

Research title : Natural Sport Drink of Sugarcane Juice containing Calamansi Juice

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Introduction

Introduce study scope

Example:

Sport drinks are typically formulated to replenish energy, nutrients, and fluid loss for athletes or individual engaged in prolonged vigorous physical activity (Maughan & Murray, 2000). One of the key ingredients in sport drinks is carbohydrate (CHO) as it is well known to improve performance and delay the onset of fatigue for athletes by serving as a fuel for working muscle (Backhouse, 2007)...

However, most of commercial sport drinks are carbonated, artificially flavored, and synthetically fortified with sugar, salt, or minerals to enhance energy density and electrolyte content. Sugarcane juice, a nutritious drink which is rich in CHO and a few electrolytes (sodium and potassium), can be a natural alternative to the commercial sport drinks, with evidence indicating the efficacy in replacing energy and fluid loss (Yusof et al., 2000)...

Fructooligosaccharide (FOS), a soluble dietary fiber, is one of the typical representatives of functional ingredients with prebiotic function and various health-promoting effects (Tanriseven & Aslan, 2004). In sport nutrition, prebiotics and probiotics are gaining attention as they may help to improve immunity, reduce the risk of infection, and promote recovery from inflammation for athletes (Shane, 2015). However, fiber is normally associated with...

Therefore, this proposed work aims to...

Problem statement & Study rationale

Why are you conducting this study?

What is the importance of your study finding(s)?

Example:

1. *Lack of information on tolerable amount of fructooligosaccharide (FOS) can be fortified in sport drink before gastrointestinal upset is induced...*
2. ...

Research Question(s)

What are the questions that you derived based on your problem statement that you would like to answer with this study?

Example:

1. *How is the effect of fructooligosaccharide (FOS) on osmolality, carbohydrate (CHO) content, and energy density...*
2. ...

Objective

Example:

General : *To formulate a high functionality natural sport drink from sugarcane juice.*
Specific : *To determine the effect of fructooligosaccharide (FOS) at different concentrations on osmolality, carbohydrate content, and energy density of sugarcane sport drink developed...*

Literature review

Critical review of previous published studies to:

1. Identify gaps of knowledge
2. Justify your study rationale
3. Justify your methodology

Example:

Consumption of sport drinks is increasing over the world by children, adolescents, athletes, and individuals engaged in prolonged vigorous physical activity. In Malaysia, sales of sport drink were reported numerous growth rate of 82.0 % from the year 2008 to the year 2013, representing the largest market share in the fortified / functional beverage market (Euromonitor International, 2014). With the rising of health-conscious, consumers today are paying more attention and seeking for a natural alternative to the commercial sport drink. In United State, Body Armor, a coconut water based sport drinks containing all natural ingredients, have successfully invaded sport drinks market and achieved a retail revenue of

USD100 million in year 2015 (Euromonitor International, 2017). However, most of the commercial sport drinks in the current market especially in Malaysia are low nutritional value and formulated with artificial ingredients such as fructose, maltodextrin, artificial flavoring, and added electrolyte (Kalman et al., 2012)...

Due to high simple sugar and water content, sugarcane juice may be a viable alternative to current sport drink to...

Fructooligosaccharide (FOS) is becoming a popular functional ingredient and widely applied in food formulations. It exhibits health beneficial effects such as enhancing defense mechanisms and gut immune functions, improving mineral absorption, reducing serum triacylglycerol, and providing anti-cancer effect (Mutanda et al., 2014). In sport nutrition, prebiotics and probiotics are gaining attraction to improve immunity, reduce the risk of infection, and promote recovery from inflammation for athletes (Shane, 2015). Recent literature claimed incorporation of prebiotics in sport drink is a convenient way to ... Biological stability of FOS in sport drink was demonstrated in a study by Morre (2011), indicating ...

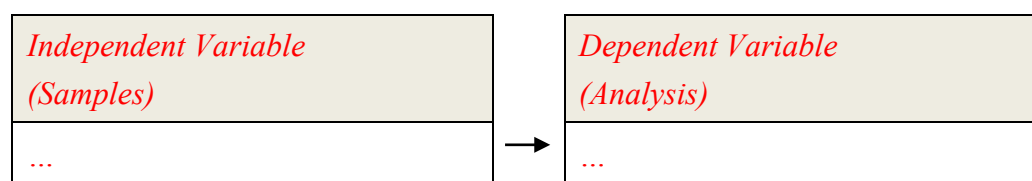
Hence, this present study was envisaged to study...

Conceptual framework

Diagrammatic illustration of the study framework based on literature review with some text to explain the diagram.

