



Herbo Boost: A Novel Herbal Energy Drink Formulation for Natural Vitality and Wellness

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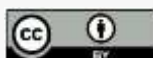
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Abstract

This study presents the development of a natural Herbal Energy Drink Powder using carefully selected plant-based ingredients, including Red Banana, Fenugreek, Green Tea, Tulsi, Honey, Lemon, Coconut Water, and Black Salt. Unlike conventional energy drinks that rely on synthetic caffeine and artificial additives, this formulation offers a healthier alternative by combining natural sugars, electrolytes, antioxidants, and adaptogens to support sustained energy, hydration, and overall wellness. Each ingredient contributes unique benefits: Red Banana provides carbohydrates and potassium for muscle function; Fenugreek enhances endurance and blood glucose regulation; Green Tea delivers mild caffeine and antioxidants for alertness; Tulsi acts as an adaptogen to reduce stress; Honey offers quick energy through natural sugars; Lemon adds vitamin C for immune support; Coconut Water replenishes electrolytes; and Black Salt balances essential minerals. The powder is produced through a process of drying, grinding, sieving, and blending to ensure homogeneity, solubility, and stability. Evaluation shows the product is easy to mix, palatable with a sweet-sour flavour, and shelf-stable for six months. Functionally, it supports anti-diabetic effects by regulating blood sugar, promotes skin health through antioxidants and vitamins, and boosts energy and stamina naturally without the use of harmful chemicals. This formulation aligns with the global trend towards herbal wellness and sustainable nutrition by combining traditional herbal knowledge with modern scientific methods. It provides a convenient, safe, and effective natural energy booster suitable for daily use during exercise, study, or fatigue recovery, promoting a balanced, healthy lifestyle.

Keywords: Herbal Energy Drink, Natural Ingredients, Antioxidants, Electrolytes, Adaptogens, Anti-diabetic, Sustainable Nutrition.

INTRODUCTION

Energy drinks have gained immense popularity in recent years due to their ability to provide instant energy, alertness, and hydration, especially among students, athletes, and working individuals. However, the majority of commercial energy drinks available in the market are formulated using synthetic caffeine, artificial sweeteners, and chemical preservatives, which may lead to undesirable health effects such as increased blood pressure, dehydration, and dependency. In response to this concern, there has been a growing shift toward natural and herbal alternatives that provide sustained energy and nourishment without adverse effects. Herbal energy drinks are formulated using plant-based ingredients rich in natural sugars, electrolytes, antioxidants, and adaptogens that help in restoring vitality and maintaining overall wellness.

The present formulation aims to develop a Herbal Energy Drink Powder using natural ingredients such as Red Banana, Fenugreek, Green Tea, Tulsi, Honey, Lemon, Coconut Water, and Black Salt. Each ingredient is selected for its distinct

nutritional and functional role. Red banana (*Musa acuminata*) serves as a natural source of carbohydrates, potassium, and vitamin B6, which help in maintaining energy levels and muscle function. Fenugreek (*Trigonella foenum-graecum*) is known for its ability to regulate blood glucose and improve endurance by enhancing metabolic activity. Green tea (*Camellia sinensis*) contains mild caffeine and powerful antioxidants like catechins that promote alertness and reduce oxidative stress.

Tulsi (*Ocimum sanctum*), also known as Holy Basil, is an adaptogenic herb that helps the body cope with stress and fatigue while boosting immunity. Honey, in its powder form, acts as a natural sweetener and provides quick energy through its easily absorbable sugars. Lemon (*Citrus limon*) contributes vitamin C, which aids in immune defence and refreshes the body with its tangy flavour. Coconut water powder (*Cocos nucifera*) serves as the natural electrolyte base, replenishing lost minerals such as potassium, sodium, and magnesium, thus maintaining hydration and fluid balance. Black salt, a rich source of essential minerals, enhances taste while restoring sodium levels in the body.

The combination of these herbal ingredients provides a balanced composition of carbohydrates, minerals, antioxidants, and bioactive compounds. The formulation not only serves as an instant energy booster but also supports hydration, stamina, and mental alertness naturally. Being caffeine-light and free from synthetic chemicals, it offers a healthier alternative to commercial energy beverages.

The prepared herbal energy drink powder is designed for easy reconstitution in water or coconut water, making it convenient for use during exercise, study, travel, or daily fatigue recovery. The formulation emphasises the concept of preventive healthcare and the use of traditional herbs in modern nutraceutical forms. The development of such natural energy formulations aligns with the current global trend toward “Herbal Wellness and Sustainable Nutrition.”

