MANSOURA UNIVERSITY

FACULTY OF AGRICULTURE

FOOD INDUSTRIES DEPARTMENT

PRODUCTION OF HIGH NUTRITIONAL VALUE JUICES TO ENHANCE IMMUNITY

Graduation project submitted by

HAGAR MOHSEN SHAQUIR

HALA OSAMA ABDEL-HAMIED

NADA ATEF TONY

YASMIN MOHAMED ASHOUR

HAGAR RAMADAN KHASHABA

As a part of requirements for a bachelor's degree in agriculture sciences

Food science and technology program

SUPERVISION

Prof. Dr

Abd El-Hamid I. Abd el-Gawwad

Prof of Food Industries
Faculty of Agricultural
Mansoura University

Dr

Mohamed M. Rabie

Prof of Food Industries
Faculty of Agricultural
Mansoura University

Prof. Dr

Gehan A. Ghoneim

Prof and head of Food Industries
Faculty of Agricultural
Mansoura University

2021

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PROCESSING UNTRADITIONAL BEVERAGES FORMULA TO INCREASE IMMUNE SYSTEM

RESEARCHER NAME:

Student Name	Univ.Code
Nada Atef Mahmoud Tony.	800124546
Hagar Ramadan Khashaba.	800119118
Hagar Mohsen Shaquir.	800118988
Hala Osama abdel-hamied	800118989
Yasmin Mohamed Ashour.	800127128

SUPERVISORS

Name	Profession	Signature
Prof. Dr Abd El-Hamid I. Abd el-Gawwad	**Prof of Food Industries** Faculty of Agricultural Mansoura University	
Prof. Dr Gehan A. Ghoneim	**Prof and head of Food Industries** Faculty of Agricultural Mansoura University	
Dr Mohamed M. Rabie	**Prof of Food Industries** Faculty of Agricultural Mansoura University	

Head of Department	Vice Dean of Education and Students Affairs	Dean of Faculty
Prof. Dr/	Prof. Dr/	Prof. Dr/
Gehan A.Ghoniem	**Saleh Sayed Saeed**	**Ayman El-Ghamry**

2021

ACKNOWLEDGEMENT

Thanks to Allah by the grace care of whom indeed, we could find our way out to complete this work and have it come out to light.

We would like also to express thank to **(prof.Dr. Abd El-Hamid I. Abd eL-Gawwad)** prof of Food Industries Dept., fac. of Agric., Mansoura University, for her kind help and continuous encouragements facilities and support.

The authoress wishes to express their deepest gratitude and sincere appreciation to **(prof.Dr. Gehan A. Ghoneim)** prof and head of Food Industries., fac. of Agric., Mansoura University for her kind and continuous guidance throughout the experimental work.

As we cannot forget the great role played by soda supervisors and Especially Thank to **(Dr. Mohamed M. Rabie)** lecturer of Food Industries Dept., fac. of Agric., Mansoura University for his constructive supervision, suggesting the theme of this study, valuable advice, kind help and continuous encouragements facilities and support, he till it reaches its final form.

The authoress grateful to all member stuff in Food science and technology Department for their encouragements.

It Wants Dedicate This Work to our parents and Sisters and We Hope that This Work may Have Won admiration From Reads.

Thanks are also due to all my friends and may colleagues who helped us in various ways during his Study.

Project Team

Nada Atef Tony.

Hagar Ramadan Khashaba.

Hagar Mohsen Shaquir.

Hala Osama abdel-hamied.

Yasmin Mohamed Ashour.

CONTENTS

Introduction

Review of literature

- Beetroot
- Orange
- Tangerine
- Carrot
- Strawberry
- Apple

Material and methods

- Methods
- Material

Results and discussion

INTRODUCTION

1. INTRODUCTION

This study conducted for producing mixtures of juice of high nutritional value and selected some components with a high nutritional value such as:

Beetroot: contains many essential nutrients, beetroots are a great source of fiber, folate vitamin B9, manganese, potassium, iron, and vitamin C and numerous health benefits, including improved blood flow, lower blood pressure, and increased exercise performance and many of these benefits are due to their high content of inorganic nitrates.

Apple: It is a most popular fruits as it is very rich in fiber, vitamin C potassium and various antioxidants, considering their low calorie count its benefits include reducing cholesterol levels, reducing cancer risk, promoting digestion, help lower blood sugar levels and protect against diabetes.

Strawberries: excellent source of vitamin C and manganese and contain decent amounts of (vitamin B9) and potassium and very rich in antioxidants and plant compounds. Its benefits reducing risk of many chronic diseases and improve heart health, lower blood sugar levels, and help prevent cancer.

Tangerine: are relatively low in carbs when compared to other types of fruit because of small size, contain more water, and contain less acid and sugar. It contains small amounts of thiamin, vitamin B6, folate and small amounts of minerals including potassium, calcium, magnesium, and iron. Calcium is important for healthy bones and teeth. Magnesium helps regulate blood pressure. Iron is important for providing oxygen to muscles.

Orange: It is a citrus fruit and is famous for its vitamin C content, which is necessary to protect the body from disease. It is a very rich source of many vitamins, mineral and nutritional elements. Among its benefits are reducing cancer risk, reducing cholesterol levels, enhancing cardiovascular health, strengthening the digestive system, and enhancing iron absorption.