Example:

Phase 1



Research design

You may need to split into phases of study

You may use these type of study designs:

- 1) Cross sectional study – including questionnaire based study and study that use secondary data
- 2) Cohort or prospective study
- 3) Case control study

- 4) Interventional study –non-randomised controlled trial, randomised controlled trial, interventional study without control, any matching or blinding applied

Example:

Phase 1: Counterbalanced crossover design will be applied in Gastrointestinal (GI) tolerance study. Subjects will be randomly allocated to an order of treatment over 3 different trial days in 3 consecutive weekends as shown below...

Phase 2: ...

Study area

Where will you collect your data? Introduce the place if necessary

Example:

Product/sample analysis will be conducted at analysis lab in School of Industrial Technology, Universiti Sains Malaysia (USM), Penang. Gastrointestinal (GI) tolerance study will be held...

Study population

Reference population – The overall or big population that your study findings is able to represent. Must be appropriate for the level of your study design

Example: Male and female athletes in USM, main campus, Penang.

Source population / sampling pool – The source where your subject will be recruited

Example: Male and female athletes in USM, main campus, Penang, who are from football, squash, or badminton team.

Target population- The specific target group that you will recruit from the source population (Target population may be similar to reference population in small scale study)

Example: Male and female athletes in USM, main campus, Penang, who attended all the fixed training sessions in their team.

Sampling frame – The list / register from where you will sample your subject

Example: Name list from team captain of the football, squash, and badminton team

Subject criteria

Inclusion & exclusion criteria (for each group if more than one group)

Example:

1. *Subject must be healthy male or female athletes between 19 – 25 years old.*
2. *Subject must be a nonsmoker...*
3. *...*

Sample size estimation

Estimate sample size for each objective as much as possible. Add if necessary sample size estimation when considering non response or drop out percentage.

State the software/formula used and the measures used to calculate. State the 95% CI, power of study 80%

Example: Sample size of 30 trained athletes will be used in gastrointestinal (GI) tolerance study in phase 1, according to the method described by Shi et al. (2004)...

Sampling method and subject recruitment

How you select a subject from the sampling frame

Example: Athletes from football, squash, and badminton teams will be chosen to be involved in the study. These sports are categorized as intermittent high-intensity exercise, which characterized by intermittent bursts of high-intensity exercise over 1–2 hours, with a resting period in intervals (Baker et al., 2015). The principal investigator will approach team captain from USM football...

Research tool

List all research tool(s) and its validity, reliability, or source whenever applicable

Example:

1. *Questionnaires*
 - *Validity and reliability: Post trial questionnaires consist of 3 section, which covers gastrointestinal (GI) symptoms on the upper abdomen, lower abdomen, and systemic. Each section will be divided and questioned to evaluate all the possible GI symptoms and its severity according to a method described by Pfeiffer et al. (2009)...*

Data collection method

How you will collect the data, may be written in phases. What EACH subject will undergo and the quality assurance of data collected.

How you handle sample – ensuring confidentiality, labelling, sample flow chain and storage, sample destruction post study (whenever applicable).

Example:

Phase 1:

Subjects will be instructed to report at USM stadium at 7.00 am after overnight fasting (at least 6 hours). All the trials will be done at the same time of day to avoid any influence of circadian variance. A standardized breakfast (2 slices of bread and 500 mL of plain water) will be provided after registration session. The briefing will be given on all associated risks...

Subjects will be instructed to complete a 2 min warm up, and following by trial which consists of 4 circuits (quarters), referring to a method developed by Shi et al. (2004). Each circuit will comprise of 3 exercise stations as shown in Figure 1...

Each subject will receive 1 sample (around 15 °C) per session in a randomized crossover counterbalance order and consume predetermined volume...

