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## On the effect of biodynamic preparations

Evidenced research results – an overview

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The inventions of compost and field preparations form the heart of organic dynamic farming. Do you want the reasons? describe briefly and to the essentials the use of the bio-dynamic-dynamic preparations, so they aim for the *land-*

Production of high-quality, healthy food/feed; Maintaining/increasing plant health Resilience. It's always about that about the process of "enlivening" natural products eat.

plant morphology to be "apparent".

The remarkable thing about the effectiveness of the preparations Soil and plant is that currently a specific one only one parameter coupled, measurable effect cannot be predicted can, as these always come from the specific conditions or the circumstances of the agricultural management, the landscape, des climate and weather etc. depends. Contrary to some practical observations, there is your own experience, supported by scientific studies, is not from the point of view of a negative effect of the preparations of the entire system or the farm organism can occur. According to available results from drug trials shows that under certain conditions where If the yield generation is not fully exploited, there will be considerable increases in growth are possible (SPIEB 2002): However, the opposite was also observed. That's how it became under the conditions of high Nitrogen effects and limited potassium availability in the soil the yield through the silica preparation significantly diminished, but at the same time Grain properties like that glue and seed quality, improved (SPIEB 2006). In therefore, in most cases

At the suggestion of the editors results are displayed here of preparation research, which is essential to the have contributed to our understanding of their effects. It was obvious to the author that these were statistically verified in exact tests were, ie upon repetition under the same conditions would lead to the same results. After 38 years Work in scientific research and 33 years of activity within the

biodynamic practice (on/in farm research) there is one in relation to the effects and effectiveness of the preparations internal security that doesn't only on your own professional experience, but also on based on tests carried out by other experimenters around the world. It should be clearly stated that in in most cases the resulting bearable ones Effects of the preparations are barely noticeable visually were. Only in a few experiments that still exist is entered into, seemed a change in the



Biodynamic preparations for Compost, soil and plant: a natural set of measures for healthy agriculture

economic course (Steiner 1924) including the previously developed thimble preparation made from *digitalis purpurea* extract (Heinze 1983) in three areas: Health of the earth/ development of soil fertility/ productivity;

### Short and sweet:

Biodynamic preparations have been used for more than 80 years used in agriculture.

The overview article summarizes effects on soil fertility, quality, yield and plant health.

The concept of system regulation is used to explain how it works used.

# no

observed the application of biodynamic preparations... activity increases... or aging... giving ingredients, resilience

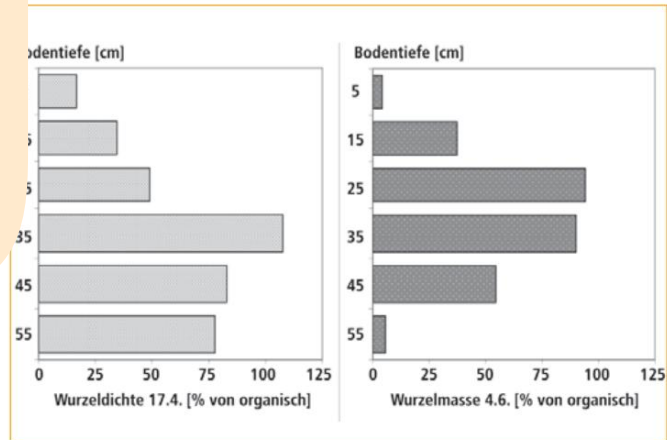
or plant health. Based on some experimental In the following, the system character of the system will be discussed Effect and mode of action of biodynamic preparations can be made clear. This can only be about a small limited one Act excerpt, why on the compilation of results from KÖNIG (1999) is pointed out.

## influence of the preparations Soil fertility

A repeatedly described one The phenomenon of the effectiveness of the preparations is their influence on the root formation of the Plant. Especially clear this was done as part of the continuous fertilization experiment Darmstadt from BACHINGER (1995) demonstrated. Here was shown in the comparison of biodynamic to organic Management with equal fertilization that through the use of all preparations the root density and the ash-free root dry matter, especially in the soil below the topsoil were significantly promoted up to a relative 208% (Fig. 1). The Importance of intensive rooting of the soil for water and nutrient absorption and digestion, But humus accumulation does not need to be particularly emphasized either. she is a key factor for the Generation of soil fertility. (GOLDSTEIN 2008)

from this... lie... al... lts... estigat... he so-called... (CH-Frick)... (2002)... be support... in comparis... to organic... Management a significantly lower metabolic quotient (qCO<sub>2</sub> = Soil respiration/microbial biomass), that is, a better one Energy use efficiency as a result of a more diverse Microorganism community (Shannon index) prove.