Carrot: are a particularly good source of beta carotene, fiber, vitamin K1, potassium, and antioxidants also have health benefits like lower cholesterol levels and improved eye health. Beta-carotene antioxidants law a reduced risk of cancer. Also beta-carotene an antioxidant that your body converts into vitamin A.


AIM
OF
PROJECT

AIM OF PROJECT

The aim of the project is producing mixtures of some types of fruits that are distinguished by their high content of mineral, food, fiber and other foodstuffs which have the ability to give the body all of its daily energy needs, increase the body's immunity and protect it from diseases Such as Covid-19, cancer and anemia (the three goals of the project) and the source of priority in the selection and preference of added fruit to the mixture and protection from other diseases by providing the body with elements such as iron, vitamin C, calcium and magnesium, with ease of trading and eating for all age groups, whether small for children or large for the elderly.

REVIEW OF LITERATURE

2. REVIEW OF LITERATURE

PIC 1 BEETROOT

2.1. BEETROOT:

Beetroots have an excellent nutritional profile that includes plenty of essential vitamins, minerals, and antioxidants. They also contain unique bioactive compounds called battalions, which may benefit a person's health.

People can get these benefits from consuming whole beetroots or their juice. Beetroots contain beneficial compounds as Phytochemicals give plants their color and flavor. They also stimulate the immune system, minimize inflammation, and reduce oxidative stress. Betalains are responsible for the deep red color of beetroots. These pigments have promising antioxidant, anti-inflammatory, and antitoxic properties. Nitrates refer to a group of organic compounds that improve blood flow and promote heart health.

Beetroot contains high amounts of biologically active substances including betalains, carotenoids, phenols, B-vitamins (B1, B2, B3, B6 and B12), folate minerals, fibers, as well as sugars with low energetical value, and inorganic nitrate. All parts of this plant have different medicinal uses, such as anti-oxidant, anti-depressant, anti-microbial, anti-fungal, anti-inflammatory, diuretic, expectorant and carminative. **Clifford, T.; Howatson, G.; West, D. J. and Stevenson, E. J. (2015)**. The potential benefits of red beetroot supplementation in health and disease.

Beetroot (Beta vulgaris) is botanically classified as an herbaceous biennial from Chenopodiaceae family and has Severna varieties with bulb colors ranging from yellow to red.

Deep red-colored beet roots are the most popular for human consumption, both cooked and raw as salad or juice. Beetroot is one of the richest dietary sources of antioxidants and naturally occurring nitrates **(Maheswari *et al.,* 2013)**.

The nitrates in beetroot improve blood flow through the body including the brain, heart and muscles. It increases a molecule in the blood vessels called nitric oxide which helps open up the vessels and allows more oxygen flow; it also lowers blood pressure and decreases the incidence of cardiovascular disease **(Kenjale & Ham, 2011).**

A number of studies have reported beetroot as a dietary inorganic nitrate with a potential for reducing blood pressure in human's pressure **Webb *et al.,* (2008) Bailey *et al.,* (2009) and Van hatolo *et al.,* (2010).**

Oles and Clifton (2012) reported that after consumption of beetroot juice on a low nitrate diet, it may lower blood pressure and therefore reduce the risk of cardiovascular event. Dietary nitrate supplementation has also been reported to reduce the oxygen cost of low intensity exercise in humans **(Bailey, *et al.*, 2009).**

Reports have indicated that beetroot juice has immersed nutritional, medicinal and health benefits besides its rich supply of vitamins and minerals such as phosphorus, calcium, magnesium, Sulphur; it is also an excellent source of foliate, manganese, iron and many antioxidants **(Kanika, 2012).**

The antioxidant property helps to prevent the formation of cancerous tumors and is therefore a powerful cancer-fighting agent. Its effectiveness against colon and stomach cancer has been established through various studies **(Stephen, 2014).**

A case study of a patient who drank a quart of beetroot juice each day was reported to have effectively broken down and eliminated the cancerous tumors **(Stephen, 2014). Van hatolo, *et al.,* (2010).**

Also reported that people who drank two cups of beetroot juice had lower blood pressure within about 60 min of drinking the juice, with a peak drop occurring 3 – 4h after ingestion.

The reduction in blood pressure continued to be observed until up to 24h after the juice was consumed. The conclusion made was that one of the biggest benefits of beetroot juice is that it provides another way to combat high blood pressure without using medication (**Van hatolo *et al.,* 2010) Bobek *et al.,* (2000)** had also observed its ability to lower LDL cholesterol levels and raise HDL cholesterol levels in the body.

There is growing interest in the use of natural food colors, because synthetic dyes are becoming more and more critically assessed by the consumer. But in food processing, as compared with anthocyanin and carotenoids, betalains are less commonly used, although these water-soluble pigments are stable between pH 3 and 7 to improve the red color of tomato pastes, sauces, soups, desserts, jams, jellies, ice creams, sweets and breakfast cereals, fresh beet/beet powder or extracted pigments are used **(Koul *et al*. 2002 and Roy *et al*. 2004).**

It also contributes to consumers' health and wellbeing because it is known to have antioxidants because of the presence of nitrogen pigments called betalains, mainly comprise of red–violet-colored betacyanins (betanin, isobetanin, probetanin and neobetanin) and yellow–orange-colored betaxanthyns **(Kaur & Kapoor 2002)**.

