spray dried; vitamin D; fortification.

INTRODUCTION

The spray drying the most widely used industrial process to obtain powdered products from fruits and vegetables, associated to short process time that contribute to minimum thermal deterioration, given that the formation of small drops produces high specific surface and high mass transfer. The rate and short times of the drying process permit its application even in thermosensitive products, which has massive use in the development and microencapsulation of their own and added bioactive compounds. In spite of these characteristics, the selection of operating parameter to achieve high nutritional quality and the best physical and physiochemical characteristics of the products and also freeze drying, spray drying method is also discussed in this article [1-6].

Coconut is a no-climatic tropical fruit with high nutritional value. Two maturity stages of coconut are tender coconut and mature coconut in that it's water and pulp are theedible portions. Coconut water is refreshing beverage low in calories, free fat and rehydrating which contains sugar, vitamins, minerals such as potassium, calcium, sodium, phosphorus, iron, magnesium and growth promoting factors of protein. The coconut powder which is made from the biggest edible part of the fruit contains amino acids, minerals, antioxidants like phenols and tocopherols. The objective of this paper is to assess the influence and quality attribute of the conditions of spray drying process and freeze drying of coconut powder fortified with vitamin C, D3 and E, which have been identified as deficient disease like anaemia, blindness, rickets, osteoporosis., etc.

MATERIALS AND METHODS

Coconuts of Enano Malayo variety are used which is from the Colombian Pacific region. The selected whole coconut was first washed with the water and with sodium hypochlorite solution (disinfected) with 200 ppm, after that the coconut water is removed and scalded in boiling water at temperature of 96°C for 20 minutes, then the shell was removed from the coconut pulp. The selected coconut pulp was again washed with water and with hypochlorite (disinfected), cut into pieces and ground.

Freeze drying mechanism

Freeze drying is dehydration processing. Usually it is used for the preservation of a perishable product. In freeze-drying the coconut water is firstly freeze and then surrounding pressure is reduced so that the frozen water in the product get sublimate. Freeze drying is completed in four stages i.e. pre-treatment of the product, freezing, primary drying, and the last secondary drying.

Pre-treatment of the product: Pre-treatment means any method used for treating the product before the freezing. Like concentration of the product, product formulation, increasing in the surface area of the product.

Freezing: In this stage, it is necessary to cool the product lower than its triple point temperature i.e. the lowest temperature where the solid and liquid phases of the product can exist together, which ensures the sublimation of the product and prevents melting.

Primary drying: In this step, pressure is reduced and heat is given to the product for sublimation. In this step around 95% of water in the product gets sublimated. The phase of this can be slow, because if large amount of heat is applied to the product then that can alter

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the structure of the product.

Secondary drying: Its main objective is to remove the water molecules which are unfrozen. The temperature should be higher than temperature used in primary drying. The increasing of temperature will make breakage of any physico-chemical interaction which may be occurred between the unfrozen water molecules and the frozen product.

Freeze drying of coconut water

This processing is under research. No commercial utilization of this process for the processing of coconut water is there. The freeze-dried coconut water contains all nutritional properties nearly equal to the fresh coconut water. The optimum condition of this process was -20°C for 3 hours to pre-freeze, -20°C for 4 hours for first drying, -10°C for 7 hours is for second drying and finally 0°C for 6 hours for third drying then it was heated up to 30°C. The product formed is of very good in nutritional quality. It is not a commercial product but all its research parameters make it feasible to be commercialized.

Powder production

The coconut powder was produced by spray drying with the initial temperature of 165°C and final temperature of 65°C. The dried powder was collected and the yield was calculated by the ratio of the mass of solid collected on dry basis.

Moisture

Content of the moisture in the dried powder was determined by the standard method of AOAC 1999.

Water activity

The water activity of the dried coconut powder was determined using hydro thermometer.

Vitamin d fortification in dried coconut powder

The consumable level of Vitamin D by kids were higher by the fortification applied to every food in the amount they consumed. Some research show that there is no risk to cause adverse health effect by daily consumption of vitamin D in higher level. The higher consumption is set at 62.5 l g day for up to 3 years old children.

Health effects

Kidney problem

Low blood pressure

High levels of potassium in the blood

Cystic fibrosis

Pregnancy and breast feeding

RESULT AND DISCUSSION

Among the two types of spray and freeze-dried process. Spray dried process has less advantage than freeze dried process. But in freeze dried process shown that there will be no changes in analytics of freeze-dried coconut water. And also, in freeze drying there will be extension in shelf life. Fortification with freeze dried coconut is also a very useful, without the loss of any vitamins. So, it will give healthy life and it is easily diluted with water.

CONCLUSION

This study shown that when comparing this two-drying process, freeze drying is the efficient process with fortification of vitamin. And also, this coconut powder is useful for the cholera disease. Due to this disease, many of the people lost their water content through vomiting, diahorrea. So, to control the loss of electrolytes, this coconut powder is very useful. In this I conclude that freeze dried powder is effective for cholera with the food safety rules and regulations basis for the daily consumption.

REFERENCES

1. Konsta-Gdoutos MS. Effect of CNT and CNF loading and count on the corrosion resistance, conductivity and mechanical properties of nanomodified OPC mortars." Constr Build Mater. 2017; 48-57.
2. Shang Y, Zhang D, Yang C, Liu Y. Effect of graphene oxide on the rheological properties of cement pastes. Constr Build Mater. 2015; 20-28.
3. Tian X, Hu H. Test and study on electrical property of conductive concrete. Procedia Earth Planet Sci. 2012; 5: 83-87.
4. Yunchuan Z, Liang B, Shengyuan Y, Guting C. Simulation analysis of mass concrete temperature field. Procedia Earth Planet Sci. 2012; 5: 5-12.
5. Lu Z. Early-age interaction mechanism between the graphene oxide and cement hydrates. Constr Build Mater. 2017; 152: 232-239.
6. Makar JM, Chan GW. Growth of cement hydration products on single-walled carbon nanotubes. J Am Ceram Soc. 2009; 92: 1303-1310.