In this context are also used in attempts to influence the activity of microorganisms in soil incubation experiments of the horn cow dung preparation and various C and N sources (DEWES and AHRENS 1990). With addition from horn meal to the ground a priming effect occurs with strong sales intensity. is an expression of this a high ferment activity with release of CO<sub>2</sub> and NO<sub>3</sub>. The measurements of the dehydrogenase activity showed as shown in Figure 2 compared to the unfertilized one Control a strong increase between the 22nd and 37th day. When adding the horn cow dung preparation at the start of the experiment and on the 7th day the microorganism activity was severely restricted, what in the around more than that half reduced values is expressed. Out of View of a sustainable, the The preparation compensates for this with fertilization adapted to plant physiology Priming effect. In biodynamic

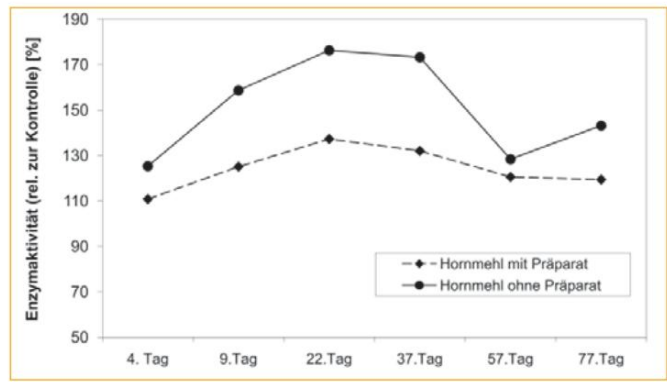


**Fig. 1:** With other preparations Rooting pattern: Distribution of relative root density (roots/100 cm<sup>2</sup>) and the relative, ash-free root dry matter in the soil up to 60 cm in comparison of bio-dynamic to organic fertilization. Permanent fertilization trial in Darmstadt (17.4. and June 4, 1990) Source: Bachinger 1995

In mixed terms this would be to be seen as a "reasonable" effect.

## Drug influence on yield

With regard to yield formation, the selected comes from The result of early experiments but it shows the classic Influence of the injection preparations Horn cow dung and horn pebbles depending on the productivity of the location and



**Fig. 2:** Stimulating for soil life: Influence of double applications of horn cow dung preparation on the time course of dehydrogenase activity in the soil (uS, 45% max. WK, 20°C) with the addition of horn meal (180 kg N/ha) in an aerobic incubation experiment Source: Ahrens and Dewes 1990

of management. It is a field test that is being carried out at the university Pour with carrots on one in conversion to bio-dynamic farming in the fertile loess soil (SPIEB 1978). According to Figure 3, stable manure



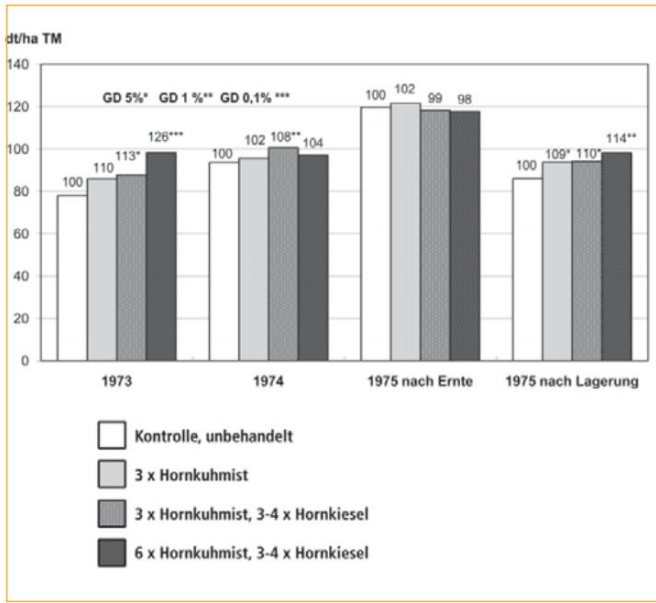


Fig. 3:

**Stabilizing income:**

Influence of biodynamics  
Spray preparations on the level of dry matter yields of carrots 1973–75 as well as taking into account the storage losses from the 1975 harvest.