Carrot (*Daucuscarota*) is a worldwide root vegetable that is highly nutritional, and an important source of β-carotene besides its appreciable number of vitamins and minerals often used for juice production **(Demir, *et al.,* 2004).**

In recent years, a steady increase of juice consumption has been reported in many countries **(Schieber, *et al*., 2002).** Epidemiological studies provide growing evidence that carotenoids and other antioxidants may protect humans against certain types of cancer **(Steinmetz and Potter, 1996)** and cardiovascular diseases (**Gaziano, *et al.,* 1992).**

2.1. 1. HEALTH BENEFITS OF BEETROOTS

i. Preventing anemia:

Beetroots are rich in iron, an essential component of red blood cells. Without iron, red blood cells cannot transport oxygen around the body.

ii. Protecting the liver:

Beetroot juice contains antioxidants, vitamin A, vitamin B-6, and iron. These compounds help protect the liver from inflammation and oxidative stress while enhancing its ability to remove toxins from the body.

iii. Improving blood pressure:

A growing body of research suggests that beetroots can help lower a person's blood pressure as believe that this is due to their nitrate content and beets naturally contain large quantities of nitrates, which the body converts into nitric oxide. This compound dilates the blood vessels, which improves blood flow and lowers overall blood pressure.

The nutritional value of beetroot

2.1.2. THE NUTRITIONAL VALUE OF BEETROOT:

CONTENT	AMOUNT	UNIT
Water	87.58	g
Energy	43	kcal
Energy	180	kJ
Protein	1.61	g
Total lipid (fat)	0.17	g
Ash	1.08	g
Carbohydrate, by difference	9.56	g
Fiber, total dietary	2.8	g
Sugars, total including NLEA	6.76	g
Calcium, Ca	16	mg
Iron, Fe	0.8	mg
Magnesium, Mg	23	mg
Phosphorus, P	40	mg
Potassium, K	325	mg
Sodium, Na	78	mg
Manganese, Mn	0.329	mg
Vitamin C, total ascorbic acid	4.9	mg

2.2 Orange:

PIC 2 ORANGE

It is a citrus fruit and is a famous for its vitamin C content, which is necessary to protect the body from disease. It is a very rich source of many vitamins, minerals and nutrition elements. Among its benefits are reducing cancer risk, reducing cholesterol levels, enhancing cardiovascular health, strengthening the digestive system and enhancing iron absorption.

2.2.1. Health benefits of orange:

Heart health:

Heart disease is currently the world's most common cause of premature death. Flavonoids — especially hesperidin — in oranges may have protective effects against heart disease.

In addition, daily intake of orange juice for four weeks has a blood-thinning effect and may reduce blood pressure significantly. Fibers also seem to play a role. Intake of isolated fibers from citrus fruits has been shown to decrease blood cholesterol levels. Taken together, it is likely that regular consumption of oranges may help lower your risk of heart disease.

Kidney stone prevention:

Oranges are a good source of citric acid and citrates, which are believed to help prevent kidney stone formation.

Potassium citrate often prescribed to patients with kidney stones. Citrates in oranges seem to have similar effects.

Anemia prevention:

Anemia is a condition characterized by low levels of red blood cells or hemoglobin, decreasing its ability to carry oxygen. It often caused by iron deficiency. Although oranges are not a good source of iron, they are an excellent source of organic acids, such as vitamin C (ascorbic acid) and citric acid. Both vitamin C and citric acid can increase your body's absorption of iron from the digestive tract. When eaten with iron-rich food, oranges may help prevent anemia.

High in antioxidants:

Orange juice is high in antioxidants and can help increase antioxidant status to aid in disease prevention.

Diabetes:

A medium orange weighing 131 grams (g) contributes 3.14 g trusted of fiber, which is nearly 10% of an adult's daily fiber requirement. Several studies have found that fiber can improve some factors trusted source that contribute to diabetes development and progression.

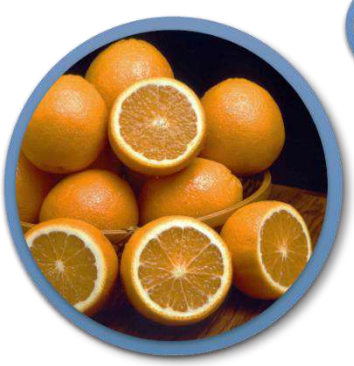
For example, one 2019 study Trusted Source found that consuming 4 g of a dietary fiber supplement per day did not reduce blood glucose but improved how the body responds to insulin. Low insulin sensitivity can contribute to type 2 diabetes.

Weight control is also important for reducing the risk of diabetes, as obesity and overweight can contribute to the development of type 2 diabetes. The body processes fiber more slowly Trusted Source than other nutrients, so it can help a person feel fuller for longer and reduce their urge to eat snacks throughout the day.

Skin:

Consuming enough vitamin C can help a person maintain skin health Trusted Source and appearance. Vitamin C contributes to collagen production Trusted Source. Collagen supports the skin, promotes wound healing, and improves skin strength.

The outcome of a 2015 review Trusted Source suggests that dietary vitamin C improved how people perceived their skin health and how healthful it actually was, including appearance, wrinkling, elasticity, and roughness.



