



## Comparison of nutrient content in Redbull energy drink and developed performance enhancing drink by proximate analysis

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### Abstract

In the present scenario, the mixture of products became an alternative to increase the nutritional value or even to develop new flavours in the formulation of mixed drinks by beverage industries. The present study was undertaken to develop a 100 % natural product, free from any stimulants, preservatives, artificial colouring or additives which could be consumed as an alternate of energy drinks available in Indian market. The developed performance enhancing drink was formulated by incorporating coconut (*Cocos nucifera*) water, pineapple (*Ananascomosus*), orange (*Citrus sinensis*) and lotus seeds (*Nelumbo nucifera*). Proximate analysis result showed a high increase in attributes as, 130 Kcal – 210 Kcal, 30g – 51g, 0.1mg – 0.4mg, 0 – 50µg, 0 – 150mg, 7.8mg – 284mg, 7.8mg – 40mg for energy, carbohydrate, thiamine, folates, ascorbic acid, potassium and magnesium respectively in product 2 compared to standard product. When applied t-test, statistically significant difference were seen (at p<.05) for thiamine, folates, vitamin c, potassium and magnesium.

**Keywords:** Stimulants, Preservatives, Additives, Energy Drink.

### Introduction

Energy drinks are a group of beverages used by consumers to provide an extra boost, promote wakefulness, increase attention span, maintain alertness, and provide cognitive and mood enhancement. Currently, energy drink market is the fastest growing beverage category available in around 140 countries of the world including India, which contains caffeine ranging from 80-505 mg per can or bottle (Reissig C.J. et al., 2009). Red Bull was launched in India in 2003. With a 75% market share, it is presently leading the Indian market of energy drinks. The energy drink market in India was pegged at Rs 700 crore in 2013; comprising of 5% of the total soft drinks market dominated by colas, fruit juices, and flavoured milk (Mukherjee A, 2013).

Despite the cost factor, youth do not mind spending money on energy drinks due to their much advertised perceived benefits on endurance, attention, and stamina. The ingestion of low to moderate doses of caffeinated energy drinks has been associated with adverse side effects such as insomnia or increased nervousness. The ingestion of an energy drink with 3 mg/kg of caffeine increased the prevalence of side effects. The presence of these side effects was similar between male and female participants (Salinero J.J. et al., 2014).

It was observed, based on the interview, clinical manifestation, and negative toxicology laboratory testing (excluding the presence of ethanol), it is

possible to connect the seizure state with the consumption of a high dose of energy drinks, rich in caffeine and taurine (Matuszkiewicz E. et. al., 2015). Consuming sugar-free Red Bull energy drink before exercise has become increasingly popular among exercising individuals. In a study, it was observed that sugar-free Red Bull energy drink did not influence high-intensity run time to-exhaustion in young adults (Candow D. et al 2009).

**Materials and Methods**

The drink was standardized through repeated organoleptic evaluation performed in order to check the overall acceptability with key attributes such as appearance, taste, mouth feel, odour, consistency and overall acceptability. The final formulated drink comprised *Citrus sinensis* (orange juice) 60 ml, *Ananas comosus* (pineapple juice) 90 ml, *Cocos nucifera*

(coconut water) 100 ml, *Nelumbo nucifera* (lotus seeds puree) 50 ml and 10 g sugar. The developed drink, along with the standard, i.e. Red bull, were subjected to proximate analysis for nutrient content. Standardized testing methods for food testing laid down by AOAC was followed for proximate analysis. Thiamine (B1), Ascorbic acid (C), Folates (B9) content was analysed using HPLC (High Performance Liquid Chromatography), Sodium, Potassium, Magnesium content were analysed by AAS technique (Atomic Absorption Spectrophotometer), Carbohydrate and total Energy content by calculation.