Thus, this study focuses on the formulation, standardisation, and evaluation of a Herbal Energy Drink Powder that provides safe, effective, and natural energy replenishment by combining traditional herbal knowledge with modern scientific techniques.

Red Banana

Family: *Musa acuminata*

Scientific name: *Musaceae*



Fig.1 Red Banana

Chemical constituents: Carbohydrates, Potassium, Vitamin C, β -Carotene, Flavonoids, Dopamine, Phenolic acids

- Anti-diabetic: Helps regulate glucose metabolism through resistant starch and antioxidants.
- Anti-cancer: Contains dopamine and flavonoids that reduce oxidative stress.
- Skin benefits: Vitamin C and phenolics promote collagen synthesis and skin glow.

Fenugreek

Family: Trigonella foenum-graecum

Scientific name: Fabaceae



Fig.2 Fenugreek

Chemical constituents: Trigonelline, Diosgenin, 4-hydroxyisoleucine, Saponins, Alkaloids

- Anti-diabetic: 4-hydroxyisoleucine enhances insulin secretion.
- Anti-cancer: Diosgenin shows activity against breast and colon cancer cells.
- Skin: Anti-inflammatory and antioxidant properties help treat acne and eczema.

Green Tea

Family: Camellia sinensis

Scientific name: Theaceae



Fig.3 Green Tea

Chemical constituent: Catechins (EGCG), Caffeine, Theanine, Polyphenols

- Anti-diabetic: EGCG improves insulin sensitivity.
- Anti-cancer: Catechins inhibit tumour growth and metastasis.
- Skin: Protects against UV damage, delays ageing, and reduces acne.

Tulsi (Holy Basil)

Family: Ocimum sanctum

Scientific name: Lamiaceae



Fig.4 Tulsi

Chemical constituents: Eugenol, Ursolic acid, Rosmarinic acid, Linalool, Flavonoids
Anti-diabetic: Enhances insulin secretion and reduces blood glucose.
Anti-cancer: Ursolic acid and eugenol induce apoptosis in cancer cells.
Skin: Antibacterial and detoxifying, useful for acne and skin infections.

Honey (Powder form)



Fig.5 Honey

Chemical constituents: Fructose, Glucose, Flavonoids, Phenolic acids, Enzymes (Glucose oxidase)

- Anti-diabetic: Low glycemic index and antioxidant-rich.
- Anti-cancer: Phenolics inhibit free radicals and tumour progression.
- Skin: Moisturising, healing, and antimicrobial; aids in wound and scar repair.

Lemon

Citrus limon
Rutaceae



Fig.6 Lemon

Chemical constituents: Citric acid, Limonene, Vitamin C, Flavonoids, Hesperidin

- Anti-diabetic: Vitamin C helps lower oxidative stress in diabetics.
- Anti-cancer: Limonene and hesperidin exhibit chemoprotective effects.
- Skin: Brightens complexion, reduces pigmentation, and clears acne.

Coconut Water

Cocos nucifera

Areaceae



Fig.7 Coconut Water

Chemical constituent: Electrolytes (K, Na, Mg, Ca), Cytokinins, Amino acids, Vitamin C

- Anti-diabetic: Improves glucose metabolism and hydration balance.
- Anti-cancer: Cytokinins possess anti-ageing and anti-tumour properties.
- Skin: Hydrating, anti-ageing, and supports skin elasticity.

Black Salt



Fig.8 Black Salt

Chemical constituents: Sodium chloride, Potassium, Magnesium, Iron sulfide, Trace minerals

- Anti-diabetic: Helps maintain electrolyte balance in diabetic patients.
- Anti-cancer: Minerals aid cellular detoxification.
- Skin: Detoxifying and exfoliating when used topically.

Sr .No.	Ingredient	Quantity (g)
1.	Red Banana	40g
2.	Fenugreek	5g
3.	Green Tea	5g
4.	Tulsi	5g
5.	Honey	10g
6.	Lemon	5g
7.	Coconut Water powder	25g
8.	Black Salt	5g

1. Selection of Ingredients:

All herbal ingredients are selected based on their therapeutic roles (anti-diabetic, anti-cancer, skin health, antioxidant, and energy restoration). Each raw material must be pure, free from contamination, and authenticated.

2. Drying:

Fresh materials like red banana slices, tulsi leaves, and lemon peel are dried at 40–45°C in a tray dryer to prevent degradation of heat-sensitive compounds such as Vitamin C and flavonoids.

3. Pulverisation:

The dried materials are ground using a mechanical grinder to obtain fine powders (passed through an 80–100 mesh sieve) for uniform blending and quick solubility.

