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Research Article

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Factors Affecting to β-Caroten Extraction from Sweet Potato

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ABSTRACT

Sweet potatoes (Ipomoea batatas L.) are rich in dietary fibre, minerals, vitamins, and antioxidants, such as phenolic acids, anthocyanins, tocopherol and b-carotene. Carotenoids have been linked with the enhancement of immune system and decreased risk of degenerative diseases such as cardiovascular problems, age-related macular degeneration and cataract formation. Our research is to investigate some technical factors affecting to β-caroten extraction in the sweet potato. Our results show that the the extraction is appropriated by solvent n-Hexan at 80°C in 4 hours.

***Keywords**: Sweet potato, β-caroten, extraction, n-Hexan*

INTRODUCTION

Sweet potato (Ipomea batatas) is the sixth most important food crop after rice, wheat, potatoes, maize, and cassava[5]. Sweetpotatoes are highly nutritious vegetables. Sweetpotatoes are known as a rich source of carbohydrates, beta-carotene, ascorbic acid, and minerals[3]. Besides acting as antioxidants, carotenoids and phenolic compounds also provide sweet potatoes with their distinctive flesh colours (cream, deep yellow, orange and purple)[2]. It has long been known that the orange-fleshed sweetpotato contains beta-carotene, responsible for conferring pro-vitamin A activity that contributes to the prevention of vitamin A deficiencies and night blindness[6]. Sweet potato is also a rich source of vitamin B1 (Thiamin) and vitamin C[4,7]. The sweetpotato has been reported to have numerous health benefits including antimutagenic, antioxidant, hepato-protective, cardio-protective, and antidiabetic effects, which have been attributed to the sweetpotato's phytochemical constituents[1].

The main purpose of this research is to investigate some technical factors affecting to β-caroten extraction in the sweet potato.

MATERIAL AND METHODS

Material

Orange-fleshed sweet potato is collected in Mekong River Delta, Vietnam.

Figure 1: Orange-fleshed sweet potato

Research method

Experiment #1: Effect of solvents to β-caroten extraction

We examine 4 kinds of solvents such as ethanol, acetone, diethyl ether and n-Hexan in different temperatures from 50-80^{o}C.

Experiment #2: Effect of temperature to β-caroten extraction

After finding the best solvent, we examine the effect of temperature (50, 55, 60, 65, 70, 75, 80, 85^{o}C) to β-caroten extraction.

Experiment #3: Relationship between extraction time and β-caroten residue

We examine different extraction durations (60, 90, 120, 150, 180, 210, 240, 270 and 300 minutes) to β-caroten residue.

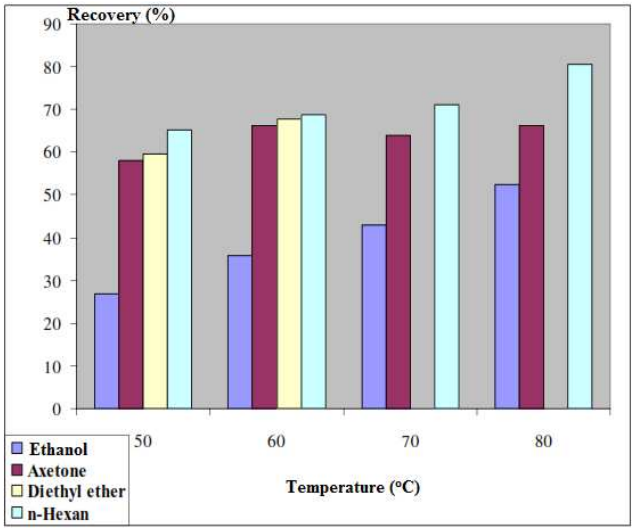
Statistical analysis

All data are processeed by Excel.

RESULT AND DISCUSSION

Effect of solvents to β-caroten extraction

Figure 2. Effect of solvents to β-caroten extraction



From figure 2 above, we decide to choose n-Hexan for β-caroten extraction in the orange-fleshed sweet potato.