Source: Spieß 1978

fertilization at the rate of 200 dt/ha (1973, 1974) or 300 dt/ha (1975) almost linear increasing yields of 78, 93 and 120 dt/ha DM in the control harvested. By The extent to which the physiological

te, to the treatments react, which no longer occurs with maximum yield (1975). was the case. That however after storing the carrots for 5.5 months by deducting the spoilage losses again evident differences in yield in all treated Variants were based on the preparation-related significant improvement the shelf life of the carrots (SAMARAS 1977). These results prove that for one Proof of the effectiveness of the preparation on the plant the environmental conditions and a methodology adapted to the experimental question must be used.

**influence of the preparations food quality**

Biodynamics have been used for decades and organic farming Questions of holistic Determination of food quality using suitable methods Parameters researched. In addition count e.g. B. Value giving or harmful ingredients, the physiological state of a plant (storability), microorganism population or sensory properties (taste, well-being, sensory effects).

A wide variety of quality tests were carried out. If you select vitamin C as an ingredient, it shows up in a comparison organic and biodynamic fertilization (Fig. 4) show obvious differences in the Amount of salaries and the Storage losses. The use of the preparations then led to one Vitamin increased by 26% C synthesis in fresh spinach. In addition, the Vita-min was released in this version on least broken down: while the loss for organic was 97%, this was only with biodynamic 76%, corresponding to a 10-times higher amount at the end the storage time. Parallel In addition, the lowest nitrate contents were measured at Biodyna-misch.

Even in more recent attempts could have an influence of biodynamic preparations the content of secondary plant substances can be determined. In the potash fertilization experiment with potatoes (SPIEß et al. 2004) led to the use of the the extract mentioned at the beginning of foxglove in biodynamic farming significantly increased values with ascorbic acid (Vita-min C) up to a maximum of 123% (Fig. 5). The low level of content is on the longer storage time of the tubers.

In this context is also on improvement the seed quality or viability (cold test value) as shown by, among other things Treatments with the silica preparation in trials with Wheat (SPIEß 2002) or Bush beans (FRITZ and KÖPKE 2005) was found.

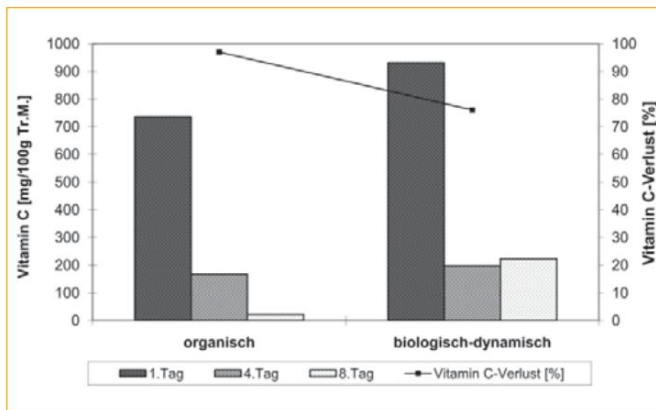


Fig. 4:

**Less storage losses for vitamin C:**  
Influence from biodynamic to organic Fertilization on the contents and the course the vitamin C levels during eight days Storage of spinach.  
Source: Ahrens 1988

gical performance limit Plants in mass formation was achieved, decreased the one that increases yield Effect of applied separately or together compared to injection preparations the untreated control (Law of diminishing returns increase in yield). This means that at the lowest yield level the plant still has the opportunity

There is a wide range for this of results, of which initially one from the early quality work from E. AHRENS (University of Giessen) is presented. In the post-harvest behavior of spinach, which Comparison of mineral fertilizer (NPK), manure compost (STM/org.) and prepared STM plus spray preparations (bio-dyn.) were grown during eight days storage time

**influence of the preparations  
Plant health**

Maintaining plant health is important for the factors the herbal quality influence, essential. So can e.g. B. the formation of phenolic substances as Flavor carriers on the one hand with a view to increased nutritional value be seen. On the other hand, the resistance of the plant, among other things influenced by their synthesis. In various experiments the

Use of biodynamic preparations improves the resilience of the Plants have been proven to be resistant to diseases and pests, not directly, but indirectly

Influence on physiology of the plant through increase of enzyme activity and increased formation of phytoalexins etc is. This could e.g. B. proven in experiments on induced resistance in cucumbers (SCHNEIDER- MÜLLER 1991, see SPIEß 2002).

