

## *Micronutrients TBZC*

Zinc is an important essential trace mineral, needed for virtually all forms of plant and animal life. Basic zinc chloride has attractive fundamental chemical properties for use in food and animal feed applications. It is insoluble in water, non-hygroscopic, unreactive in most foods or feedstuffs, and yet highly bioavailable.

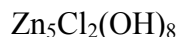
Heritage Technologies, LLC invested three years in research and development on the applicability of basic zinc chloride as a source of zinc in nutrition. An important first step was to develop a robust manufacturing process that would produce material with:

1. A consistent chemical structure
2. Consistent chemical and physical properties, and
3. Particle size suitable for blending as a food or feed additive.

Basic zinc chlorides are normally formed by hydrolysis and precipitation, resulting in an impure, amorphous product, that is difficult to wash. Since they are insoluble in water, crystallization of these salts can only be done from special solvents. Heritage has developed a crystallization process that results in a pure, washed, granular product with good handling and blending properties.

The second product development step involved animal feeding trials and *in vitro* tests on how the salt would behave in use. The enclosures describe several of these studies.

The Micronutrients process produces a crystalline form of the compound represented by the following empirical formula:



This compound is identified as CAS Number 11073-22-6 in its dehydrated form. A similar monohydrate form of the compound (CAS 12167-79-2) is stable at low temperature and/or high humidity and the water is reversibly gained or lost rather easily. In the field of mineralogy, the class of similar chemical compounds is often called zinc hydroxy chloride (hydrate). Our product name, *Micronutrients TBZC* refers to a pure, crystalline form of the specific compound from this class that can be called **Tetrabasic Zinc Chloride**.

The following data compares *Micronutrients TBZC* to reagent grade zinc sulfate heptahydrate and zinc chloride.

	<u><i>TBZC</i></u>	<u>ZnSO<sub>4</sub>·7H<sub>2</sub>O</u>	<u>ZnCl<sub>2</sub></u>
Hygroscopicity <sup>1</sup> (%wt. Gain in 24 Hrs. @90%RH)	4.65%	36.1%	
	126.5%		
Water Solubility (g Zn/l @ 20°C)	0.015	21.9	201

The zinc assay of *TBZC* will range from 58 to 61% depending on the relative amount of the monohydrate form in a particular specimen.

Since the compound is neutral and water insoluble, it has **excellent palatability** and **very low interaction** with other ingredients in a food mixture compared to zinc chloride, zinc sulfate or chelated forms of the metal. It has **high relative bioavailability**, giving results for RBV in the range of 102 to 107% that of analytical grade zinc sulfate heptahydrate. Testing *in vitro* and in weanling pigs has shown better **antimicrobial activity** than both zinc sulfate and zinc oxide.