Effect of temperature to β-caroten extraction

Figure 3. Effect of temperature to β-caroten extraction

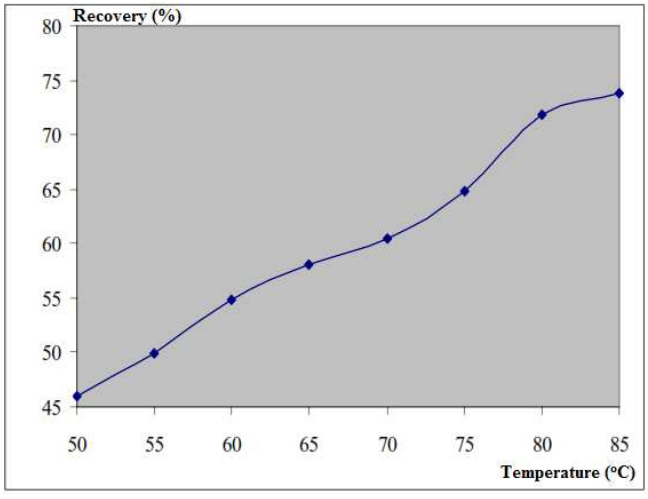
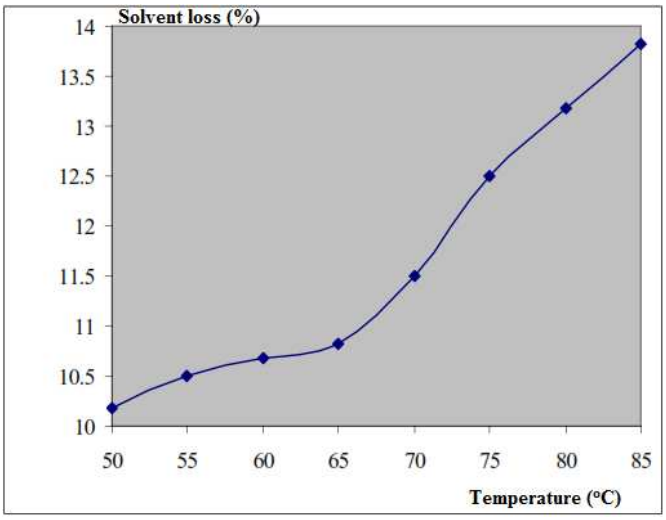


Figure 4. Solvent loss at different temperature



From figure 3 and figure 4 above, we choose 80°C for β-caroten extraction

Relationship between extraction time and β-caroten residue

Figure 5. Relationship between extraction time and β-caroten residue

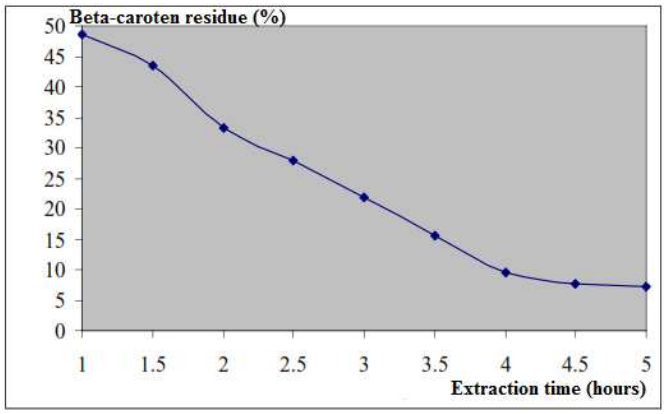
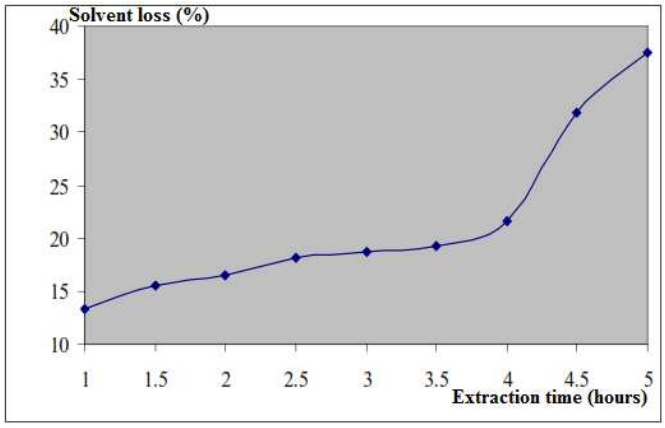
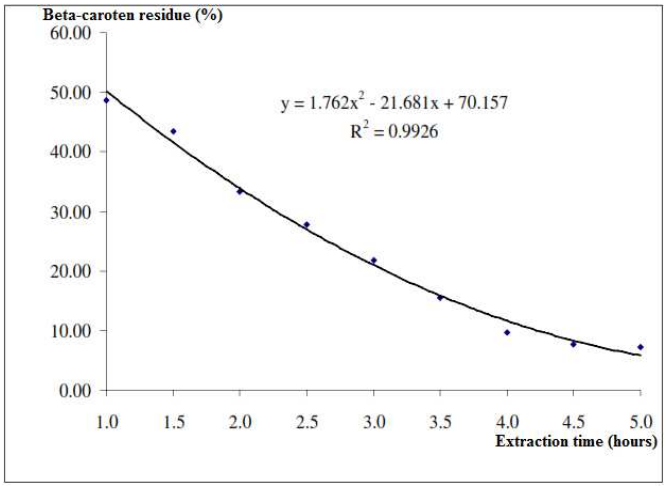


Figure 6. Relationship between extraction time and solvent loss



From figure 5 & 6, we choose the extraction time at 4 hours for application.

Figue 7. β-caroten remaining by the extraction time



CONCLUSION

Sweet potato (*Ipomoea batatas* L.) is an important tuber crop grown in the tropics, sub-tropics and warm temperate regions of the world for its edible storage roots. The roots are used as a source of carbohydrate and dietary fibre. Dietary fibre has the potential to reduce the incidence of a variety of diseases in man including colon cancer, diabetes, heart diseases and digestive disturbances. We have successfully investigated possible conditions for extracting β-caroten in this valuable food source. This is a fundamental approach for β-caroten refinery applicable for functional food.

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