



Effects of Omega-3PUFA (Fish Oil) in cupcake

Briana Holness

Department of food and Nutritional Sciences · North Carolina Agricultural and Technical State University · Greensboro · NC 27411-1064



ABSTRACT

Marine lipid has gained its popularity among the food scientist and industries, because of its beneficial effects on humans' health. Researchers also revealed low intake of fish in the western diet and because of the low intake of fish, consumption of EPA and DHA has gone far below the recommended intake. This research was conducted at the Food and Nutritional Science Laboratory at North Carolina A & T State University and only ten untrained panelist participated. The purpose of this study was to determine whether cupcake is a good media for omega 3 Polyunsaturated fatty acid. It was hypothesized that the emulsion ingredients (such as milk, WPI, fish oil and xanthan gum) will have impacts on the cupcake physical nutritional attributes. The results of this study shows that addition of the emulsion posted negative impact on cupcake. However, further study is needed to determine the significant effect of the emulsion. The results of the study will have positive contribution to food science researcher and the entire food industries.

BACKGROUND

Omega-3 fatty acids are important for a number of functions in the body. The omega-3 fatty acids have at least three double bonds starting from the 3rd carbon from the methyl end of the fatty acid molecule (Pak, 2005b). The essentiality is based on the chemical structure of these fatty acids and where the chemical bonds are located along the fatty acid structure. It's the location and amount of double bonds and length of the fatty acid chain in its chemical structure that determines the biological importance of the essential fatty acid with regard to nutrition and health. The first unsaturated carbon bond in Omega 3 fatty acid occurs at the third carbon from the methyl end.

(Scrimgeour, 2005) defined Omega-3 fatty acids as the natural product known as nonvitamin and nonmineral supplements, and most commonly used by adults in the United States. Fatty acids can be defined as compounds that composed of long chains of carbon and hydrogen atoms (referred to as hydrocarbon molecules) containing a carboxylic acid at one end (COOH). The presence of carbon-carbon double bonds in fatty acids significantly lowers the melting point relative to that of a saturated fatty acid of the same number of carbon atoms. In the food industries, many animal and plant derived polyunsaturated fatty acids are chemically treated to introduce hydrogen atoms onto the carbon atoms that are double bonded to form solid at room temperature. This process is termed hydrogenation, for example margarine.

However, most of fatty acids found in the body are acquired in the diet. Human body synthesizes all the various fatty acid structures needed from other carbon compounds with exception of PUFAs (alpha- linoleic acid α -linolenic) and linolenic acid. Since plants are capable of synthesizing linoleic acid and Alpha linolenic acid, humans can acquire these fats by consuming a variety of plants or else by eating animals that have consumed these plant fats. These two essential fatty acids are also referred to as omega fatty acids. Linoleic acid is an example of omega-6 PUFA and α -linolenic is an example of omega-3 PUFA. Several studies have been conducted on linoleic acids and Alpha linolenic acid and the results revealed that are beneficial to human health. In 2003, Morris et al concluded in their study that omega-3 fatty acids have some beneficial effects against neurological diseases such as depression and Alzheimer's disease.

Further, additional supplementation with DHserum lipid profiles A and EPA has been shown to favorably influence the in women (Laidlaw, 2003) findings showed that EPA arrested cell-cycle progression at G0/G1 phase, inducing necrosis in human leukemic HL-60 and K-562 cells in vitro. Likewise, EPA has induced apoptosis in HL-60 cells by down regulation of Bcl-2. (Leaf A, 1997); (PL, 1993) found from their study that modest intake of omega-3 PUFA could reduce the risk of primary cardiac arrest by electrical stabilization of myocardial membranes and risk of sudden death. Due to the beneficial effects of aforementioned omega 3 the research hypothesize that the DHA and EPA will not only add to the nutritional effect of cake but might also impact the shelf life.

OBJECTIVES

- To determine whether cup cake is a good media for omega 3 Polyunsaturated fatty acid.