Only recently was this Magazine about a result for increased resistance of grain versus that Storage pest grain beetle reported (SPIEß 2008, cf. SPIEß 2009). Afterwards showed after six years of storage of three types of wheat depending on Spraying with the horn silica preparation and the addition of valerian by an average of 22% significantly reduced infestation compared to the control. It was assumed that the preparation leads to a higher formation or stability of ethyl formate

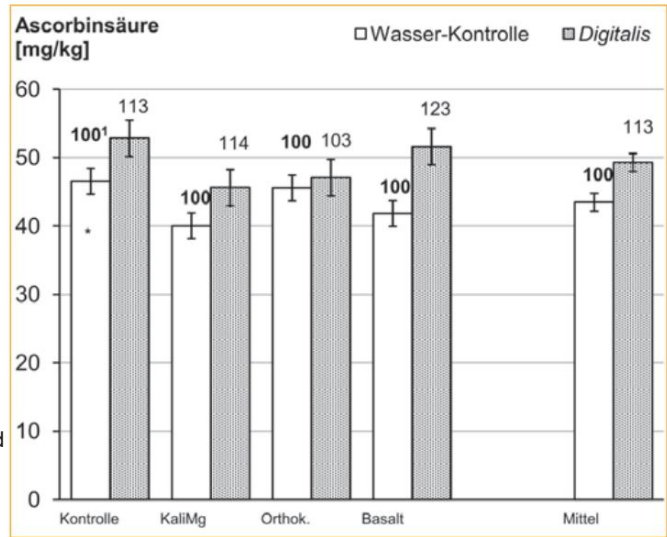
serves the plant's self-protection. Comparable results were achieved with oats using the same method Combination of preparations LIEBOLD and PYTTLIK (2000) and LIEBOLD (2003). In Vascular tests were carried out Oat-pea mixture cultivated and comparative with dilutions or potencies of valerian preparation together with the spray preparations horn cow manure and Treated with horn pebbles. Among many other interesting phenomena occurred very different infestations with the oat aphid

on (Fig. 6). While the Control plants into one third clearly pronounced showed infestation treated variants either no (dilution 1:1,000) or only small Infestation with 3.6% to 17% of Plant. Here too, it must be assumed that the preparation on the lice did not have a direct effect, but rather a systemic effect that occurs in one stronger implementation of Metabolic products – from low molecular weight amino acids to higher molecular weight ones proteins – consists. The consequence would be that due to the reduced food supply a limit is placed on the reproduction of harmful insects becomes. Similar observations exist, for example: B. from the fruit growing (PFEIFFER 1992).

of the blinded variants on shape phenomena Cereal plants according to the Flower (BBCH 70) appeared in the treated strip obviously a stronger one Homogeneity of the stock forming individual plants. These observational differences could be found in morpho-logical studies be secured (SPIEß et al. 2002; VITALE et al. 2002). According to Figure 7 shows measured from the length of the 2nd to 4th internodes of 50 main stems of plants,

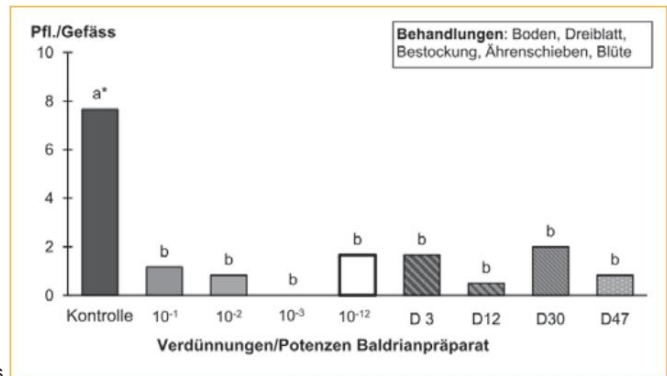
**Normalizing  
Effect of the preparations**

