



LEAD AMERICAN UNIVERSITY OF BEIRUT INVENTOR

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BACKGROUND AND UNMET NEED

Micronutrient deficiencies are a global danger, particularly affecting women of childbearing age. This group faces increased nutritional requirements prior to, during, and post pregnancy; deficiencies in folate, Vitamin B12, and Vitamin D pose significant risks both to mother and child.¹

Vitamin B-12 is crucial for maintaining normal brain function in women, especially before, during, and after pregnancy. Its deficiency is associated with pernicious anemia and an increased risk of stomach cancer. The insufficiency in women of all ages can lead to various nervous system disorders, including chronic tingling, balance issues, and cognitive impairments. Inadequate intake during pregnancy has been found to cause megaloblastic anemia and creates the risk of neural tube defects, or the likelihood of birth abnormalities affecting the fetus's brain and spinal cord. Further, as it is naturally provided through eating animal meat, vegan and vegetarian populations are at high risk of B-12 deficiency.

Surveys report the prevalence of folate deficiency was >40% in most countries, where the majority of women had suboptimal folate status indicating increased risk of neural tube defect affected pregnancy.² Similarly, the occurrence of worldwide Vitamin B12 deficiency varies between 2.5% to 60%; the variation is affected by age group, gender, and ethnicity.³

Addressing these deficiencies through nutritional interventions is essential to mitigate these risks and promote overall health.⁴

OPPORTUNITY

Dr. Obeid's lab has developed a lipstick product that directly provides essential nutrients, including folate, Vitamin B12, and Vitamin D, to women. Positioned as an over-the-counter supplement, this product is designed to seamlessly incorporate micronutrient consumption into the daily routines of women, fostering a proactive approach towards enhancing the well-being of both themselves and possible offspring.

The proprietary blend may be integrated into numerous lip care and cosmetic products, such as lipsticks, balms, and glosses. This technology offers a transformative era where the act of applying lip care products transcends cosmetics, becoming a conscientious step towards

¹ Stevens, G. A., Beal, T., Mbuya, M., Luo, H., Neufeld, L. M., Addo, O. Y., ... & Young, M. (2022). Micronutrient deficiencies among preschool-aged children and women of reproductive age worldwide: a pooled analysis of individual-level data from population-representative surveys. *The Lancet. Global health*, 10(11), e1590-e1599.

² Sisay, B. G., Tamirat, H., Sandalinas, F., Joy, E. J., Zerfu, D., Belay, A., Mlambo, L., Lark, M., Ander, E. L., & Gashu, D. (2022). Folate deficiency is spatially dependent and associated with local farming systems among women in Ethiopia. *Current Developments in Nutrition*, 6(5).

³ Basalamah, M. A., Ibrahim, M. O., Qutob, M. S., Jazar, A. S., Bakr, E.-S. H., Alazzeah, A. Y., Al-Slaihah, A. H., & Azzeh, F. S. (2023). Vitamin B12 status among asymptomatic young adult females and its association with some anthropometric and biochemical parameters: A cross-sectional study from Makkah (cobalamin deficiency in young adult females). *Medicine*, 102(44).

⁴ Mayo Foundation for Medical Education and Research. (n.d.). Vitamin deficiency anemia. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/Vitamin-deficiency-anemia/symptoms-causes/syc-20355025>

nourishing and fortifying the body. Because the delivery vehicle of micronutrients is a product used widely by women, a higher compliance rate is expected among women who regularly apply lip care items. This innovation stands to usher in a new standard of health and beauty.

The lip care product market size has grown strongly in recent years. It is expected to grow from \$2.33 billion in 2023 to \$2.5 billion in 2024 at a compound annual growth rate (CAGR) of 7.3%. This exceptional growth can be attributed to anti-aging products, beauty and cosmetics trends, natural and organic product demand, seasonal variations and weather conditions, influence of fashion and trends. It is expected to grow to \$3.34 billion in 2028 at a compound annual growth rate (CAGR) of 7.5%.

UNIQUE ATTRIBUTES

- Improves the nutritional status of vegetarian and vegan women, as Vitamin B12 is present only in animal products.
- Introduces a novel concept for nutrient delivery extending beyond traditional lip care, thereby potentially enhancing overall nutritional well-being.
- Ensures high compliance through seamless incorporation into a product that is part of daily use for many individuals.
- Provides a nutritional delivery method that is customized, enabling accurate dosing and absorption catered to personal requirements and preferences.
- Encourages women to get their supplementations through lipstick instead of taking pills and medications.

COMMERCIAL APPLICATIONS

This technology is designed to enhance the nutritional well-being of women of childbearing age. It may be incorporated into various products, including but not limited to lipstick, lip balm, lip glosses, etc.

STAGE OF DEVELOPMENT

Technology Readiness Level 5: Technology Validated in Relevant Environment.

INTELLECTUAL PROPERTY

Provisional Patent Application filed January, 2024.

COLLABORATION OPPORTUNITY

Seeking licensee for commercialization or collaboration to advance development.

INSTITUTIONAL CONTACT

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