

More Highlights from Albion's First International Conference on Human Nutrition

In the March, 1995 issue of Albion Research Notes, some of the significant research findings from Albion's First International Conference on Human Nutrition were summarized. As indicated in that issue, there was not enough space in a single newsletter to report all of the research shared at that conference. This issue will emphasize certain other research reported at this conference. Evidence from five different research projects demonstrated the superior chemical stability and the electrical neutrality found in Albion's mineral amino acid chelates. One of the features that differentiates a *nutritionally functional chelate* from most chelates is the electrical neutrality of

the chelate. This feature - electrical neutrality - is largely responsible for the high tolerance and low toxicity observed with Albion's patented chelates. It is also a huge factor in the lack of pro-oxidant effect seen with Albion's iron amino acid chelate - Ferrochel™. Most forms of iron are highly reactive, electrically charged pro-oxidant materials that tend to react with everything around them often causing the chemical breakdown of the other materials they come in contact with. In the case of nutritional supplements and certain foods, the addition of a pro-oxidant iron can decrease the shelf life and usefulness of the ingredients in the products to which it has been added.

Corn Flour Fortification and Ferrochel

Dr. Name also described Ferrochel research conducted under the leadership of Professor Sandra Gualandro (Fundacao Pro-Sangue Hemocentro/University of Sao Paulo). In her study, corn flour was fortified with Ferrochel at the rate of one grain of elemental iron per kilogram of corn flour. The corn flour was mixed with additional seasonings to form Venezuelan tortilla type dish called an 'Arepa'. Each arepa contained 30 grams of Ferrochel fortified corn flour providing 30 mg of elemental iron. The researchers found that even though the arepa was submitted to the high temperatures of frying and subsequently maintained at room temperature for extended periods of time, there were no changes in taste that would indicate fat peroxidation. This is truly remarkable, considering the level of iron fortification in the corn flour.

In the study, Dr. Gualandro selected 25 anemic children (ages 7 through 10, with hemoglobin levels below 12 g/dl), and had them eat one arepa per day. The children consumed the arepas as if they were ordinary unfortified arepas, thus receiving 30 mg of iron from Ferrochel per day.

Dr. Jose Joao Name reports on findings that show Albion's Ferrochel to be of great chemical stability, electrically neutral, and highly absorbable.

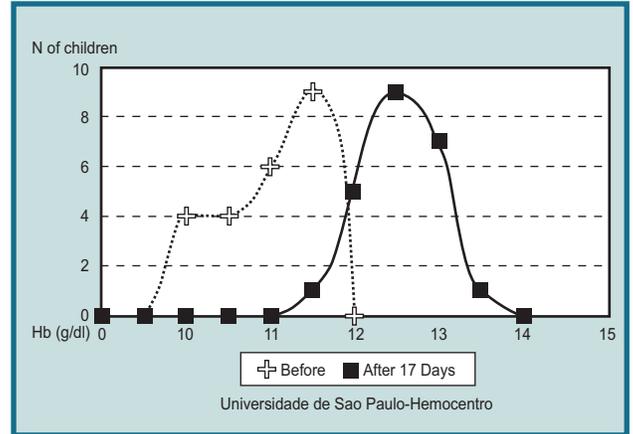
In the March, 1995 issue of Albion Research Notes, we reported on Dr. Jose Name's work with Ferrochel in milk fortification. Ferrochel's unique chemical properties allowed it to be used in the fortification of milk (unheard of before with iron). In this research, Ferrochel was shown to be highly absorbable and physiologically effective. Additionally, Dr. Name's

work showed that an iron form - Ferrochel - could be used to fortify milk without causing the milk to go rancid or to have an off taste. This has never been done before with other forms of iron, including other chelates. The electrical neutrality, which is inherent in Albion's chelates, is the reason for this stability.

The hemoglobin levels on the first day and after 17 days on the arepa program are shown in Figure 1.

No side effects resulted from consuming this high dose of iron, thus confirming Pineda's and others findings relative to tolerability of Ferrochel. The average hemoglobin increase in these children, after only 17 days on the Ferrochel fortified arepas, was 1.6 g/dl.

Figure 1.
Distribution of hemoglobin levels in children treated each day for 17 days with a corn flour arepa fortified with 30mg Fe as Ferrochel.



Margarine Fortification with Ferrochel

In a more challenging research project, margarine was mixed with Ferrochel to test the oxidative activity of Albion's patented form of iron. Margarine has a high fat content and is physically exposed to environmental factors that favor lipid peroxidation. Normally, the addition of iron to margarine is ill-advised because the pro-oxidant activity of iron hastens the margarine's rancidity. In fact, the addition of iron salts has been found to cause margarine to go rancid in a matter of hours. Normally, margarine has a three month shelf life from production to use in Brazil. In this study, Ferrochel was added to margarine at two different concentrations: 2 mg elemental iron per 100 grams of margarine and 6 mg elemental iron per 100 grams margarine.

Every ten days, the organoleptic properties of samples of these margarine preparations were tested and compared to a control made with the same lots of starting materials. The results again demonstrated the

electrical neutrality and chemical stability of the patented Ferrochel as evidenced by the relative lack of reaction between this iron form and the fats in the margarine. See Table 1 for a summary of the results. An '8' means that the product was good. A '7' indicates that it is acceptable, and a '6' shows the margarine is bad.