2.2.2. THE NUTRITIONAL VALUE OF ORANGE:

NAME	AMOUNT	UNIT
Water	86.75	g
Energy	47	kcal
Protein	0.94	g
Total lipid (fat)	0.12	g
Carbohydrate, by difference	11.75	g
Fiber, total dietary	2.4	g
Sugars, total including NLEA	9.35	g
Calcium, Ca	40	mg
Iron, Fe	0.1	mg
Magnesium, Mg	10	mg
Phosphorus, P	14	mg
Potassium, K	181	mg
Zinc, Zn	0.07	mg
Copper, Cu	0.045	mg
Selenium, Se	0.5	µg
Vitamin C, total ascorbic acid	53.2	mg
Thiamin	0.087	mg

2.3 TANGERINE:

PIC 3 TANGERINE

Like all citrus fruits, tangerines have an abundance of vitamin C. They also have a moderate amount of vitamin A, with 100 grams of tangerine providing you with approximately 14% of your daily recommended vitamin A intake.

There are also health benefits to eating tangerine peels. The peel contains a super-flavonoid, or antioxidant, called tangerine. Super-flavonoids have shown as an effective way to lower cholesterol.

2.3.1 HEALTH BENEFITS OF TANGERINES:

Skin Health:

Having healthy levels of vitamin C in your body has been tied to having healthy skin. Vitamin C has been shown to play a vital role in how your body makes collagen. Collagen is what makes our skin appear youthful. Vitamin C has also been shown to possibly prevent and treat skin damage caused by sun exposure.

Eye Health:

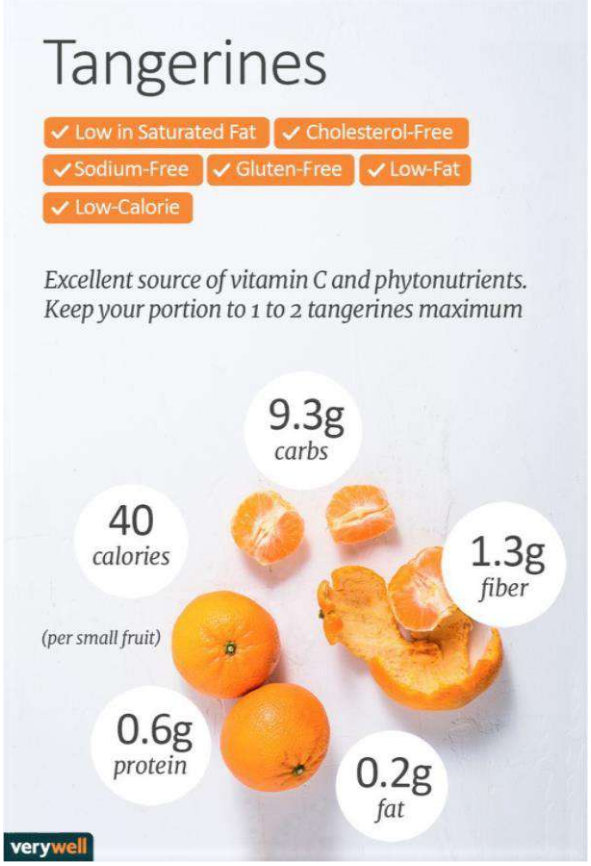
Another benefit of the high vitamin C content in tangerines is its support of eye health by delaying the onset of cataracts and age-related macular degeneration. There's evidence that vitamin C and other nutritional antioxidants can help keep your eyes healthy longer.

Heart Health:

Eating at least a half cup of fresh fruit once a day may significantly reduce the risk of cardiovascular disease. people who eat fruit daily were roughly 33% less likely to die from heart attack or stroke. Tangerines are a great option for your daily fruit consumption.

It helps to lose weight:

In addition to being packed with vitamin C, tangerines are a good source of dietary fiber. Adding fiber to your diet is a great way to lose weight. Women under 50 should aim for 25 grams of fiber per day, and men should try for about 38 grams.



2.3.2 THE NUTRITIONAL VALUE OF TANGERINES:

NAME	AMOUNT	UNIT
Water	85.17	g
Energy	40	kcal
Protein	0.6	g
Total lipid (fat)	0.2	g
Carbohydrate, by difference	9.3	g
Fiber, total dietary	1.3	g
Sugars, total including NLEA	10.58	g
Calcium, Ca	37	mg
Iron, Fe	0.15	mg
Magnesium, Mg	12	mg
Phosphorus, P	20	mg
Potassium, K	166	mg
Sodium, Na	2	mg
Zinc, Zn	0.07	mg
Vitamin C, total ascorbic acid	26.7	mg

2.4 CARROTS:

PIC 4 CARROTS

It is highly nutritious. Carrots are a particularly good source of beta carotene, fiber, vitamin K1, potassium, and antioxidants. They also have a number of health benefits. They're a weight-loss-friendly food and have lower cholesterol levels and improved eye health. Their carotene antioxidants have a reduced risk of cancer. Carrots have from beta carotene, an antioxidant that your body converts into vitamin A. Carrots contain very little fat and protein. Carrots are an excellent source of vitamin A in the form of beta carotene. They are also a good source of several B vitamins, as well as vitamin K and potassium.

2.4.1. HEALTH BENEFITS OF CARROT:

Source of vitamin A:

Vitamin A plays an important role in eyesight. Carrots contain known as beta-carotene, which is converted into vitamin A when consumed by the body. This then helps in maintaining good eyesight apart from other health benefiting properties. The main symptoms of vitamin A deficiency are vision loss or night blindness.

Antioxidant:

The carotenoids present in carrots also act as antioxidants, thereby fighting free radicals in your body and also slowing down the process of ageing. Antioxidant rich foods are necessary for good health because they help in clearing up toxins from the body, and can help in preventing cancer and heart disease.

