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BLENDING FOR BETTER HEALTH: CREATING NUTRITIONALLY BALANCED EDIBLE OILS

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ABSTRACT

Most vegetable oils, nutritionally valuable, but not ideal in their original forms due to imbalanced fatty acid compositions. Considering this limitation, a new approach was explored that involved the blending of palm oil with sunflower and groundnut oils to achieve a healthier fat profile. The goal was to create blends that align with the World Health Organization's (WHO) recommended ratio of saturated (SFA), monounsaturated (MUFA), and polyunsaturated fatty acids (PUFA), which is 1:1.3:1. The resulting oil blends not only matched this target but also brought together antioxidant-rich palm oil with the heart-healthy traits of sunflower and groundnut oil. This blending strategy offers a promising solution for both everyday cooking and nutritional interventions aimed at promoting public health.

KEYWORDS: Cardiovascular nutrition, Edible oil blending, Fatty acid balance

INTRODUCTION: A NEW WAY OF THINKING ABOUT OILS

In Indian households, oil is not merely just a cooking medium, it's central to taste, tradition, and nourishment. Yet behind the scenes, scientists and health experts have long been grappling with a fundamental challenge: no single oil offers the perfect nutritional balance. Vegetable oils like sunflower, groundnut, and palm oil each have their own benefits. Sunflower oil is high in polyunsaturated fats, groundnut oil is rich in monounsaturated fats, and palm oil brings oxidative stability and natural antioxidants to the table. However, none of them meet the ideal fatty acid ratio recommended for long-term cardiovascular and metabolic health. So, what if we could create an oil that offers the best of all worlds? That question led to an innovative yet simple idea: blending oils to achieve balance.

UNDERSTANDING THE IDEAL OIL

According to WHO (2008), a healthy oil should contain a fatty acid ratio of SFA: MUFA: PUFA = 1:1.3:1. Additionally, the balance between omega-6 (linoleic acid) and omega-3 (linolenic acid) fatty acids is crucial to prevent lifestyle disorders such as cardiovascular disease, obesity, and diabetes. No

single oil naturally adheres to all these nutritional criteria. Palm oil, although often debated for its saturated fat content, primarily contains palmitic acid, which is less cholesterol-raising compared to lauric or myristic acids. It also offers a high level of carotenoids (500–700 ppm) and tocotrienols, which provide antioxidant benefits and support cardiovascular and liver health. Its semi-solid nature also makes it suitable for baked and fried goods. Sunflower oil, favoured for its light taste and long shelf life, contains about 60% polyunsaturated fats, making it excellent for heart health. Groundnut oil, widely used in Indian cooking, contributes a rich amount of monounsaturated fats (around 46%) and offers oxidative stability during frying.

Table 1. Nutritional profile of palm, sunflower and ground oils

Oil	Carotene (mg/kg)	Tocopherol (mg/kg)	SFA (%)	MUFA (%)	PUFA (%)	Cost as of 2023 (Rs)
Palm oil	500-700	11.5-37	49.3	37	9.3	95
Groundnut oil	0-8	149-191	16.9	46.2	32	196
Sunflower oil	0-8	41-72	10.3	19.5	65.7	115

CRAFTING THE RIGHT BLENDS

The journey of formulation began with experimental blending of palm oil with sunflower and groundnut oils in various ratios to match WHO guidelines. Two combinations stood out:

- A 60:40 blend of palm oil and sunflower oil resulted in a fatty acid ratio of 1:1.39:1.03 (SFA: MUFA: PUFA), with 23.32% palmitic, 42.91% oleic, and 26.88% linoleic acid, very close to the ideal profile (Prathap *et al.*, 2025).
- A 50:50 blend of palm oil and groundnut oil offered a profile of 31.08% saturated, 43.86% monounsaturated, and 22.36% polyunsaturated fats, resulting in a ratio of 1:1.6:1.01, again aligning well with WHO's recommendation (Prathap *et al.*, 2025).

These blends weren't just nutritionally sound, they also held up under cooking conditions, making them practical for household and commercial use.

BROADER HEALTH AND ECONOMIC RELEVANCE

Such scientifically developed oil blends can play a key role in dietary interventions. The presence of beta-carotene in palm oil makes these blends potentially useful for public health programs, especially those aimed at preventing vitamin A deficiency in children. In terms of cost, palm oil remains one of the most affordable edible oils, making the blend an economically viable option as well. Moreover, these blends can be incorporated into a variety of processed foods from frying oils and margarine to bakery

shortenings and ready-to-eat snacks, bringing better health outcomes without sacrificing flavour or texture.

CONCLUSION

This exploration into oil blending reveals a practical, science-backed solution to a longstanding nutritional challenge. By combining palm oil with sunflower and groundnut oils, a balanced fatty acid profile close to the WHO's ideal ratio was achieved. Among all tested combinations, the 60:40 blend of palm and sunflower oil emerged as the most nutritionally balanced, cost-effective, and cooking-friendly option. This oil blend not only supports heart health and antioxidant defence, but also holds potential for addressing micronutrient deficiencies in vulnerable populations. It serves as a reminder that thoughtful food innovation, sometimes as simple as blending two oils, can lead to powerful solutions for healthier lives.

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