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Research Article

Biological Transmutations

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Abstract

For nearly 20 years, with many collaborators, I have studied biological transmutations, measuring the contents of seeds, bacteria, embryo cells and algae, before and after their growth. I have measured variations in their mineral composition indicating that it is very likely that transmutations occur in living systems.

Keywords: Biological transmutations, Cold fusion, ICP, Kervran, Transmutations

1. Introduction

My interest in Biological Transmutations began in 1977 while I was a Post-doctorate at the Lawrence Berkeley Laboratory in California. I read a book mentioning the work of the French scientist Louis Kervran [1–6]. Not being a chemist, I kept this information in the back of my mind. But on March 23, 1989, came the announcement by Stanley Pons and Martin Fleischmann [7] of the discovery of Cold Fusion. I then realized that if chemistry can cause nuclear reactions, then biology could certainly do the same. In 1994, I met both Fleischmann and Pons at their laboratory in the South of France. I told them about Biological Transmutations, and to my surprise they were already aware of it.

When I started experimenting with Cold Fusion, I discovered physical instruments capable of doing chemical analysis without the need for test tubes, in particular Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) and Inductively Coupled Plasma-Mass Spectroscopy (ICP-MS) instruments. As soon as possible I performed several experiments with seeds and bacteria of all kinds to check the reality of Biological Transmutations. This paper reviews the 20 years of research that I have done in collaboration with several people. For readers interested in knowing the history of the field, I suggest a review paper that I published in the *Journal of Condensed Matter Nuclear Science* [8,9]. Some of the experiments were performed with a small number of samples, so that the error bars are too large to make sure that transmutation really occurred, but the large amount of experiments showing chemical and isotopic anomalies tend to demonstrate the validity of biological transmutations.

Two types of analysis have been performed. The first is ICP-AES, which allows quantitative chemical analysis. The second is ICP-MS, which allows isotopic analysis. This second technique is very important, because it reduces

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the need for a large number of samples. When you analyze the chemical composition of any sample, there are always variations between identical samples coming from the same batch. This is why it is necessary to multiply the number of samples in order to average the measurement uncertainties. With the isotopic analysis a single sample has value, because the precision of the measurement depends only on the sample itself. If the variation in comparison to the natural composition is large enough, then this measurement is valid with only one sample.

2. General Experimental Procedure

The same experimental procedure was used for all the experiments with seeds as well as with bacteria. A typical experiment is performed as follows: A growth medium is divided into two identical volumes. In both volumes, a given quantity of seed material is added, then a volume of nitric acid is added to the first volume to mineralize it. The second volume is kept under growth conditions. When growth is finished, the same amount of nitric acid is added to mineralize it. If no transmutation occurs, then both volumes should have the same mineral composition. Since we operate in open air, we do not analyze gases like hydrogen, oxygen, or nitrogen or even carbon which could vary in quantity by absorption of air gases. Analysis was performed by either ICP-AES or ICP-MS when available. Before and after comparisons were done to check for variations.

3. Wheat Seeds

Wheat seeds were grown in light water and heavy water. The analysis was done by ICP-AES and ICP-MS. Four different experiments were performed.

In the first experiment, wheat seeds were grown in distilled water and analyzed for silicon, calcium and magnesium contents. Analysis of the seeds compared to the sprouts was performed by ICP-AES. Table 1 shows the relative variation of these elements :

Table 1. Variation of Si, Ca and Mg during germination of wheat seeds measured by ICP-AES.

Elements	Variation (%)
Si	+8
Ca	–14
Mg	–5

We observe here an increase of silicon and a decrease of calcium and magnesium.

In a second set of experiments, wheat seeds were germinated in light water and heavy water. The first batch in light water germinated well, whereas the second batch in heavy water barely germinated. The analysis was performed by

Table 2. Isotopic distribution of Li, Mg and Cu during germination of wheat seeds in light and heavy water.

Elements	Atomic mass	Natural abundance (%)	Seeds (%)	Sprouts (%) in H_2O	Sprouts (%) in D_20
Li	6	7.5	7.9	11.2	6.5
Li	7	92.5	92.1	88.8	93.5
Mg	24	78.6	76.6	77.5	78.9
Mg	25	10.1	10.6	10.4	9.5
Mg	26	11.3	12.8	12.1	11.6
Cu	63	69.1	65.8	68.4	69.7
Cu	65	30.9	34.2	31.6	30.3

ICP-MS, in order to detect any isotopic anomaly. Table 2 shows the isotopic distributions of lithium, magnesium and copper:

It is interesting to note that wheat seeds sprouted in light water show an anomaly in the lithium mass distribution: Li-6 is 40% larger than in nature, but no change when grown in heavy water (which is not surprising since the growth was very bad). For magnesium and copper, there are variations, but they are not significant.

In a third set of experiments, wheat seeds were grown in heavy water. The following variations in concentration have been observed by ICP-MS and confirmed by ICP-AES as shown in Table 3.

Table 3. Variation of Be, Na, Mg and Pd during germination of wheat seeds measured by ICP-AES and ICP-MS.

Elements	Variation (%)
Be	+50
Na	+600
Mg	–30
Pd	–80

In a fourth set of experiments, wheat seeds were grown in light water. Results are shown in Table 4.

Table 4. Variation of Ca, Mg, Mn, K, P, B, Al, Si, Fe, Zn, K and Cu during growth of wheat seeds measured by ICP-AES.