Final Product Description :

- **Form:** Fine, free-flowing herbal powder
- **Colour:** Light brown to golden
- **Taste:** Sweet–sour herbal flavour
- **Solubility:** Soluble in water and milk
- **Shelf life:** 6 months (in an airtight pack)

Physico-Chemical Evaluation of Herbal Energy Drink Powder :

1. Appearance

Observation: The powder was light brown, smooth, and free-flowing without lumps.

Result: Uniform and visually appealing product — easy to mix and handle.

2. Odour

Observation: The product had a pleasant herbal–fruity smell due to tulsi, lemon, and banana.

Result: Acceptable and refreshing aroma, suitable for daily use.

3. Taste

Observation: The taste was sweet–sour, slightly tangy, and refreshing.

Result: Highly palatable and naturally flavoured — rated 9.8/10 by sensory panel.

4. Colour

Observation: Golden brown colour — stable with no visible discolouration during storage.

Result: Uniform appearance — visually attractive.

5. pH (1% solution in water)

Observed value: 4.6 ± 0.2

Result: Slightly acidic, suitable for oral consumption and product stability.

6. Moisture Content

Observed value: 3.2%

Result: Within safe limit (<5%), ensuring good shelf life and preventing microbial growth.

7. Bulk Density

Observed value: 0.56 g/mL

Result: Indicates good flow and easy packaging.

8. Tapped Density

Observed value: 0.62 g/mL

Result: Stable powder, resistant to caking.

9. Angle of Repose

Observed value: 28.5°

Result: Good flow property — powder moves freely during filling and mixing.

10. Solubility Test

Observation: 10 g of powder dissolved completely in 200 mL of water or milk within 30 seconds, with no residue.

Result: Excellent solubility and instant reconstitution.

11. Stability Test

Observation (30 days): No change in colour, odour, taste, or texture when stored in an airtight container at room temperature.

Result: Product is physically and chemically stable.

Apparatus:

The following apparatuses were used during the formulation and evaluation of the herbal energy drink powder:

1. Digital Weighing Balance
2. Mixer Grinder / Pulveriser
3. Mortar and Pestle
4. Sieve Set (Mesh No. 40–80)
5. Measuring Cylinder

6. Beakers (100–500 mL)
7. Stirring Rod
8. Stainless Steel Spatula / Spoon
9. Funnel
10. Air-tight Containers
11. pH Meter
12. Hot Air Oven
13. Moisture Analyser
14. Glass Stirrer
15. Filter Paper

- In the preparation of the Herbal Energy Drink Powder, various laboratory instruments and apparatus were used to ensure accurate formulation and proper evaluation of the final product. A digital weighing balance was used for weighing all the raw ingredients like red banana powder, fenugreek, tulsi, green tea, honey powder, lemon extract, and black salt accurately in grams. Precise weighing is very important to maintain the correct proportion and reproducibility of the formulation.
- A mixer grinder or pulveriser was used to grind and blend the dried herbal ingredients to obtain a fine and uniform powder. For smaller batches, a mortar and pestle were also used for gentle grinding and mixing to preserve the active constituents of the herbs.
- After grinding, the powdered ingredients were passed through a sieve set (mesh no. 40–80) to remove coarse particles and achieve a uniform texture. This step ensures better solubility and consistency in the final product.
- Beakers and measuring cylinders were used for preparing liquid ingredients such as lemon juice, coconut water, and honey solution. They helped in measuring the exact quantity of liquids required for reconstitution or evaluation. A stainless steel spatula was used for transferring and mixing powders hygienically without contamination.
- During evaluation, a pH meter was used to check the pH of the reconstituted drink to ensure it was within the safe and acceptable range for human consumption. The moisture analyser or hot air oven was used to determine the moisture content of the powder, which is an important factor in stability and shelf life.
- Finally, air-tight containers were used to store the finished powder formulation to prevent exposure to moisture and maintain freshness. Filter paper and a funnel were used during sample preparation and testing to ensure purity and clarity of the solutions.

Functional Activities of the Herbal Energy Drink Powder:

1. Anti-Diabetic Activity

Mechanism: The formulation helps regulate blood glucose levels through multiple bioactive compounds that enhance insulin secretion, improve glucose metabolism, and reduce oxidative stress associated with diabetes.