Boosts immunity:

Juicing carrots gives us its concentrated form with all its essential nutrients. Having a glass, a day is said to work wonders in boosting immunity. Apart from helping the body against free radical damage, it also protects it against harmful bacteria, viruses and inflammation. Carrot juice also contains various vitamins and minerals such as B6, K, potassium, phosphorous, etc. which contribute to bone health, stronger nervous system and improve brain power.

Heart Health:

Carrots which are loaded with antioxidants and dietary fiber, work towards keeping your heart healthy by removing plaque from the arteries and maintaining blood circulation.

HEPATOPROTECTIVE, AND RENO PROTECTIVE BENEFITS:

Bishayee et al.,[44] . observed that carrot extract help to protect liver from acute injury by the toxic effects of environmental chemicals. In its study the effect of carrot extract on carbon tetrachloride (CC14)-induced acute liver damage in mouse was evaluated. The increased serum enzyme levels by CC14-induction were significantly lowered due to pre-treatment with the carrot extract. The carrot extract also decreased the elevated serum bilirubin and urea content due to CC14 administration.

Increased activities of hepatic 5'-nucleotidase, acid phosphatase,

acid ribonuclease and decreased levels of succinic dehydrogenase, glucose-6-phosphatase and cytochrome P-450 produced by CCl4 were reversed by the carrot extract in a dose-responsive way.

The investigators concluded that results of this study revealed that carrot could afford a significant protective action in the alleviation of CCl4 induced hepatocellular acute injury Mills et al., [45] measured the possible effects of bioactive compounds in 4 biofortified flesh carrot cultivars (purple/orange, purple/orange/red, orange/red, and orange) on the provitamin A bio efficacy and antioxidant potential on the liver of Mongolian gerbils. Following a 4-wk vitamin A depletion period and baseline kill, freeze-dried carrot powders were mixed into purified feeds and fed to 6 groups of 11 Mongolian gerbils for 4 weeks.

White flesh carrot fed control and vitamin A supplemented groups were used to calculate carrot provitamin A bio efficacy. Antioxidant potential of carrot powders, sera, and livers were determined using the 2, 2'- azinobis - (3-ethylbenzothiazoline-6-sulfonic acid) radical cation decolorization assay and carotenoid and retinol concentrations were determined by HPLC.

The authors observed that the antioxidant potential of the liver and vitamin A stores were greater in Mongolian gerbils fed with colored flesh carrots compared with the control gerbils fed with white flesh carrots and vitamin A supplemented groups.

Mital et al., [46] studied the reno protective activity of carrot root extract on renal ischemia reperfusion acute injury in rats.

Rats with renal reperfusion injury showed significantly decreased activity of superoxide dismutase, catalase and glutathione, and a significant increase in malondialdehyde level. The study revealed that carrot extract exerts reno protective activity against ischemia reperfusion induced kidney acute injury, by reducing free radical scavenging activity one of the mechanisms behind ischemia reperfusion damage of kidneys.

2.4.2. THE NUTRITIONAL VALUE OF CARROT:

NAME	AMOUNT	UNIT
Water	88.29	g
Energy	41	kcal
Protein	0.93	g
Carbohydrate, by difference	9.58	g
Fiber, total dietary	2.8	g
Sugars, total including NLEA	4.74	g
Calcium, Ca	33	mg
Iron, Fe	0.3	mg
Magnesium, Mg	12	mg
Phosphorus, P	35	mg
Potassium, K	320	mg
Sodium, Na	69	mg
Zinc, Zn	0.24	mg
Copper, Cu	0.045	mg
Vitamin C, total ascorbic acid	5.9	mg
Thiamin	0.066	mg
Riboflavin	0.058	mg
Niacin	0.983	mg
Vitamin B-6	0.138	mg
Folate, total	19	µg
Folate, food	19	µg
Folate, DFE	19	µg
Choline, total	8.8	mg
Vitamin A, RAE	835	µg
Carotene, beta	8285	µg
Carotene, alpha	3477	µg

2.5. STRAWBERRY:

PIC 5 STRAWBERRY

Strawberries are a good source of vitamin C, manganese, folate (vitamin B9), and potassium. They contain small amounts of several other vitamins and minerals.

Strawberries are very rich in antioxidants and plant compounds, which may have benefits for heart health and blood sugar control.

Dietary fibers are important to feed the friendly bacteria in your gut and improve digestive health. They are also useful for weight loss and can help prevent many diseases.

They contain small amounts of several other vitamins and minerals. Strawberries may improve heart health, lower blood sugar levels, and help prevent cancer.

2.5.1 HEALTH BENEFITS OF STRAWBERRY.

Prevents Cancer:

One of the antioxidants present in strawberry juice is called ellagic acid. This antioxidant can inhibit blood flow and slow down the growth of cancer cells. On the other hand, high levels of Vitamin C and fruit pectin are responsible for activating proteins that increase the production of internal antioxidants and clean the cells of toxins. This combination of vitamin C, folate, phytonutrients, and ellagic acid can help fight against cancer-causing free radicals. strawberries in frozen or extracted form have enough of these active ingredients. It is effective in lowering the risk of cancer regardless of which form you consume it.

