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A brief survey report on awareness of consumption of green coffee and its health benefits

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Abstract
Coffee is one of the most widely and popularly consumed beverages in whole of the world because of its aroma and pleasant taste. Many studies have been performed to explain the best possible beneficial effects of consuming coffee on human health and they have shown that coffee exhibits potent antioxidant activity, which is generally due to its polyphenolic content present coffee. Some of the evidences suggest that coffee roasting may change the polyphenolic content present in green coffee beans (e.g., Maillard reaction) and, accompanying their antioxidant activity. The present study was conducted to examine how many people are consuming coffee, green coffee on regular bases and to create awareness of consumption of green coffee beans and its health benefits. This study was conducted in the Department of Food and Nutrition, B.P.S.M. Vishwavidayalaya Khanpur Kalan (Sonipat) and data was collected by presenting simple questioner among forty employees of University.

Keywords: Green coffee beans, consumption, health benefits

Introduction
The recent research finds the standardize objective for the procedure of "*Evaluation of Chlorogenic acid and antioxidant properties of Green Coffee beans based value added products*". This study was conducted in the Department of Food and Nutrition, B.P.S.M. Vishwavidayalaya Khanpur Kalan (Sonipat) during the year 2021-2024. As change is the law of nature; it has been noticed that during last decades, there have been significant demographical change in country population of high trends in globalization, lifestyle and medical facility. The declining numbers of joint family system and increasing in nuclear family system has brought a new era to the care and welfare of people through various value added nutritious food products.
The present study was based on product preparation by incorporation of Coffee beans it includes to assess the consumption of green coffee among the employees of B.P.S.M.V. Khanpur Kalan (Sonipat). Thirty questions were prepared with simple "yes" and "No" answer to examine how many people are consuming coffee, green coffee on regular bases and to create awareness of consumption of green coffee beans and its health benefits.

Review
As Coffee is one of the most widely consumed beverages in the world. It is made from the seeds of the Coffee plant, which are commonly referred to as coffee beans. There are two main types of coffee beans: green coffee beans and roasted coffee beans. Green coffee beans are unroasted, while roasted coffee beans are roasted at high temperatures to produce the characteristic flavour and aroma of coffee. Green coffee beans contain higher levels of certain compounds, such as chlorogenic acids (CGAs), than the roasted coffee beans. CGAs are a group of antioxidant compounds that have been linked to various health benefits, including improved glucose metabolism and reduced risk of cardiovascular disease. Roasting coffee beans reduces the levels of CGAs and other antioxidant compounds, but it also produces other compounds, such as melanoidins and Maillard reaction products, that contribute to the flavor and aroma of coffee. Roasting also produces acrylamide, a potentially carcinogenic compound that forms when certain amino acids react with reducing sugars during the roasting process.
The term "green coffee bean" refers to unroasted mature or immature coffee beans. These have been processed by wet or dry methods to remove the outer pulp and mucilage and have an

intact wax layer on the outer surface. When beans are immature, they are green whereas when get mature they have brown to yellow or reddish colour and normally weigh around 300 to 330 mg per dried coffee bean. Volatile and Non-volatile compounds present in green coffee beans such as caffeine prevent many insects and animals from eating them. Furthermore, both volatile and non-volatile compounds contribute to the flavour of the coffee bean when they are roasted. Nonvolatile nitrogenous compounds such as proteins, trigonelline, and free amino acids. Carbohydrates play the major role in producing the full aroma of roasted coffee and for its biological action. Since the mid-2000s the green coffee extract has been sold as a nutritional supplement and it has been clinically studied for its chlorogenic acid content and for its lipolytic and weight-loss properties.

Caffeine (1,3,7-trimethylxanthine) is an alkaloid that is present most in green and roasted coffee beans. The content of caffeine is coffee beans is around 1.0% and 2.5% by weight of dry green coffee beans. The content of caffeine does not change during maturation of green coffee beans (Clifford., *et al*. 1987) [1]. Lower concentrations of theobromine, theophylline, liberine, paraxanthine, and methyl liberine is found in green coffee beans.

Caffeine is very important bioactive compound component of coffee beans, which belongs to the methylxanthine class of alkaloid. Caffeine is an alkaloid which is present in varying amounts in brewed coffees, its mostly known for its CNS stimulatory effects. It specifically effects in increasing mental alertness, wakefulness, faster information processing, restlessness, reduction of fatigue, and delay in the need for sleep. A single cup of coffee may contain 95-330 mg of caffeine. Most of the evidence suggests that caffeine intake of about 400 mg per day or less has beneficial effects on the human body. For example, it may lower the risk of Alzheimer's and Parkinson's disease, and as well as lowering the risk of type 2 diabetes (Fuller and Rao 2017) [2]. The concentration of caffeine in coffee widely depending on plant species, genetic traits, agricultural practices, storage conditions, roasting degree, and most importantly on its brewing method (Fuller and Rao 2017) [2].

