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Bilateral Impact between Dairy Cattle and Global Warming

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Although water vapour is the largest and essential greenhouse gas inclusive of ozone in the stratosphere, the mitigation of anthropogenic six greenhouse gases such as carbon dioxide, methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbons and perfluorocarbons have been established as legally binding commitments in The Kyoto Protocol [1]. Important greenhouse gases attributed to ruminant livestock are methane and nitrous oxide. When the greenhouse effect of carbon dioxide is set to 1, the impact of the greenhouse effect of methane and nitrous oxide is 21-fold and 310-fold higher than carbon dioxide respectively. Rumen fermentation of ruminant livestock like dairy cattle and anaerobic fermentation of organic waste including animal manures are major contributors of methane emission as anthropogenic sources [2]. The total contribution of belching methane derived from rumen fermentation and the manure to global methane emission might be accounted for nearly18-20%. Thus, the development of mitigation methods of rumen methane is the most significant issue in the world ruminant livestock production. Although ionophores as feed additives such as monensin and salinomycin have a potential to abate rumen methane production, the efficacy may still continue in the manure, *i.e.,* uncontrolled antibiotics will be spread over the soil environment [3]. Therefore, manipulators to abate rumen methanogenesis must be safe to the environment, not to mention human and livestock. The prompt increase of atmospheric nitrous oxide since last century is closely related to abrupt expansion of human and animal population after an innovation of Haber-Bosch process. Severe environmental pollutions were caused at the same time though the reactive nitrogen withdrawn from atmosphere as stable paired nitrogen brought about prosperous food production. Anthropogenic increases in these greenhouse gases are not immune to continuous expansion of the chemical nitrogen fertilizer consumption [4]. Accurate assessment of the impact of inorganic and organic nitrogen on greenhouse effect may be useful to make up an inventory and the mitigation strategies.

Recent climate change has amplified a risk to expose dairy cattle to hot environment [5]. In consequence, milk production and reproductive proficiency of dairy cows suffer from heat stress due to their strong stress sensitivity [6]. Heat stress might induce oxidative stress on the animals as an external inducer [7].

To alleviate these stresses on dairy cow the establishment of mitigation strategies of greenhouse gases is an urgent issue.

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