As indicated above, could Drug effects are rare be observed visually. In a specific case However, this is due to one

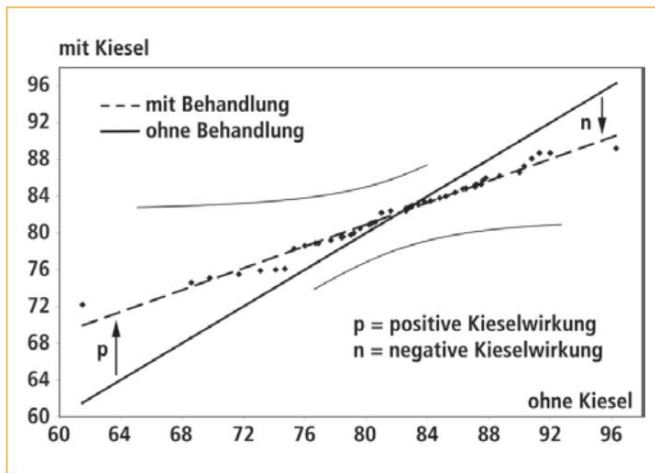


Spray comparison without and with horn silica preparation Strip trials with three Wheat varieties under biodynamic practical conditions describe. When it comes to scoring

**Fig. 5:**  
Incentive for quality education:  
Influence of foxglove treatments  
Fertilization of potash and rock powder  
the ascorbic acid content of potatoes  
in biodynamic cultivation. Dottenfelderhof 2003.  
Source: Spieß et al. 2004



**Fig. 6:**  
Less infestation:  
Number of oat plants infected with oat aphid (Rhopalosiphum padi).  
12 plants/vessel depending on the additive from valerian to cow dung and pebble preparation. Dottenfelderhof vessel test 1999 [\*] Tukey  $\bar{y}$  0.05 [Source: Liebold et al. Pyttlik 2000



**Fig. 7: Grown more evenly:**  
Influence of the horn silica preparation with additive of valerian preparation to change the Lengths of the 2nd to 4th internodes of the main stalks of 50 wheat plants cv. 'Lux'.

n = 50,  
r = 0.99\*\*\*  
R<sup>2</sup> = 98%

Linearity alpha < 0.1%  
(statistical confidence interval between the two curves)

Dottenfelderhof 2001  
Source: Vitale et al. 2002

that the silica preparation has a normalizing effect on growth. This was also true for sheet length and area measurements, but also for the nutrient absorption in Parallel experiments (HAGEL et al. 2002).

From what is shown is to conclude, that the different effects of biodynamic

Preparations expression of one Influencing the entirety of all regulatory life processes Individual organism as well of the entire agricultural organism. Included the effects always occur in the sense of optimization of the individual organism like also of the company as a whole the nature surrounding him and contribute significantly to the development of a operational individuality. These processes are in 'Agricultural Course' (so) with terms like Normalization / harmonization, individualization

and rationality. With the exception of the latter, these are now used in human medicine or can be used describe them with the term system regulation. If you think, for example, B. the functions and interactions the phytohormones these with their regulation of all plant life processes the effects of biodynamic preparations. It is therefore recommended for future research to the influence of biodynamic preparations connection with the phytohormone-controlled To examine plant processes in order to understand them better.