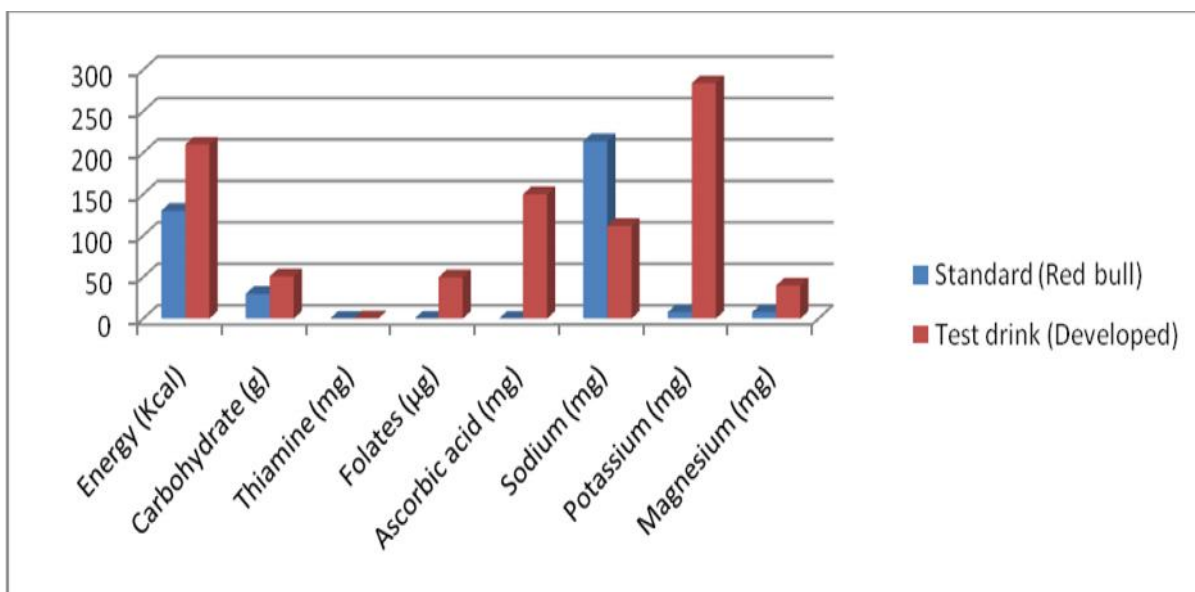
**Results**

Proximate analysis result showed a high increase in each attribute except sodium which showed a slight decrease in developed drink (Table 1).

**Table 1: Proximate analysis results of Standard drink and developed drink.**

Parameters	Standard (Red bull)	Test drink (Developed)
Energy (Kcal)	130	210
Carbohydrate (g)	30	51
Thiamine (mg)	0.1	0.4
Folates (µg)	0	50
Ascorbic acid (mg)	0	150
Sodium (mg)	214	112
Potassium (mg)	7.8	284
Magnesium (mg)	7.8	40

**Fig 1: Graphical representation of proximate analysis results**



**Table 2: Proximate analysis mean scores (t – test)**

Parameters	Standard (Red bull)	Test (Developed drink)	t - value	Significance
Energy	130.3 ± 0.57	210.6 ± 1.1	- 107.7	0.148
Carbohydrate	30.3 ± 0.57	50.6 ± 0.57	-43.1	1.0
Thiamine*	0.1 ± 0.0	0.39 ± 0.01	-44.0	0.016
Folates*	0.0 ± 0.0	50.6 ± 1.1	-76.0	0.016
Ascorbic acid*	0.0 ± 0.0	149.3 ± 1.15	-224.0	0.016
Sodium	214.6 ± 1.1	112.6 ± 1.1	108.1	1.0
Potassium*	7.8 ± .05	284.6 ± 1.1	-414.7	0.019
Magnesium*	7.8 ± .05	40.6 ± 1.1	-49.1	0.019

Table 2 shows the proximate mean analysis scores of standard drink i.e. Red bull and the developed drink. When t – test was applied statistically significant difference was seen in the parameters i.e. Thiamine, Folates, Ascorbic acid, Potassium, Magnesium at  $p < 0.05$ .

## Discussion

Carbohydrate is a critical fuel for majority of activities undertaken by endurance athletes as carbohydrate from blood glucose and muscle glycogen is fuel for contracting muscles (Coyle, E.F. 1995). This study showed a high increase in carbohydrate content in developed drink than Red bull. A study showed that total endurance time at 70%  $VO_2$ max was significantly higher after ingestion of a 5% CHO drink at 15 min intervals during exercise compared to a placebo in endurance trained individuals (Khanna G.L. and Manna I.,2005). Another study claimed that thiamine intake during exercise positively benefits carbohydrate metabolism in a way that will decrease lactate concentration, ammonia concentration, and anti- fatigue by reducing the Rate of Perceived Exertion (Choi S.K. et al., 2013), which was the other nutrient which showed increased amount in developed drink.

Vitamin C is important in biological functions that influence performance; it is thought to indirectly benefit physical performance by enhancing physiologic functions (Dunford M. 2006, Lukaski, H.C. 2004). Developed drink showed high content of Vitamin C compared to standard drink after proximate analysis. According to a study, low vitamin C concentration is linked with decreased physical performance and increased oxidative stress and that vitamin C supplementation decreases oxidative stress and might increase exercise performance (Paschalis V et al. 2016).

## Conclusion

The present study was carried to develop a performance enhancing drink made of 100% natural ingredients, without any additives and preservatives as an alternate of energy drinks and sports drinks available in Indian market which contain high amount of caffeine, taurine, preservatives and other additives which are not good for one's health. The purpose of adding coconut water was to supply electrolytes, pineapple and oranges to supply ascorbic acid which acts as a natural preservative, and lotus seeds for carbohydrate, thiamine and other minerals required by an athlete. Mixing all ingredients in exact proportions enhanced the product's nutrient content and made it more acceptable and a healthy option. This study demonstrates that the developed drink could be a healthy substitute of energy drinks available in Indian market and could confer beneficial performance results for a sportsperson.

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