MATERIALS AND METHODS

Materials needed for this study are; Flour, margarine, sugar, eggs, milk, xanthan gum, fish oil, salt and whey protein isolate. Only ten untrained panelist participated in this study.

METHODS/PROCEDURE

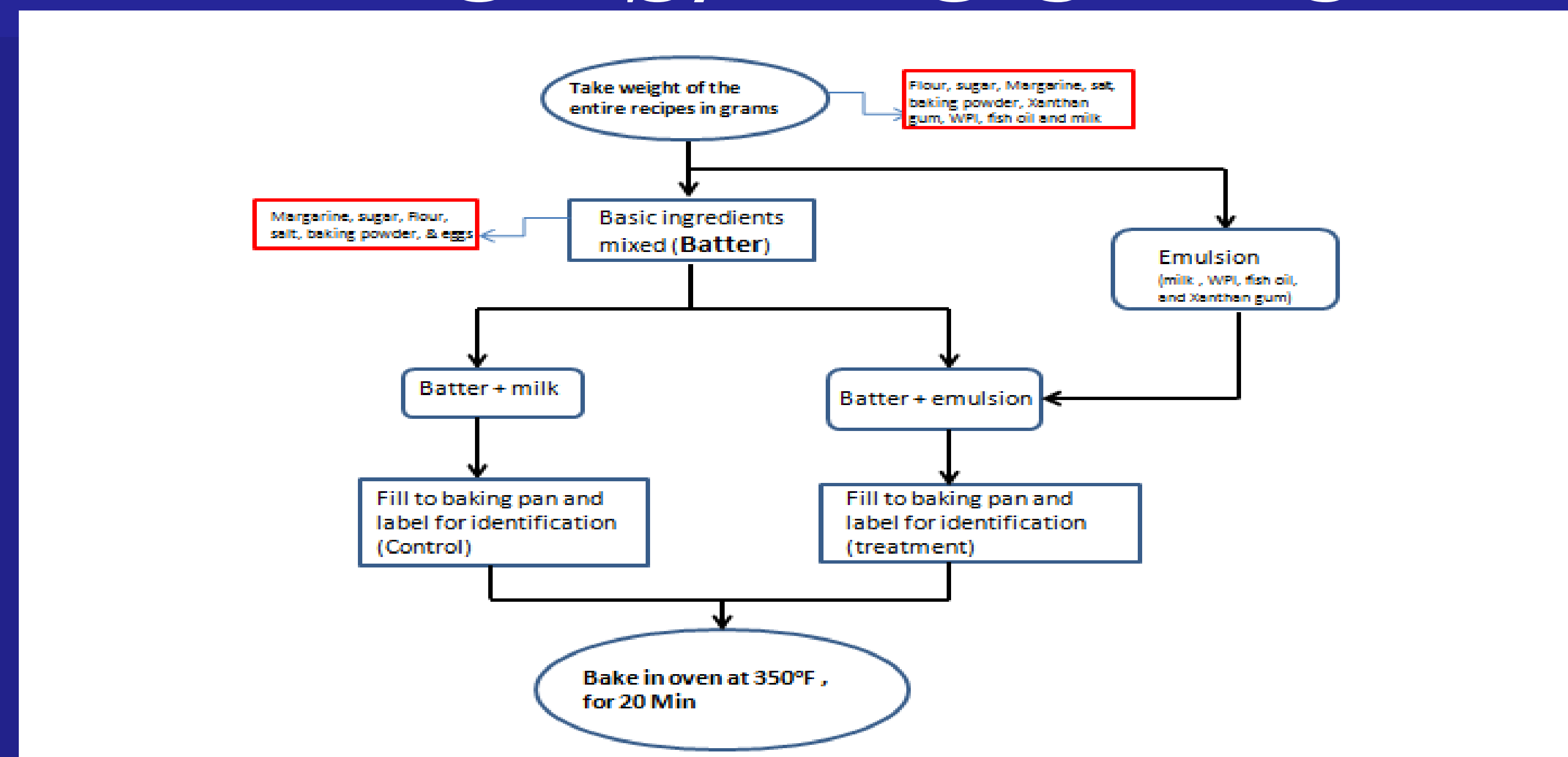


Figure 1: Flow chart for the experimental study



Figure 2: Step by step procedure for making cake

DATA COLLECTION

Data collection were based on five sensory attributes (appearance, color, texture, aroma, and Overall liking) and the attributes were scaled using likert scale. The scale ranged from 1-9