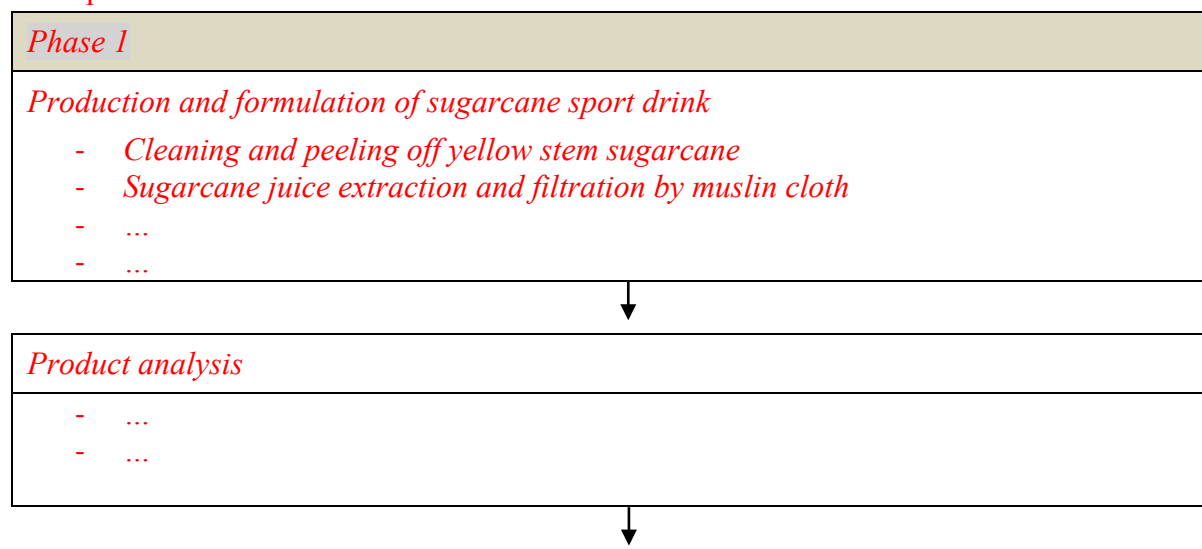
Phase 2:

...

Study flowchart

Diagrammatic illustration of the how the study will be conducted.

Example:



*Gastrointestinal (GI) tolerance study**Subjects: ...**Samples : ...**Sample treatments: Each subject will receive 1 sample per session in a counterbalanced order for 3 different days trials and consume in predetermined volume as below ...**Exercise protocol:*

- *Exercise protocol is accordance with the method developed by Shi et al. (2004) as shown in Figure 1.*
- *Subjects will complete 4 circuits, each comprised 3 stations as below...*

Measurements:

- *Body weight of subjects will be measured with...*
- *GI questionnaire will be completed by subjects after each quarter using ...*

Data analysis

You may use these as a general template for descriptive statistics [note that software & its version may need to be revised accordingly]

Example:

All results will be expressed as mean \pm standard deviation (SD). One way analysis of variance (ANOVA) will be used for analyzing the data. Statistical Package Social Science (SPSS) version 22 (IBM Corporation, New York, USA) will be used to perform the statistical analysis. Differences will be considered significant at $p < 0.05$.

Gantt chart & milestone

Provide table to illustrate the time plan of study process according to month and year in line with the study duration.

Milestone of study progress may be presented as monthly or 3-monthly.

Example:

<i>Tasks</i>	<i>Nov. 2016</i>	<i>Dec. 2016</i>	<i>Jan. 2017</i>	<i>Feb. 2017</i>	<i>Mar. 2017</i>	<i>April 2017</i>	<i>May 2017</i>	<i>...</i>
<i>Literature review</i>								
<i>Preparation for human ethnic approval</i>								
<i>Await human ethic approval</i>								
<i>Proposal presentation</i>								
<i>Product analysis</i>								

...								
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<i>Tasks</i>	<i>Due date</i>
<i>Literature review</i>	<i>Completed</i>
<i>Preparation for human ethnic approval</i>	<i>Completed</i>
<i>Await human ethic approval</i>	<i>Pending</i>
<i>Proposal presentation</i>	<i>23/2/2017</i>
<i>Formulation of sugarcane sport drink</i>	<i>31/5/2017</i>
<i>Product analysis</i>	<i>30/6/2017</i>
...	
...	

Ethical consideration(s) [if applicable]:

Example:

1. Responsibilities to participants

The dignity and well-being of participants will be protected. Participants will be informed about the study in detail before asking for their consent to take part. Participation will be entirely voluntary and participants will be allowed to withdraw from the study at any time without a penalty...

2. Privacy and confidentiality

All data and results of the study will be kept confidential and accessed only by principal investigator. Information from this study may be reported or published in aggregate form, but subject's identity will not be revealed in any publications or presentations...

3. Declaration of conflict of interest

None of conflict of interest in the present study.

4. Honorarium and incentives

Sport drink and breakfast will be provided to participants free of charge in this study. Incentives will be given per trial to each participant for both study in phase 1 and phase 2 as a token of appreciation. Subjects may receive information about their stamina through measuring their maximum power output (W_{max})...

5. Community benefits

The outcome of this study may reduce the knowledge gap... In addition, this study may provide some information and aspiration to industry or research field in developing natural sport drink with high functionality to ...

References

List all references for this study proposal