

Biological Evaluation of Different Betaine Sources

Suarez B.J. ^{1*}, **Van der Aa A.** ¹, **Rovers M.** ², **Kampf D.** ², **De Kimpe N.** ³, **Mangelinckx S.** ^{3**} and **Segers L.** ²

1. Excentials B.V., Cordoba, Argentina

2. Orffa International B.V. Werkendam, The Netherlands

3. Ghent University, Department of Sustainable Organic Chemistry and Technology, Faculty of Bioscience Engineering, Gent, Belgium.**Postdoctoral Fellow of the Research Foundation - Flanders (FWO)

Corresponding author: Suarez@excentials.com

Abstract

Betaine is a functional nutrient commonly used as a feed additive in animal nutrition, mainly as methyl donor. In the past betaine was available as betaine anhydrous extracted from sugar beets; nowadays is present in different chemical forms and produced by different methods. Concern was raised regarding the biological properties (bioactivity) of different sources and production methods. Several publications had shown osmoregulatory effects of betaine anhydrous, assisting animals during heat stress. The osmoregulatory properties of betaine hydrochloride were point of discussion. State of the art research was setup in order to evaluate the biological equivalence of different sources (monohydrate & anhydrous betaine produced by extraction vs. hydrochloride & anhydrous betaine, produced by chemical synthesis). Samples were dissolved in a water-hydrochloride solution (pH 2.3= gastric conditions) to mimic gastric passage and analyzed by high-performance liquid chromatography - electrospray ionization mass spectrometric (LC-MS) and direct mass spectrometric (MS) analysis. After gastric passage both molecules remained identical, showing that irrespective of the ionic form and production method (natural extraction vs. chemical synthesis) different sources of betaine gave the same analytical LC-MS and MS results (same m/z retention time pairs); therefore no difference in biological activity should be expected. Further in vivo research (Haldar, 2011) carried out with broilers confirmed in vitro findings and indicated that betaine hydrochloride is also effective as osmoregulator to overcome heat stress in broiler chickens.

Key Words: Betaine, sources, biological equivalences.