To have a good bone:

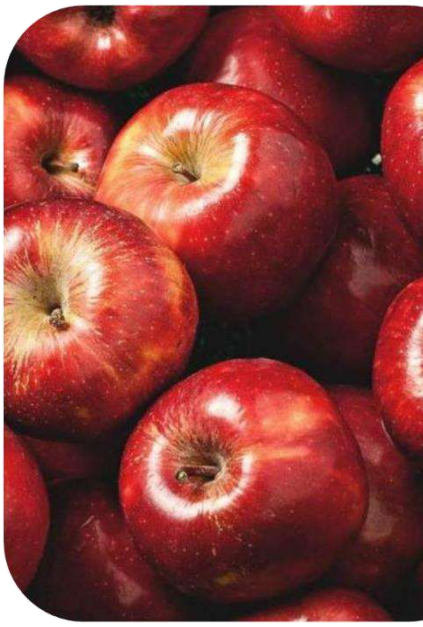
Potassium, folate, manganese, zinc, iron, phosphorus, copper and magnesium can all contribute to the healthy development of bones and teeth. They help increase bone mineral density, which puts you at a lower risk of osteoporosis.

Keep Blood Sugar and Lowers Cholesterol Levels:

The soluble fiber in strawberry juice stops dietary cholesterol from being broken down and digested. Regular consumption of food with soluble fiber can help lower cholesterol levels, ensuring that it remains in control enough to keep your heart healthy. In addition, soluble fibers also slow down the speed of digestion of other nutrients, which reduces the likelihood of sharp spikes in blood sugar levels. Decreased fat absorption, lower cholesterol levels, and stabilized blood sugars alleviate the strain on your cardiovascular system. Moreover, potassium promotes the dilation of blood vessels and arteries, keeping away from heart attacks, atherosclerosis, and strokes.

2.5.2. THE NUTRITIONAL VALUE OF STRAWBERRY:

NAME	AMOUNT	UNIT
Energy	50	kcal
Protein	3.33	g
Total lipid (fat)	0	g
Carbohydrate, by difference	113.33	g
Fiber, total dietary	10	g
Sugars, total including NLEA	96.67	g
Calcium, Ca	67	mg
Iron, Fe	0	mg
Sodium, Na	67	mg



PIC 6 APPLE

2.6. Apple:

Are among the world's most popular fruits. Apples are high in fiber, antioxidants, flavonoids, and some types of vitamins, making them a very useful food source.

are one of the main dietary sources of antioxidants, phenolic compounds such as flavonoids. Flavonoids reduce the risk of cardiovascular diseases by increasing the release of endothelial nitric oxide NO and inducing vasodilation (Nicholas et al, 2010). Several studies have specifically linked apple consumption with a reduced risk for cancer, especially lung cancer, asthma and diabetes (Feskanich et al., 2000).

Among the most important constituents of apple juice are polyphenols that have the ability to increase its anti-oxidant potential. Polyphenols also affect lipid metabolism (Akazone, 2004) and the absorption of cholesterol (Aprikian et al., 2001). Some authors have suggested that apple juice can reduce some forms of cancer (Barth et al.,2005); however, such an effect was only found for cloudy apple juice.

Most apple juice is still consumed as clear juice, which is characterized by having a low phenolics content (Markowski and Płocharski, 2005) due to the clarification process which leads to dramatic changes in the profile of phenolic compounds compared to whole fruit (Hubert et al., 2007). Clear juice is also deprived of pectin.

As a form of soluble fiber, pectin substances may play an important role in the prevention of obesity, arteriosclerosis (Galisteo et al., 2008), and diabetes (Giacco et al., 2002). Current research has shown some advantages of consuming cloudy apple juice compared to clear juice (Markowski et al., 2007; Oszmiański et al., 2007), indicating that this product may be more beneficial to human health than clear apple juice.

Juice blending is one of the best methods to improve aroma, taste and the nutritional quality of the juice. It can improve the vitamin and mineral content depending on the kind and quality of fruits and vegetables used (De Carvalho et al., 2007).

Apart from nutritional quality improvement, blended juice can be improved in its effects among the variables, thus it cannot depict the net effects of various parameters on the reaction rate. Moreover, one could think of a new product development through blending in the form of a natural health drink, which may also be served as an appetizer. So far, no more work has been carried out on mixed fruit juice and spiced beverage. The aim of this research is therefore to develop the various blends of beetroot juice with carrot and apple juices and determine their chemical characteristics.

Evaluation of Beetroot Juice Blends with Carrot and Apple Juice as Healthy Beverage (Abeer M.N.H. El-Dakak; Mona E. Youssef and Hanaa S.M. Abd El Rahman) Special Food and Nutrition Dept., Food Technology Research Institute, Agric. Res. Center, Giza, Egypt.

2.6. 1 HEALTH BENEFITS OF APPLE:

Health of heart:

Apples contain good amounts of fiber, antioxidants, such as vitamin C, in addition to potassium, which works to maintain a healthy heart and a normal blood pressure level, and reduce the incidence of complications on the heart.

In addition, eating apples and their dietary fiber, the most famous of which is pectin, contributes to reducing high cholesterol levels, especially harmful cholesterol (LDL), and this is a result of its role in protecting blood vessels and the circulatory system.

Immune support:

Apples are rich in many vitamins that benefit your health, as they contain good amounts of beta-carotene, and vitamin C, which is a powerful natural antioxidant, important for fighting diseases and infections, and preventing cancer, especially breast cancer.