Sensory Analysis and Evaluation Performance Checklist

202-2022-2022-2022

Product: Sample #: Date:

Instructions: Prior to performing this sensory, slightly smell the cake in the provided plate. This will clear the nasal passages optimizing the sense of smell. Analyze and evaluate the following product(s) and score in the corresponding sections. When you have completed the study, please discard product. Leave panelist and score sheet(s) on table. Thank you for your participation!

Table with 5 columns: Attribute, 1, 2, 3, 4, 5, 6, 7, 8, 9. Rows include Appearance, Color, Texture, Aroma (Smell), and Overall Liking.

Each subject participated in two sensory evaluations one for control (meaning cake without Omega -3 supplements) and one treatment (cake with Omega-3 supplement).

Each subject evaluated checklist was recorded and tabulated using Excel version 2010.

RESULTS

Table 1: Average and standard deviation of all Attributes examined

Table with 11 columns: Attribute, Control, Treatment, Control, Treatment, Control, Treatment, Control, Treatment, Control, Treatment. Rows include AVERAGE and SD.

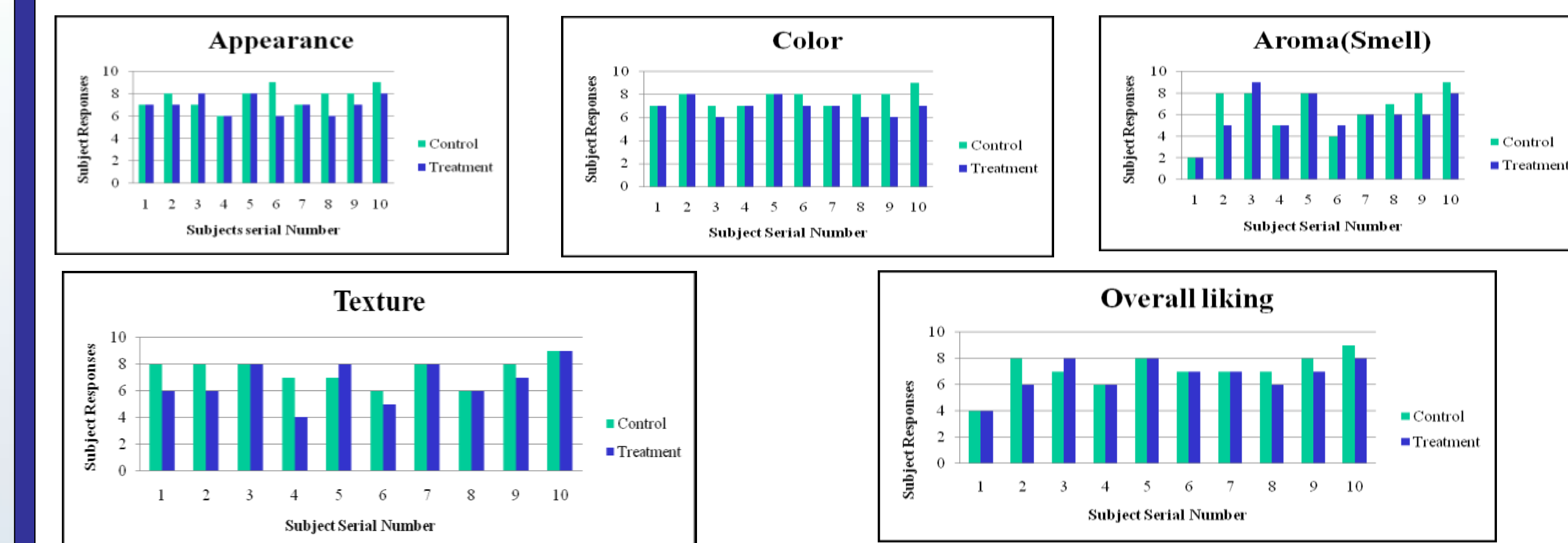