Fuller and Rao (2017) [2] also claims that cold brew coffee made with medium roasted beans has higher concentrations of caffeine and 3-CGA in comparison to dark roasted beans. Moreover, cold brew coarse grinded coffee samples have a higher concentration of caffeine than hot brew coffee beans.

Alqarni *et al.* (2018) [3] confirm that dark roast coffee beans have lower antioxidant capacity and caffeine compared to raw coffee beans. Regarding the green coffee beans, the highest and the lowest caffeine contents are found in the samples of highest and lowest quality, respectively. The same tendency is maintained after roasting the beans Caffeine content of green coffee beans is within the range of 1-4% (on dry basis) while the roasting causes a reduction in caffeine content approximately 30%. Caffeine presents a distinct behaviour for 200 °C and 300 °C roasting conditions, showing a sharper decrease on roasting at 300 °C. Since the solubility of caffeine in water increases with increase in temperature, the caffeine loss may be attributed to a drag by water vapour released during roasting (Mazzafera and Silvarolla, 2010) [4].

Caffeine and its catabolic products xanthine and theobromine exhibit both antioxidant and pro-oxidant properties. Therefore, caffeine and its metabolites may also contribute to the overall antioxidant and chemo preventive properties of caffeine-bearing beverages (Vignoli *et al*., 2011) [5]. Caffeine mainly effect is on the brain and stimulates the brain by locking the effects of the neurotransmitter adenosine (Ferre, 2008) [6]. This causes a relative increase in other signalling molecules, such as dopamine and norepinephrine which are thought to benefit brain function and mood (Nehig *et al*.,1992) [7].

(*N*-methyl-nicotinate) is a derivative of vitamin B_6 that is not as bitter as caffeine. In green coffee beans, the trigonelline content is between 0.6% and 1.0%. At a roasting temperature of 230 °C (446 °F) 85% of the trigonelline is degraded to nicotinic acid and leaving small amounts of unchanged molecule in the roasted beans (Girma *et al*., 2020) [8].

Proteins account for 8% to 12% of dried green coffee beans. A majority of the proteins are of the 11-S storage kind (Bau *et al*., 2001) [9] (alpha - component of 32 kDa, beta - component of 22 kDa), most of which are degraded to free amino acids during maturation of green coffee beans.

The lipids found in green coffee include: linoleic acid, palmitic acid, oleic acid, stearic acid, arachidic acid, diterpenes, triglycerides, unsaturated long-chain fatty acids, esters, and amides. The total content of lipids in dried green coffee is 11.7-14 g/100 g (Gotoda and Iwai., 2006) [10].

Materials and Methods

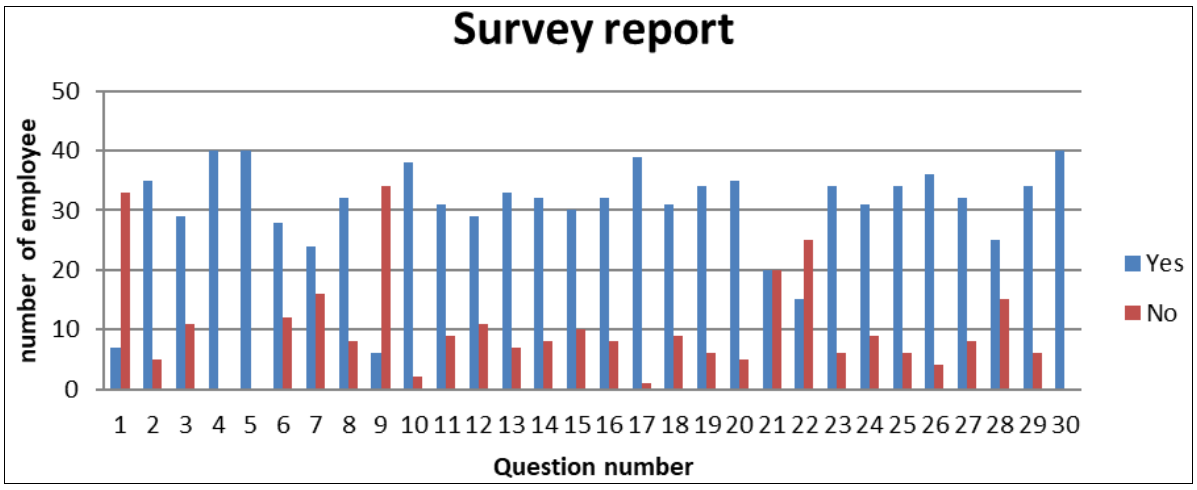
Thirty simple questions were prepared in a form of questioner with simple "Yes" and "No" answers and was presented to forty employees of B.P.S.M.V. Khanpur Kalan (Sonipat). The aim was to know how many people consume coffee regularly in their day to day life and how many employees are aware of green coffee beans and its health benefits. Along with collecting the information another target was also to make employees aware of health benefits of green coffee beans in their daily routine.

