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Is daily consumption of natural cocoa beverage sufficient to end diabetes?

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Type 2 Diabetes Mellitus (T2DM) is a notable chronic condition globally, and causes substantial perturbation of cellular metabolism in affected individuals. The geographical distribution of T2DM is not uniform across the continents; the highest burden is observed in low- and middle-income countries, where prevalence is rising very rapidly due to epidemiological transitions, lifestyle changes, and limited access to treatment services. Up till the 1980s, T2DM was predominantly presented by middle-aged and older adults. However, the incidence has increased in the subsequent years across all spectrum of age groups, including adolescents and young adults (Perng et al., 2023). An individual is diagnosed with T2DM when the body is unable to produce sufficient insulin or resists the cellular effect of the hormone, leading to persistent hyperglycaemia (fasting blood glucose ≥ 126 mg/dL or glycated haemoglobin ≥ 6.5%). Clinical management of T2DM usually relies on a combination of lifestyle modifications and pharmacological therapy.

A study by Dordoye et al. (2026) reports the wound healing potential of natural cocoa in a rat model induced for T2DM using nicotinamide and Streptozotocin. Cocoa (*Theobroma cacao*) contains a wide range of bioactive compounds including polyphenols, methylxanthines and plant sterols. Flavanol (a polyphenol) is a strong antioxidant and also contributes to improving cardiovascular health (Tušek et al., 2024). Theobromine is the principal methylxanthine in cocoa, and functions as an inhibitor of phosphodiesterase and an antagonist for adenosine receptor (Martínez-Pinilla et al., 2015). Flavanols and methylxanthines have been postulated to enhance insulin sensitivity and reduce blood pressure, possibly through cellular mechanisms that promote endothelium-dependent vasodilation in healthy individuals (Grassi et al., 2005). Even though plant sterols have no direct impact on blood glucose levels or insulin resistance, they inhibit cholesterol absorption at the small intestines and can cause reduction in fasting triglycerides thereby contributing to improved cardiovascular health especially in individuals at risk of T2DM (De Smet et al., 2012).

The molecular mechanisms underlying the physiological benefits of cocoa flavanols include enhanced bioavailability of nitric oxide in the body via activation of the nitric oxide synthase located at the endothelium (Heiss et al., 2003). Together with the antioxidant capabilities of these flavanols, degradation of cellular nitric oxide due to oxidative stress is inhibited leading to relaxation of blood vessels and improved blood circulation. Moreover, the bioactive compounds in cocoa can modulate immune response by downregulating leukocyte adhesion and expression of pro-inflammatory genes such as IL-6 and TNF-α leading to improved vascular elasticity and enhanced flow of blood within cellular tissues (Ellinger & Stehle, 2016; Al-Khayri et al., 2022). Collectively, these physiological processes mediated by the bioactive compounds in cocoa are crucial for early stages of wound healing, by recruiting platelets, immune cells and growth factors to the site of injury.

The data reported by Dordoye et al., is consistent with the literature pertaining to the molecular mechanisms underlying bioactivity of the principal compounds in cocoa. Firstly, the authors demonstrated there was at least 4-fold

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increase in fasting blood sugar levels and a significant increase in percentage glycated haemoglobin in the rat model induced for diabetes compared to the control non-diabetic rats, confirming successful induction of the metabolic state associated with the disease condition. Even though ingestion of cocoa by the diabetes-induced rats did not cause a reversal of the hyperglycaemic state, the study demonstrated a significant wound contraction in the diabetic rats model fed with cocoa compared to the diabetic rats that were not fed with cocoa. Moreover, the wound contraction in the diabetic rats fed with cocoa was comparable to non-diabetic control rat, confirming the wound healing potential of the bioactive compounds in cocoa. Finally, the authors showed a higher expression of insulin-like growth factor-1, and inferred its potential role in facilitating wound healing in the diabetic rats fed with cocoa compared to the diabetic rats that were not fed with cocoa.

Ghana and Côte d'Ivoire, both classified as low- and middle-income countries, are the world's leading producers and exporters of cocoa. Consequently, cocoa is regarded as a key economic commodity in these countries, contributing significantly to foreign exchange earnings, employment, and overall economic development. Since a country's greatest assets are the human resource, it is worth reconsidering the value of cocoa produced in these countries beyond economic benefits to include possible ways of integrating healthy beverages or diets emanating from cocoa harvested from the vast farmlands in these countries. We may also have to reconsider advocating and resuscitating indigenous delicacies that are made directly from other foods and vegetables produced by our farmers. The conscious inculcation of these dietary staples into our daily meals will enhance wellbeing and lead to reduction in diabetic cases that are driven by westernized dietary lifestyle. Moreover, maintaining backyards in household for subsistence faming can contribute to improving the state of physical fitness, which is also a notable risk factor for diabetes. Cocoa consumption may not directly reverse hyperglycaemia in T2DM patients, but could contribute to alleviating delayed wound healing in patients presenting with such symptoms.

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