



Dietary Supplementation with Nitrates during Pregnancy

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INTRODUCTION

Due to its high amount of inorganic nitrate (NO_3) and ability to boost the bioavailability of nitric oxide, a wide range of beetroot products has become a popular supplement this year (NO). Beetroot supplementation has traditionally been thought of as a multi-targeted supplemental treatment for cardiometabolic disorders such as hypertension, vascular dysfunction, atherosclerosis, cardiorespiratory disorders, and diabetes.

The L-arginine-NO synthase pathway, as well as alternate enzymatic and non-enzymatic nitrate-nitrite-NO pathways, creates NO, an important physiological signalling chemical. Inorganic NO_3 is now highlighted as a potential NO precursor that can improve glucose metabolism, vascular homeostasis, insulin signalling pathways, metabolic disorders, and diabetes complications, owing to recent changes in historical concepts on hazardous effects of NO_3 and some documents regarding negative associations between dietary intakes of NO_3 and metabolic diseases [1,2].

DESCRIPTION

NO is important in several physiological aspects of a healthy pregnancy, including early embryonic development, implantation, and placenta perfusion, as well as maternal systemic vasodilation and renal adaption. Physiologically, both endothelium and neuronal NO synthase upregulate maternal NO production throughout pregnancy [3,4]. NO deficiency has been linked to a variety of disorders during pregnancy, including maternal hypertension, preeclampsia, proteinuria, fetoplacental endothelial dysfunction, hemodynamic disturbances, and an imbalance between coagulation and fibrinolysis in the foetal and maternal circulations, all of which

can lead to foetal growth restriction. During the 20-year research effort to improve NO signalling in pregnancy with the goals of vascular function, placental development, and foetal growth, L-arginine and L-citrulline (as NOS enzyme substrates) as well as NO-donors (e.g. glyceryl trinitrate, S-nitrosoglutathione, isosorbide mononitrate) have been suggested as effective, safe, and inexpensive drugs that may contribute to Early pregnancy diseases such as repeated abortions and dysmenorrhea, therapy of premature labour, and other pregnancy illnesses such as hypertension and preeclampsia have all been treated with NO donors or NO substrates.

In the direction of a novel strategy, beetroot juice, a NO_3 -rich dietary supplement, is currently being promoted as a more appealing option with less side effects than current pharmaceuticals. Following some evidence that NO_3 supplementation, when given in the form of beetroot juice, improved maternal hypertension and foetal outcome in a preeclampsia-like animal model, an ongoing clinical trial is currently targeting pregnant women with hypertension for a short-term (week) administration of NO_3 in the form of beetroot juice. There are also several commercial health claims about the beneficial effects of beetroot, recommending it as a super food and unique supplement in pregnant women; these claims primarily include improvement of iron deficiency and anaemia, digestion and constipation, prevention of osteoporosis, decrease blood pressure, metabolism regulation, and immune system enhancement [5].

Due to its high NO_3 level, beetroot supplementation may be associated with a wide range of unexpected maternal and fatal adverse effects. Because of its possible endogenous conversion to N-nitroso compounds (NOC), induction of methemoglobinemia, and mutagenic, teratogenic, and

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carcinogenic qualities, as well as anti-thyroid effects, NO₃ is addressed with caution [6].

CONCLUSION

With the growing public interest and widespread health claims about the benefits of NO₃-rich dietary supplements like beetroot byproducts in pregnant women, urgent pre-clinical and clinical studies are needed to determine whether supplementation with beetroot or other dietary NO₃-rich sources is a safe intervention during pregnancy. For a safe intervention, it will also be necessary to establish maternal eligibilities for NO₃ supplementation, as well as the dose and duration, while taking into account the phases of pregnancy.

CONFLICT OF INTERESTS

No conflict of interest by author.

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