Results

As people are becoming aware and getting more health and dietary cautious consumption of coffee has increased day by day. But people are less aware of green coffee and its benefit compared to roasted coffee. So to assess the consumption of green coffee and for spreading awareness among the employees of BPSMV Khanpur Kalan, (Sonipat) a questioner was designed with thirty simple questions with simple answer of yes and no, information was collected from forty employees of University (graph 1) as shown in (table 1)along with result and percentage in yes.

Table 1: Questions present for survey for awareness of consumption of green coffee and its health benefits of University employee along with the result and percentage in yes.

S. No.	Questions	Yes	No	% in yes
1	Do you consume coffee regularly?	07	33	17.5
2	Do you prefer drinking tea over coffee for its health benefits?	35	05	87.5
3	Do you believe that coffee has more health benefits compared to tea?	29	11	72.5
4	Do you think that drinking coffee can boost your energy levels?	40	00	100
5	Do you know that coffee is a rich source of antioxidants?	40	00	100
6	Have you heard of green coffee and its benefits?	28	12	70
7	Do you know that green coffee is unroasted, which helps it retain more antioxidants?	24	16	60
8	Do you know that green coffee has higher Chlorogenic acid content compared to regular coffee?	32	08	80
9	Have you ever used green coffee as a dietary supplement?	06	34	15
10	Do you believe that green coffee can help with weight loss?	38	02	95
11	Do you think green coffee can help in managing blood glucose levels?	31	09	77.5
12	Have you heard that green coffee can improve cardiovascular health?	29	11	72.5
13	Do you believe that green coffee can reduce the risk of chronic diseases?	33	07	82.5
14	Are you aware that green coffee contains higher levels of caffeine compared to regular coffee?	32	08	80
15	Are you aware that green coffee can have anti-inflammatory properties?	30	10	75
16	Do you think green coffee can boost cognitive function and enhance focus?	32	08	80
17	Have you heard that green coffee can have anti-aging effects?	39	01	97.5
18	Do you believe that green coffee can help in detoxification and liver health?	31	09	77.5
19	Are you aware of the potential benefits of green coffee for athletic performance?	34	06	85
20	Do you believe that green coffee can improve mood and reduce symptoms of depression?	35	05	87.5
21	Are you aware of the potential benefits of green coffee for managing high blood pressure?	20	20	50
22	Do you think green coffee can improve dental health and reduce the risk of cavities?	15	25	37.5
23	Do you believe that green coffee can help in managing stress and anxiety?	34	06	85
24	Are you aware of the potential benefits of green coffee for reducing inflammation in the body?	31	09	77.5
25	Do you think green coffee can improve insulin sensitivity and reduce the risk of diabetes?	34	06	85
26	Have you heard that green coffee can have anti-cancer properties?	36	04	90
27	Do you believe that green coffee can improve the body's antioxidant defence system?	32	08	80
28	Are you aware of the potential benefits of green coffee for improving digestion?	25	15	62.5
29	Do you prefer green coffee over tea for its potential benefits in managing cholesterol levels?	34	06	85
30	Do you think green coffee is a healthier alternative to regular coffee and tea?	40	00	100



Graph 1: Survey report on awareness of consumption of green coffee and its health benefits of University employee

Discussion

This shows that people are aware of benefits of consumption of coffee but are less aware of green coffee. We hope that this questioner would have been beneficial in creating awareness about green coffee.

Report of Coffee Board of India Ministry of Commerce and Industry, Government of India, Bengaluru, Coffee consumption trends in India, 2023 published in april 2024 reported that the average person in India consumes around 30 cups of coffee per year, which is much less than the global average of 200 cups per year. However, coffee consumption in India is increasing, and is expected to more than double by

2027. The south of India is the region with the highest coffee consumption, accounting for 75-80% of the country's total consumption. However, other regions have seen increased coffee consumption due to increased awareness and the presence of retail coffee brands. The study estimates overall coffee consumption at 91,000 tonne green bean equivalent (GBE) in 2023, up from 84,000 tonne in 2012, which is mainly attributed to increased consumption at home, with higher penetration of instant coffee, and higher consumption out of home, in cafes across the country.

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