Apples are also rich in flavonoids such as quercetin, epicatechin, and procyanidin (Procyanidin B2), in addition to containing tartaric acid, which gives the sour flavor to apples, all of these compounds help the body get rid of free radicals in addition to their role in enhancing the body's immunity.

value of apple:

2.6.2. THE NUTRITIONAL VALUE OF APPLE:

Name	Amount	Unit
Energy	54	kcal
Protein	0.41	g
Total lipid (fat)	0	g
Carbohydrate, by difference	14.05	g
Fiber, total dietary	2.1	g
Sugars, total including NLEA	10.33	g
Calcium, Ca	8	mg
Iron, Fe	0.15	mg
Potassium, K	107	mg
Sodium, Na	0	mg
Vitamin C, total ascorbic acid	2	mg
Vitamin A, IU	41	IU

MATERIALS AND METHODS

3. MATERIALS AND METHODS

3.1.1. The first mixture: (tangerine – carrot – orange)

1. Water
2. Tangerine
3. Carrot
4. Orange
5. Citric acid
6. Sodium benzoate
7. Sugar

3.1.2. The second mixture: (carrot – beetroot – apple)

1. Water
2. Carrot
3. Beetroot
4. Apple
5. Citric acid
6. Sodium benzoate
7. Sugar

3.1.3. The third mixture: (beetroot – strawberry – orange)

1. Water
2. Beetroot
3. Strawberry
4. Orange
5. Sodium benzoate
6. Sugar

3.2. Methods:

3.2.1. The first mixture: (Tangerine –carrot –orange)

- Prepare a sugar solution of 50%, if the amount of sugar per liter is equal to 75 grams.
- Adding sodium benzoate by 1/2 gram per liter and adding citric acid according to the degree of PH to take into account the trend of acidity
- Add the mango, guava and kiwi concentrate, measuring one unite per fruit to the Refractometer
- The mixture is stirred well at 25 ° C.
- The mixture is pasteurized at 80 ° C for a minute, then the mixture is filled.

3.2.2. The second mixture: (Carrot - Beetroot – Apple)

- Prepare a sugar solution of 50%, provided that the amount of sugar per liter is equal to 75 grams.
- Adding sodium benzoate by 1/2 gram per liter and adding citric acid according to the degree of PH to take into account the trend of acidity.
- Add the orange, guava and Pomegranate concentrate, measuring one unite per fruit to the Refractometer.
- The mixture is stirred well at 25 ° C.
- The mixture is pasteurized at 80 ° C for a minute, then the mixture is filled.

3.2.3. The third mixture: (Beetroot– Strawberry – Orange)

- Prepare a sugar solution of 50%, provided that the amount of sugar per liter is equal to 75 grams.
- Adding sodium benzoate by 1/2 gram per liter and adding citric acid according to the degree of PH to take into account the trend of acidity.
- Add the kiwi, broccoli and watercress concentrate, measuring one unite per fruit •
- The mixture is stirred well at 25 ° C •
- The mixture is pasteurized at 80 ° C for a minute, then the mixture is filled.

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

We did evaluation tests on a number of different groups of people to clarify the sensory evaluation of these juices, and the average of these evaluations was:

AVERAGE RESULTS OF EVALUATED JUICES:

Sample No.	Color	Odor	Taste	Consistency	Overall
Mix 1	9.95	9.47	9.60	9.56	9.43
Mix 2	9.86	8.78	8.69	9.43	8.95
Mix 3	9.78	9.47	9.43	9.43	9.30

Because of the many benefits of vitamins and their importance to the immune system of the body and fighting diseases, so take this in account in the work of these juices.

The result of the three mixed studies is that; the first mixture, which contains (orange, carrot, and tangerines), is the best mixture due to it giving it a thermal energy of 141 kcal and it contains the highest percentage of iron estimated at 0.55 mg and vitamin C 85.6 mg. The second mixture is the highest mixture containing iron at an estimated rate of 1.25 mg.

4.1. The first mixture: (orange - carrot- tangerines)

Energy = 141 Kcal

Iron (Fe) = 0.55 mg

Vit.C = 85.8 mg

4.2. The second mixture: (apple – beetroot – carrot)

Energy =138 Kcal

Iron (Fe) = 1.25 mg

Vit. C = 12.8 mg

4.3. The third mixture: (orange – strawberry - beetroot)

Energy = 140 Kcal

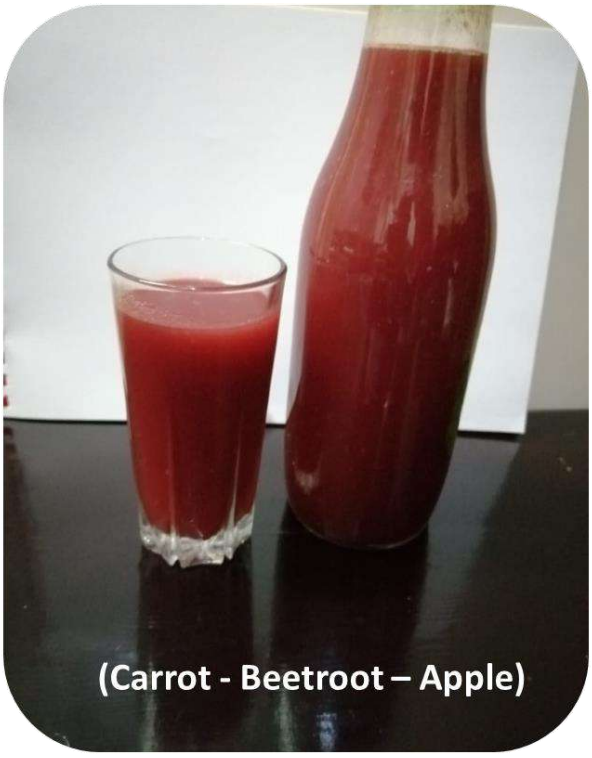
Iron (Fe) = 0.9 mg

Vit. C = 58.1 mg

Therefore, we recommend people to drink juices rich in vitamin C and iron to help boost immunity, keep human health and safety from diseases, consist of available natural fruits, and free of preservatives.