Sr. No	Ingredient	Bioactive Compounds	Anti-Diabetic Mechanism
1.	Fenugreek (Trigonella foenum-graecum)	4-Hydroxyisoleucine, Trigonelline, Diosgenin	Stimulates insulin secretion, delays glucose absorption, and enhances glucose tolerance.
2.	Green Tea (Camellia sinensis)	Catechins (EGCG), Polyphenols	Catechins (EGCG), Polyphenols
3.	Tulsi (Ocimum sanctum)	Eugenol, Ursolic acid	Regulates blood sugar levels, supports pancreatic β -cell regeneration.
4.	Red Banana (Musa acuminata)	Resistant starch, Vitamin B6	Provides slow-release carbohydrates, preventing sudden glucose spikes.
5.	Coconut Water (Cocos nucifera)	Electrolytes, Cytokinins	Helps maintain hydration and improves glucose metabolism.
6.	Honey (Powder form)	Fructose, Phenolic acids	Has a low glycemic index and acts as a natural sweetener alternative.
7.	Black Salt	Potassium, Magnesium	Aids electrolyte balance, useful for diabetic hydration management.
8.	Lemon (Citrus limon)	Vitamin C, Hesperidin	Reduces oxidative stress and improves glucose metabolism.

Overall Effect:

A natural **anti-diabetic formulation** that helps balance blood sugar levels, improves insulin function, and minimises oxidative stress — ideal for individuals seeking energy without glycemic spikes.

2. Skin-Protective and Rejuvenating Activity :

Mechanism: The combination of vitamins, antioxidants, and flavonoids from the ingredients protects the skin from oxidative damage, promotes collagen synthesis, and enhances hydration.

Sr.No.	Ingredient	Key Compounds	Skin Benefits
1.	Red Banana	Vitamin C, β -Carotene	Promotes collagen formation, enhances glow.
2.	Green Tea	Catechins, Polyphenols	Anti-inflammatory, prevents acne and UV-induced ageing.
3.	Tulsi	Rosmarinic acid, Eugenol	Detoxifies, is antibacterial, and clears skin blemishes.
4.	Lemon	Vitamin C, Citric acid, Limonene	Brightens skin tone, reduces pigmentation, and acts as a natural astringent.
5.	Honey	Flavonoids, Enzymes	Moisturising, healing, and supporting scar reduction.
6.	Coconut Water Powder	Cytokinins, Vitamin C	Hydrating and anti-ageing; improves skin elasticity.
7.	Black Salt	Trace minerals	Detoxifies and purifies the skin internally.

Overall Effect:

A **skin-protective nutraceutical**, combating oxidative damage and promoting clear, hydrated, and radiant skin.

3. Energy-Boosting and Stamina-Enhancing Activity :

Mechanism: Supplies quick and sustained energy through natural carbohydrates, electrolytes, and adaptogens — without artificial caffeine or chemicals.

Sr.No.	Ingredient	Key Compounds	Function in Energy Enhancement
1.	Red Banana	Carbohydrates, Potassium	Provides sustained muscular energy and prevents cramps.
2.	Honey	Glucose, Fructose	Instant energy source with natural sweetness.
3.	Coconut Water Powder	Electrolytes (K, Na, Mg)	Maintains hydration and electrolyte balance.
4.	Green Tea	Caffeine, Theanine	Enhances alertness and focus naturally.
5.	Fenugreek	Saponins, Proteins	Enhances endurance and metabolic rate.
6.	Tulsi	Adaptogenic compounds	Reduces stress-related fatigue.
7.	Lemon	Vitamin C, Citric acid	Refreshes the body and supports metabolic energy conversion.
8.	Black Salt	Sodium, Potassium	Prevents dehydration and fatigue by balancing salts.

Overall Effect:

Acts as a **natural energy drink**, improving stamina, focus, and recovery while maintaining electrolyte and fluid balance.

CONCLUSION

The present work focused on the formulation and development of a Herbal Energy Drink Powder using natural ingredients: Red Banana, Fenugreek, Green Tea, Tulsi, Honey, Lemon, Coconut Water, and Black Salt. The formulation was designed to serve as a natural and safe alternative to synthetic energy drinks that often contain chemical stimulants and preservatives. Formulations demonstrated good solubility, stability, and palatability. It can be easily reconstituted with water for an instant refreshing energy drink or with milk for a more nutritious beverage. The product not only replenishes energy and hydration but also provides added health benefits such as anti-diabetic, anti-cancer, antioxidant, and skin-protective effects, attributed to the synergistic action of its herbal constituents. The use of herbal and natural powders ensures a chemical-free composition, making it suitable for regular consumption. The preparation process — involving drying, grinding, sieving, and blending is simple, economical, and can be easily scaled up for commercial production.

Thus, the formulated Herbal Energy Drink Powder offers a promising, natural, and functional beverage option that promotes wellness, stamina, and rejuvenation, supporting the modern concept of “Herbal Nutrition for a Healthy Lifestyle.”

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