Elements	Variation (%)	Variation (mg/ppb)
Ca	+5	+2mg
Mg	+3	+3mg
Mn	0	0
K	+4	+12mg
P	+3	+10mg
B	0	0
Al	–15	–80ppb
Si	–50	–5.2mg
Fe	–2	–0.1mg
Zn	+4	+0.2mg
K	+5	+12mg
Cu	–22	–185ppb

There are discrepancies between Table 1 and Table 4 since both experiments were performed under similar conditions: wheat seeds in light water and ICP-AES analysis. In Table 1, we observe a decrease of Ca and Mg and an increase of Si whereas in Table 4 we measure the exact opposite: increase of Ca and Mg and decrease of Si! This indicates either that the precision of the analysis is not good enough and that there is no change in composition, or as Kervran [1–6] pointed out, the reactions are reversible, and can change according to the growth conditions. Growth of seeds is never identical between one experiment and another.

4. Oat Seeds

Oats seeds are difficult to germinate. However, we have analyzed a set of seeds and an equivalent set of sprouts grown in light water, by ICP-MS. See Table 5.

Table 5. Variation of Hg, Zr and Pd during during germination of oat seeds measured by ICP-MS.

Elements	Variation (%)
Hg	–2000
Zr	–700
Pd	–300

Even though these are trace elements, it is interesting to observe here a large decrease of heavy metals during germination of oats seeds.

5. Marine bacteria (Marinobacter sp strain CAB)

Marine Bacteria were grown in a culture medium containing the following minerals; K, Mg, Na and Ca. Three experiments were performed.

The first set of experiments was performed with two samples of each. Table 6 shows the variation of the major minerals both in percentage and in weight.

Table 6. Variation of Na, Mg, K and Ca during development of Marine Bacteria measured by ICP-AES.

Elements	Variation (%)	Variation (mg)
Na	–10	–250
Mg	–5	–40
K	–22	–22
Ca	+17	+45

In addition to the analysis of the major components, trace elements have been also measured. Table 7 shows the relative variation of these metals.

Table 7. Variation of trace elements of Zn, Fe, Mn, Li and Cu during development of Marine Bacteria measured by ICP-AES.

Elements	Variation (%)
Zn	+33
Fe	+100
Mn	+100
Li	+53
Cu	+72

A second set of experiments has been performed with five samples of each. Table 8 shows the variation of the major minerals. No analysis of the trace elements has been made.

A third set of experiments with three samples and three blanks showed somewhat different results as shown on Table 9:

Table 8. Variation of Na, Mg, K and Ca during development of Marine Bacteria measured by ICP-AES

Elements	Variation (%)	Variation (mg)
Na	–2	–50
Mg	–4	–30
K	0	0
Ca	+9	+24

Table 9. Variation of Na, Mg and Ca during development of Marine Bacteria measured by ICP-AES.

Elements	Variation (%)
Na	–20
Mg	–1
Ca	–5

All three experiments show a decrease of Na and Mg, whereas Ca has increased in the first two experiments and decreased in the third one. The same comments as the one for wheat applies here: these discrepancies that may indicate a reversible reaction.

6. Lactobacillus

Lactobacillus bacteria were developed in a Rogosa medium. The following elements were analyzed by ICP-AES: Na, Mg, K, Ca, Mn and Fe. The relative variations of the minerals are listed in Table 10.

Table 10. Variation of Na, Mg, K, Ca, Mn and Fe during development of Lactobacilius bacteria measured by ICP-AES.

Elements	Variation (%)
Na	–2
Mg	–5
K	–5
Ca	+20
Mn	–4
Fe	–3

We observe here a large increase of Ca and a decrease of Na, Mg, K, Mn and Fe.

7. Mice Embryo Cells

A first set of experiments was performed. Mice embryo cells were developed in the Dulbecco's Modified Eagle's Medium. The variation of some of the measurable elements are listed in Table 11.

A second set of experiments was performed, the results are shown in Table 12. We observe an increase of five elements, and no decrease.

Table 11. Variation of Fe, K, Ca and Mg during development of mice embryo cells measured by ICP-AES.

Elements	Variation (%)
Fe	+19
K	+21
Ca	+13
Mg	+18

Table 12. Variation of Na, K and Ca during development of mice embryo cells measured by ICP-AES.

Elements	Variation (%)
Na	+5
K	+4
Ca	+6

8. Algae Spirulina

The growing medium included the following elements: Na, K, Mg, P, B, Zn, Mo, Mn and Fe. Six samples were used as blanks and six as active. The analysis of these elements is shown in Table 13.

Table 13. Variation of B, Mn, Na, K, Fe, Zn and Mg during development of Algae Spirulina measured by ICP-AES.

Elements	Variation (%)
B	+265
Mn	+41
Na	+9
K	+4
Fe	–7
Zn	–7
Mg	–14

9. Discussion

The whole field of Biological Transmutations makes no sense considering what we know about nuclear physics. There are several issues: first, how can we imagine two heavy nuclei fusing or a heavy nucleus fissioning in a living cell at room temperature? This is obviously against everything we know now. Second, if that much mass is involved in nuclear reactions, a lot of energy should be generated, but we do not see it. My work and also the work of other scientists show that transmutations occur in living cells. The results of this work are not sufficient to prove that Biological Transmutations really occurring, but there are many indications that it is happening.

10. Conclusion

The preliminary results reported in this work confirm previous results by Kervran: decrease of some elements and increase of others. Also, new information is shown: an important decrease of heavy mass metals during germination of seeds (wheat and oat). More work needs to be performed in order to verify these observations.

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