Figure 3: Graphical representation of panelists responses

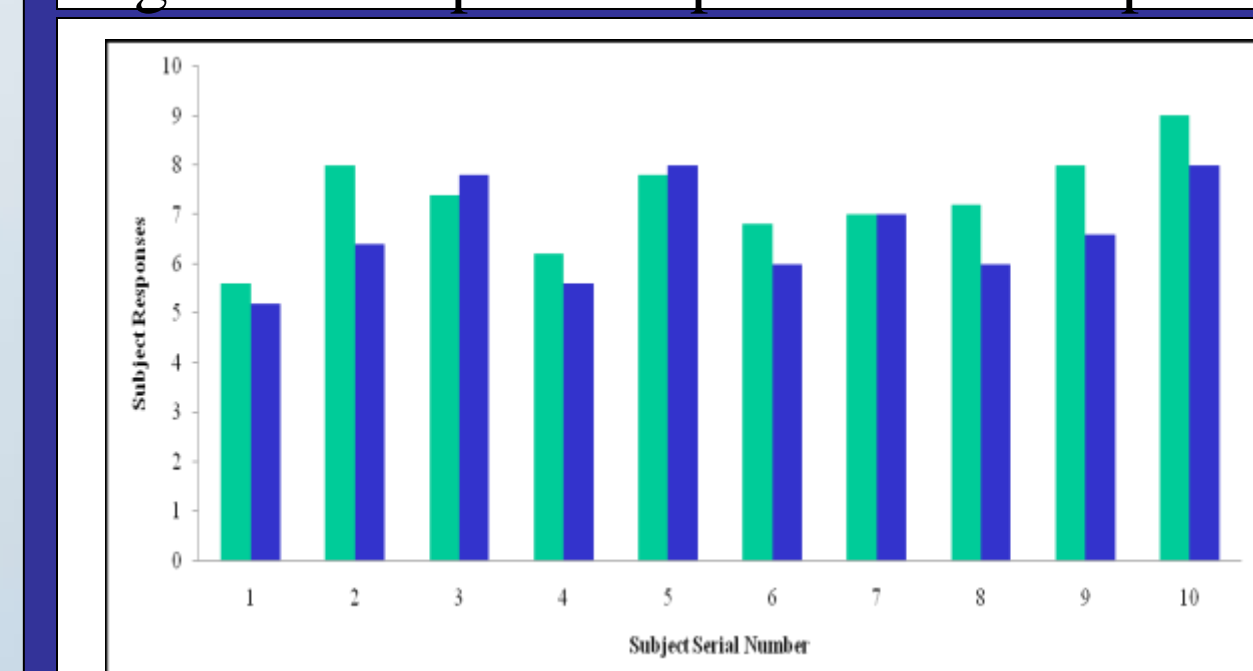


Figure 4: Average Responses for Control Vs. Average Responses for Treatment

RESULTS DESCRIPTION

- Descriptive analysis was performed using Excel version 2010
Results of the study show that control has larger average values for all the attribute tested.
For all the five attributes panelist number five could not differentiate between the two specimen.
CA---Control and TA ---Treatment

CONCLUSIONS & FUTURE WORK

- Based on the five attribute s control seems to be better , Table 1 showed a detailed description of each attribute under control and treatment. But it can not be concluded that control is better except that an inferential statistics is perform to see the significant.
In the future work, more panelist should be used (most especially trained panelist)
Inferential statistics should be perform to see the significant difference between control and treatment.
For future study shelf life of the products should be considered for strong conclusion.

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