THE FIRST MIXTURE

THE SECOND MIXTURE



THE THIRD MIXTURE

The third mixture:

Beetroot

Strawberry

Orange

SUMMARY

5. SUMMARY

This study was conducted with the aim of making mixtures of juice with high nutritional value and energy that provides the body with the necessary energy. These mixtures contain important nutrients for the human body, the most important of which are iron and vitamin C, which are necessary to treat anemia and some other elements that help in treating some diseases and raise the body's immunity. As it was worked on three different mixtures of juices that contain a variety of fruits. The first mixture contains {orange, carrot and tangerines}, and this mixture is rich in vitamin C.

The second mixture contains {apple, beetroot, and carrot} and is characterized by a higher in iron than other mixtures.

The third mixture contains {orange, strawberry and beetroot} and is characterized by a high vitamin C content compared to the other mixtures.

The results of the sensory evaluation of these juices showed that the first mix was the best in taste, color, odor and consistency

Therefore, we recommend the first mix, because it contains vitamins and nutrients that are useful for the immunity of the human body.

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الملخص العربي

الملخص العربي:

أجريت هذه الدراسة بهدف عمل مخاليط عصير ذات قيمة وطاقة غذائية عالية تمد الجسم بالطاقة اللازمة وتحتوي هذه المخاليط على عناصر غذائية مهمة لجسم الانسان واهم هذه العناصر هي (الحديد وفيتامين سي) اللازمان لعلاج امراض الانيميا وبعض العناصر الأخرى التي تساعد في علاج بعض الامراض ورفع مناعة الجسم.

حيث يتم العمل على ثلاث مخاليط مختلفة من العصائر التي تحتوي على أنواع متنوعة من الفاكهة.

الخليط الأول: يحتوي على (جزر – برتقال –يوسفي) وهذا الخليط غنى بالطاقة وفيتامين سي بكمية كبيرة.

الخليط الثاني: يحتوي على (جزر – بنجر – تفاح) ويتميز بارتفاع الحديد والطاقة عن باقي المخاليط.

الخليط الثالث: يحتوي على (بنجر – فراولة – برتقال) ويتميز بارتفاع نسبة فيتامين سي.

أظهرت نتائج التقييم الحسي لهذه العصائر أن الخليط الأول كان الأفضل في الطعم واللون والرائحة والقوام.

لذلك ننصح بالخليط الأول لاحتوائه على فيتامينات وعناصر غذائية مفيدة لمناعة جسم الإنسان.

جامعة المنصورة
كلية الزراعة
قسم الصناعات الغذائية

إنتاج خلطات من العصائر الطبيعية عالية القيمة الغذائية لتعزيز المناعة

أسماء الباحثون

هاجر رمضان محمد خشبة
هالة أسامة عبد الحميد
ندى عاطف محمود تونى
هاجر محسن محمد شقوير
ياسمين محمد مجاهد عاشور

تحت مناقشة المشروع من قبل لجنة الاشراف :

الاسم	الوظيفة	التوقيع
ا.د/ عبد الحميد إبراهيم عبد الجواد	استاذ الصناعات الغذائية كلية الزراعة – جامعة المنصورة	
ا.د/ جيهان على عوض غنيم	أستاذ ورئيس قسم الصناعات الغذائية كلية الزراعة – جامعة المنصورة	
د/ محمد ممدوح ربيع	مدرس الصناعات الغذائية كلية الزراعة – جامعة المنصورة	

رئيس مجلس القسم	وكيل الكلية لشئون التعليم والطلاب	عميد الكلية
أ.د/ جيهان على غنيم	أ.د/ صالح سيد سعيد	أ.د/ أيمن الغمرى

2021

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إنتاج خلطات من العصائر الطبيعية عالية القيمة الغذائية لتعزيز المناعة

مشروع تخرج مقدم من الطلاب

هاجر رمضان محمد خشبة
هالة أسامة عبد الحميد
ندى عاطف محمود تونى
هاجر محسن محمد شقوير
ياسمين محمد مجاهد عاشور

(كجزء من المتطلبات للحصول على درجة البكالوريوس فى العلوم الزراعية)

برنامج علوم وتكنولوجيا الاغذية

الاشراف

ا.د/ عبد الحميد إبراهيم عبد الجواد
أستاذ الصناعات الغذائية
كلية الزراعة – جامعة المنصورة

ا.د/ جيهان على عوض غنيم
أستاذ ورئيس قسم الصناعات الغذائية
كلية الزراعة – جامعة المنصورة

د./ محمد ممدوح ربيع
مدرس الصناعات الغذائية
كلية الزراعة – جامعة المنصورة

2021