#### Sources

- AHRENS E. 1988: Aspects of post-harvest behavior and suitability for storage. In: Meier-Ploeger A. and Vogtmann H.: Food quality – holistic methods and concepts. Publishing house CF Müller, Karlsruhe
- BACHINGER H. 1995: The influence of different types of fertilization (mineral, organic, biodynamic) on the temporal dynamics and spatial distribution of soil chemical and microbiological parameters of C and N dynamics as well as on plant and root growth of winter rye. Diss. Casting
- DEWES Th., AHRENS E. 1990: Interactions between organic fertilization and the use of the biodynamic preparation P500 in an aerobic incubation experiment. *Agribiol. Res.* 43, 1:65-73
- FRITZ J. and KÖPKE U. 2005: Influence of light, Fertilization and biodynamic Spray preparation horny pebbles for bush beans (*Phaseolus vulgaris* L. var. nanus) on the Germination properties of the newly formed seeds. *Plant production science* 9(2):55-60
- GOLDSTEIN, W. 2008: Soil, roots, preparations, LE 6/08, 44-48
- HAGEL I., HANEKLAUS S., SCHNUG E., SPIEß H. 2002: Mineral content and gluten tensile strength of winter wheat depending on variety and biodynamic Silica preparation. German Ges. Quality Research, 37th Lecture Conference Hanover, pp. 75-80
- HEINZE H. 1983: On the question of mineral fertilization. in: *People and Earth*. Publisher on Goetheanum, CH-Dornach
- KÖNIG UJ (ed.) 1999: Results from the Preparation research. Series Vol. 12, IBDF, Brandschneise 5, 64295 Darmstadt
- LIEBOLD S., PYTTLIK C. 2000: Effectiveness biol.-dyn. Preparations and potentiated sub-preparations in the optimization of arable and crop cultivation measures. IBDF eV, Darmstadt, series 16, pp. 51-59
- Peas and coriander using the example of Valerian preparation. Project work Witzzenhausen and LBS Dottenfelderhof
- SPIEß H. 2006: The Demeter preparations – Basics and effect. documentation November 10, 2006 "Life forces in the Orchard", pp. 3-31. Öko-Obstbau Nord D. Experiments and Consulting Ring eV, Moor- und Peas. Dipl. arb. Witzzenhausen
- LIEBOLD S. 2003: The biol.-dyn. Valerian seminar preparation in its use as a spray preparation in the plant growth of oats
- MÄDER P., FLIEß BACH A., DUBOIS A., GUNST L., FRIED P., NIGGLI U. 2002: Soil fertility and biodiversity in organic farming. *Science*, Vol. 296:1694-1697
- PFEIFFER B. 1992: Influence of plant starches products on the pest and health economic course. Agricultural documentary volume disease infestation of apple trees. Dipl. arb. Wei conference 2009. Section for Agriculture on henstephan
- SAMARAS I. 1977: Post-harvest behavior and different fertilized vegetables special attention to physiological fertilization of potassium magnesia, orthoclase and shear and microbiological parameters. Diss. Casting
- SCHNEIDER-MÜLLER S. 1991: Physiological Changes in plants during the Induced Systemic Resistance. Diss. Darmstadt
- Pike , H. 1978: Conventional and organic VITALE I., KLAUSE S., MATTHES C., SPIEß H. 2002: Gisch-dynamic methods for increasing soil fertility. Diss. Casting
- H., KLAUSE S., MATTHES C., RUGE D. 2002: Effect of the biodynamic Kie- Vilbel self preparation on the morphology of Winter wheat. Annual Report 2002, IBDF eV, D-64295 Darmstadt, pp. 24-25
- SPIEß H. 2002: The importance of biol.-dyn. preparations in the optimization of arable and crop cultivation measures. IBDF eV, Darmstadt, series 16, pp. 51-59
- SPIEß H. 2006: The Demeter preparations – Basics and effect. documentation November 10, 2006 "Life forces in the Orchard", pp. 3-31. Öko-Obstbau Nord D. Experiments and Consulting Ring eV, Moor- und Peas. Dipl. arb. Witzzenhausen
- SPIEß H. 2008: Preparations with multiple spritzen is worth it! Live. Earth 5:16-17
- SPIEß H. 2009: The harvest after 35 years Research work with the agricultural institute course. In: Mahlich O. (Ed.): The agricultural products on the pest and health economic course. Agricultural documentary volume disease infestation of apple trees. Dipl. arb. Wei conference 2009. Section for Agriculture on Goetheanum, Dornach (CH), pp. 241-250
- SPIEß H., HORST H., SCHAFF H. 2004: Effect an extract of *Digitalis purpurea* special attention to physiological fertilization of potassium magnesia, orthoclase and shear and microbiological parameters. Diss. Casting
- 64295 Darmstadt, p. 19
- STEINER R. 1924: *Humanities Fundamentals for Thriving Farmer Training of shaft*. GA 327. Rudolf Steiner Verlag 1979, CH Dornach