The researchers noted that the control sample showed the same oxidation at the fourth month as the fortified samples, which suggested

that the initial quality of the fats could have been improved. In any event, the samples fortified with Ferrochel showed significant lack of peroxidation in the margarine. The near absence of reactivity between the Ferrochel and the lipids in the margarine, coupled with the findings in the earlier milk experiment and the corn flour research, are conclusive evidence of this iron form's uniquely useful chemistry, a usefulness that has not been observed in any other form of iron.

	30 Days	60 Days	90 Days	120 Days
Control without iron	8	8	8	6
Margarine fortified with 2mg	7	7	7	6
Margarine fortified with 6mg	7	7	6	6

The state of research at Albion

Stephen Ashmead, one of the scientists in the Research and Development Department at Albion Laboratories, spoke of the past, present, and possible future courses of research for Albion. It became obvious from his presentation that Albion is devoted to furthering the state of knowledge on the benefits of mineral amino acid chelates for many years to come. He reported that there have been over 4000 individual

research studies dealing with Albion products. An interesting review of some of the 'landmark' research on Albion chelates was also included. In the course of his presentation, Stephen Ashmead reviewed two studies that related to the electrical neutrality and chemical stability seen in Albion's patented mineral amino acid chelates. Following are summaries of those studies.

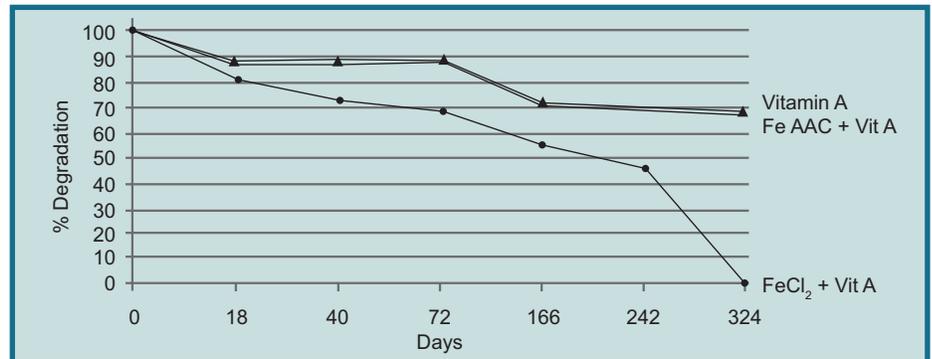
Ferrochel - No Effect on Vitamin A Degradation

Recently, a French company - Zootech - conducted research on Albion's iron amino acid chelate and its effect on the deterioration of vitamin A. Iron salt forms are known to accelerate the breakdown of vitamin A. This interaction limits shelf life of products, such as multivitamin/mineral formulations. To perform the study, Zootech made up three test solutions: vitamin A alone (20,000 IU/ml), vitamin A (20,000 IU/ml) plus 5 mg/ml of iron as FeCl₂, and vitamin A (20,000 IU/ml) plus 5 mg/ml iron as Albion's iron amino acid chelate. The test solutions were then stored at room temperature for 324 days, and periodically assayed for vitamin A

activity. The results are summarized in the Figure 2 shown.

As one can see in Figure 2, at the end of 324 days, there was no longer any vitamin A activity when inorganic iron was mixed with the vitamin A solution. On the other hand, the vitamin A activities of the vitamin A solution alone and the mix of vitamin A and Albion's iron amino acid chelate were the same. There was no interaction between Albion's chelate and the vitamin A. This is strong evidence of the electrical neutrality and chemical stability of the patented Albion chelate.

Figure 2. Comparison of interactions between vitamin A alone, vitamin A and Albion's Iron amino acid chelate, and vitamin A and FeCl₂.



Multivitamin/Mineral Formulation Stability

Stephen Ashmead also reported on another study performed in Canada, in which a multivitamin/mineral formulation containing a full range of vitamins, along with Albion's patented iron, copper, manganese, zinc, and chromium amino acid chelates was tested for stability. Upon completion of its manufacture, the product was analyzed for the potency of all of the vitamins in its formula. Seventeen months later, the vitamin potency assays were repeated on this multivitamin/mineral product. This assay of the product showed no degradation of the vitamin over what would be normally expected for vitamins alone. There was virtually no interaction between Albion's chelates and the vitamins in the formula. For reprints of this material call 1-800-222-0733.

What Does All of This Mean?

In the course of summarizing some of the research reported at Albion's conference, some startling facts have been uncovered about the unique chemistry of Albion's patented mineral amino acid chelates which are not available in other forms of minerals. The electrical neutrality

and chemical stability of Albion's chelates has been shown in:

- Fortification of milk
- Fortification of margarine
- Fortification of corn flour, followed by deep frying
- Mixture in vitamin A solutions
- Inclusion in multivitamin/minerals supplements

The electrical neutrality of Albion's mineral chelates, including its iron (Ferrochel), has been dramatically shown by their lack of interaction with

the lipids in milk, margarine, and in the frying process utilizing Ferrochel fortified corn flour. It is further evidenced by their lack of interaction with the vitamin A solution, as well as the vitamins in the multivitamin/mineral product. The electrical neutrality and chemical stability of Albion's mineral chelates translate into a unique set of ingredients that:

- Provide products with longer shelf life
- Have great versatility
- Exhibit the highest gastrointestinal tolerance

Imagine the implication of an iron form that does not interact with lipids. Ferrochel showed no signs of pro-oxidant activity!



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