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A Review On Devolopment Of Functional Cookies Enrich With Flax Seeds And Moringa Powder

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ABSTRACT

Because of their proactive role in promoting health and preventing disease, functional foods have gained s ignificant international attention.

Cookies are among some of the most popular baked food that have potentially high ability to transfer thera peutic substances successfully into the human body.

This research critically assesses functional cookies that could be enhanced with powdered flaxseed and m oringa leaves, which are rich sources of nutrients and bioactive substances.Moringa gives proteins, vitami ns, minerals, and antioxidants; flaxseed delivers omega-3 fatty acids, lignans, and fiber—
everything required for growth and survival.

According to the nutritional studies included in this review, using these powders in place of some of the w heat flour improves functional qualities, adds antioxidant benefits, and raises nutritional values while main taining tolerably high levels of sensory qualities! As a result, these enriched cookies may become in-demand goods on the market as extremely wholesome and healthful snacks.

INTRODUCTION

Among bakery items, cookies are particularly popular because of their taste, shelf life, and adaptability. However, classic cookies frequently lack important nutrients and are high in processed fats and carbohydr ates. (Singh et al., 2016).

The nutritional content of cookies is increased by adding natural functional ingredients like flaxseed and p owdered moringa leaf. Omega-
3 fatty acids, lignans, dietary fiber, and proteins are all abundant in flaxseed.

Because it contains vital amino acids and is rich in vitamins, minerals, and antioxidants, Moringa oleifera has earned the nickname "wonder tree."

Flaxseed as a Useful Substance

According to Goyal et al. (2014), flaxseed is a good source of lignans, soluble dietary fiber, and alpha-linolenic acid (ALA). When flaxseed flour is fortified, its protein and omega-3 fatty acid levels are increased, and it may also have antioxidant and cholesterol-lowering qualities. Additionally, flaxseed has been demonstrated to improve the properties of dough handling and give baked goods a nutty flavor.(Goyal et al., 2014).

M. oleifera as a Supplement to Nutrients

According to Leone et al. (2015), moringa leaves are a nutrient-dense treasure since they are high in polyphenolic compounds and include iron, calcium, potassium, and vitamins A, C, and E. Additionally, moringa has demonstrated antidiabetic, anti-inflammatory, and antioxidant properties. Although adding moringa leaf powder to baked goods encourages vitamin fortification, the concentration may have some effect on color and flavor.(Kajla, Sharma, & Sood, 2015).

Product Development for Functional Bakeries:

Additional research on functional bakery products has demonstrated that using plant powders (such as flaxseed, moringa, amaranth, or spirulina) in place of wheat flour improves the products' nutritional content and antioxidant capacity [5-7]. But sensory acceptability needs to be maintained. The best enrichment doses (5–15% flaxseed + 1–5% moringa powder) demonstrated the finest balance between health benefits and palatability.

Quality attributes & analytical methods

Key parameters to measure:

Physicochemical

- Moisture content (AOAC), water activity (aw).
- Spread ratio, thickness, hardness (texture analyzer — three-point bend or puncture), and color (L*ab*).
- Fatty acid profile (GC-FID) to quantify ALA retention pre- and post-baking. (Calculate % ALA per 100 g cookie.)
- Proximate analysis: protein, fat, ash, crude fibre, total carbohydrates.
- Total phenolic content (Folin–Ciocalteu) and antioxidant activity (DPPH/ABTS/FRAP assays) — to show functional improvements.
- Mineral analysis (ICP-OES) for Ca, Fe, Zn to demonstrate moringa contribution.

Microbiological

- Standard plate counts, yeast/mold counts, and pathogen screening as per food safety norms.

Sensory

- 9-point hedonic scale (appearance, color, aroma, texture, taste, overall acceptability). Trained panel can perform descriptive profiling to quantify greenness or bitterness.
- Purchase intent and willingness-to-pay survey optional.

Shelf-life

- Accelerated storage (40°C) and real-time at ambient (25°C) for moisture migration, sensory, rancidity (peroxide value, TBARS), and microbial growth. Package with modified atmosphere or antioxidants as needed.

Statistical

- Use randomized complete block design (RCBD) for sensory; ANOVA and post hoc tests (Tukey) for analytical data; shelf-life modeling (Weibull or Arrhenius if temperature accelerated).

6. Nutritional & functional claims — bioavailability issues

- Flax ALA is largely in the oil fraction; milling increases accessibility. Baking may oxidize ALA — quantify retention and consider using defatted flax + added stabilized flax oil microencapsulated if high omega-3 claim is needed.
- Moringa micronutrients (iron, calcium) may have limited bioavailability due to phytates — combining with vitamin C (from added fruit bits or fortification) can increase iron uptake. Consider in vitro digestion assays (Caco-2 or simulated gastro) to estimate bioaccessibility.

7. Sensory balancing & masking strategies

- Masking moringa bitterness: sugar, vanilla, cocoa, or nut/seed inclusions (crushed almonds). Roasting moringa lightly or encapsulation with maltodextrin can reduce off-notes.
- Texture: reduce flax particle size to avoid grittiness; or use whole flax as topping for mouthfeel contrast.

8. Safety, regulatory & labeling

- Source moringa from tested suppliers; test for heavy metals (Pb, Cd, As) and pesticide residues.
- Allergen labeling: flax and moringa may cause reactions in sensitive individuals — check local labeling laws.
- Nutrition & health claims must conform to local food regulations (e.g., “source of omega-3” requires minimum ALA per serving as defined by regulators). Calculate serving size composition to justify claims.

9. Challenges & research gaps

- Oxidative stability of omega-3s during baking and shelf life — need for antioxidant strategies or encapsulation.
- Consumer acceptance of green/savory notes from moringa at higher inclusion levels.
- Standardized methods for measuring bioaccessibility of micronutrients in the finished product.
- Techno-economic analysis for scaled production and cost per functional serving.

DISCUSSION

Cookies improved with flaxseed and moringa powder undergo formulation improvement, nutritional analy sis, and sensory evaluation.
Flaxseed and moringa leaf powders are frequently used in varying amounts to partially substituted wheat f lour in cookie recipes.

improvement in nutrition.

Moringa increases the amount of vitamins and minerals in the enhanced cookies, while flaxseed adds more protein, fat, and nutritional fiber. The increased antioxidant capacity of the cookies is due to the phenolic chemicals in moringa and the lignans in flaxseed.

Features of the senses

At lesser inclusion levels (10% flaxseed and 2% moringa), cookies retain their good texture, flavor, and color. Increased moringa concentrations could provide a greenish tint and a little bitter aftertaste. Optimizing the senses is therefore crucial for gaining the approval of customers.

Benefits to Health

These two components combine to:

improvement of heart health (omega-3 fatty acids obtained from flaxseed).

antioxidant and anti-inflammatory qualities (moringa polyphenols).

enhanced dietary fiber-induced digestion and cholesterol regulation.

Immunity is boosted by micronutrient fortification.

Prospect market and Research Opportunities; functional cookies have a lot of potential in places where consumers are concerned about their health. Future studies can focus on nutritional bioavailability, storage stability, and the feasibility of large-scale production. The natural bitterness of moringa can also be disguised by exploring flavor-enhancing technique

CONCLUSION

The development of functional cookies boosted with flaxseed and moringa powder is a promising trend in the functional food sector. The nutritional and antioxidant profiles of cookies are significantly enhanced by the addition of these natural ingredients, and their acceptable sensory aspects are kept at their best. Because they include essential components including vitamins, minerals, omega-3 fatty acids, and antioxidants, these cookies are a healthier alternative to typical munchies. With continued research and product development, these functional cookies can be brought to the commercial market, satisfying both nutritional deficiencies and consumer desire for healthy meals.

REFERENCES

Goyal, A., Sihag, M., Gill, S., Upadhyay, N., and Sharma, V. (2014).
Flax and flaxseed oil: A modern functional food and traditional medicine.51(9), 1633-
1653, Food Science and Technology Journal.
Battezzati, A., Schiraldi, A., Aristil, J., Leone, A., Spada, A., & Bertoli, S. (2015).
An introduction to the pharmacology, ethnopharmacology, phytochemistry, genetics, and leaf cultivation o f Moringa oleifera. International Journal of Molecular Sciences, 16(6), 12791–12835.