Das Lebensministerium

Effects of organic fertilizers on yield and quality of potato tubers in organic farming

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Results

- Compost
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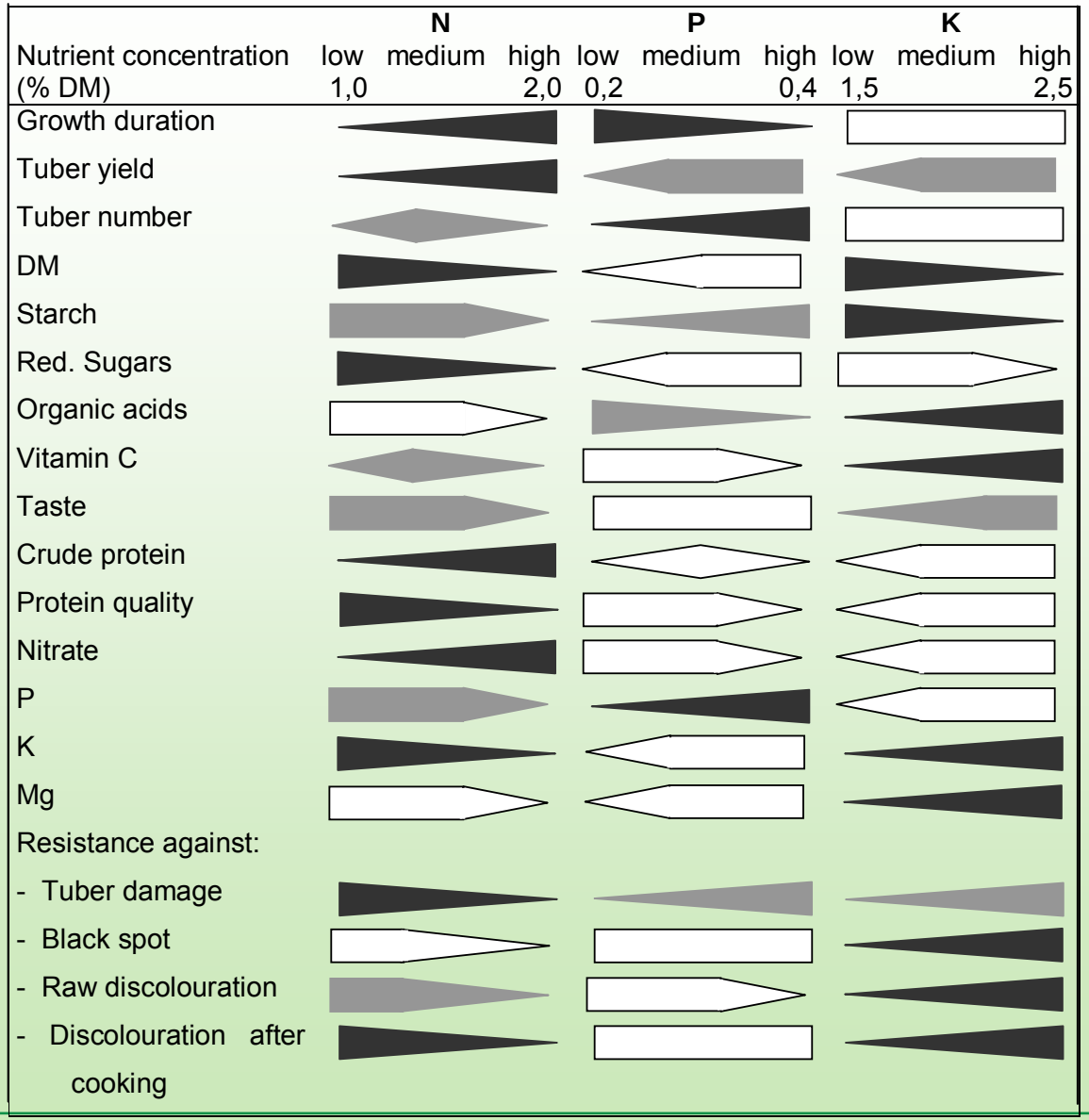
Summary

Materials and Methods

Cited literature data:

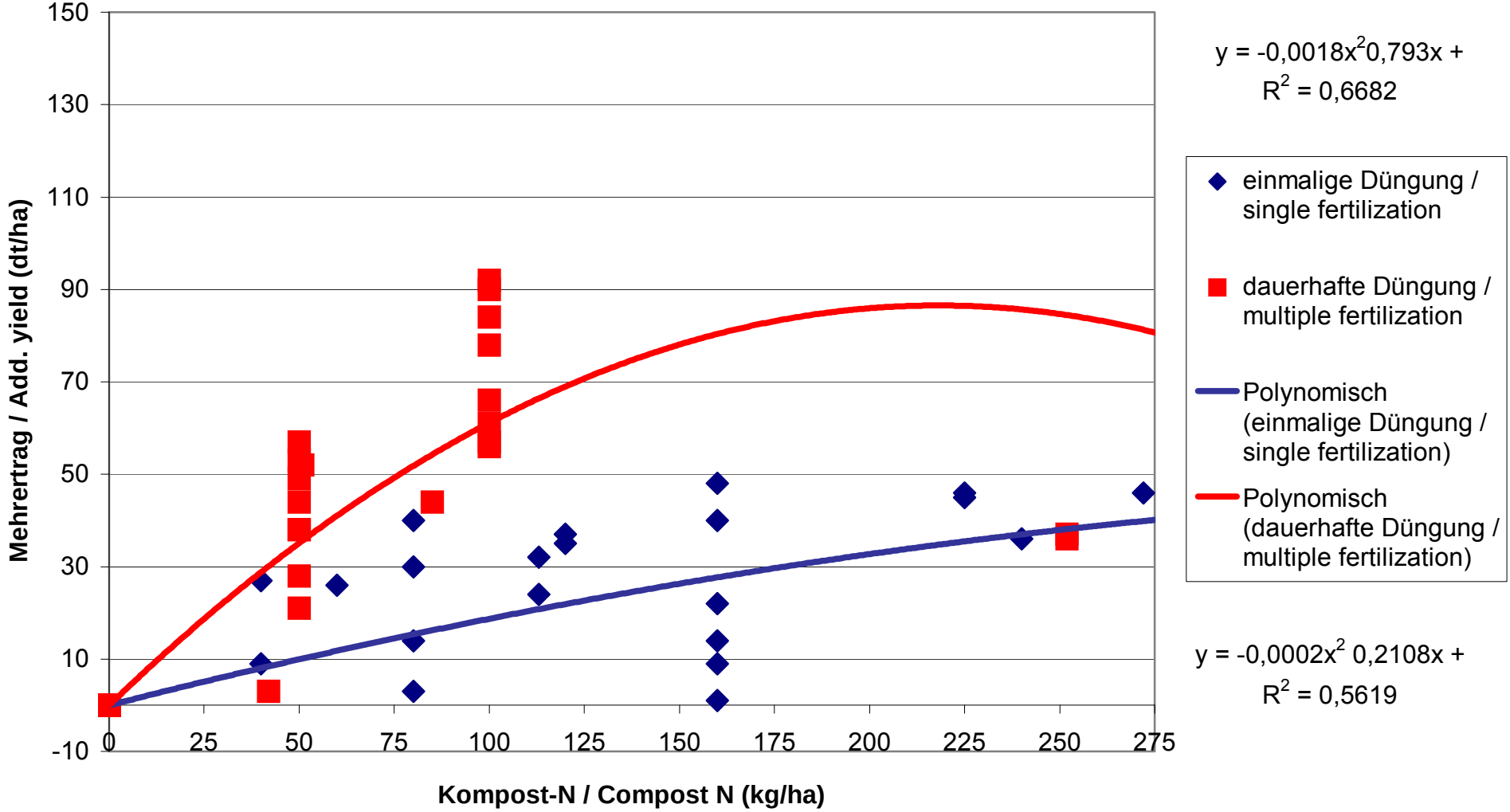
- **Compost:** KLEIN (1968); ABELE (1987); BESSON et al. (1991); MATHIES (1991); STEIN-BACHINGER (1993); NEUHOFF (2000); SCHULZ (2000); KOLBE (2006)
- **Stable manure:** PETTERSSON & ENQUIST (1964); BÖHM & DEWES (1997); PAGEL & HANF (1997); NEUHOFF (2000); SCHULZ (2000); DEBRUCK (2000); BÖHM (2001); BRUNSCH (2002); KOLBE (2006)
- **Slurry (cattle):** ASMUS et al. (1973); REHBEIN (1982); BÖHM (2001); KOLBE (2006)
- **Organic commercial fertilizer:** KLEIN (1968); ROSIGKEIT (1973); MATHIES (1991); PAFFRATH (1999, 2001); DEBRUCK (2000); LWK (2001); PAFFRATH et al. (2003)

Effects of nutrient supply on tuber yield components, ingredients and discolouration of the potato crop (KOLBE 1995)

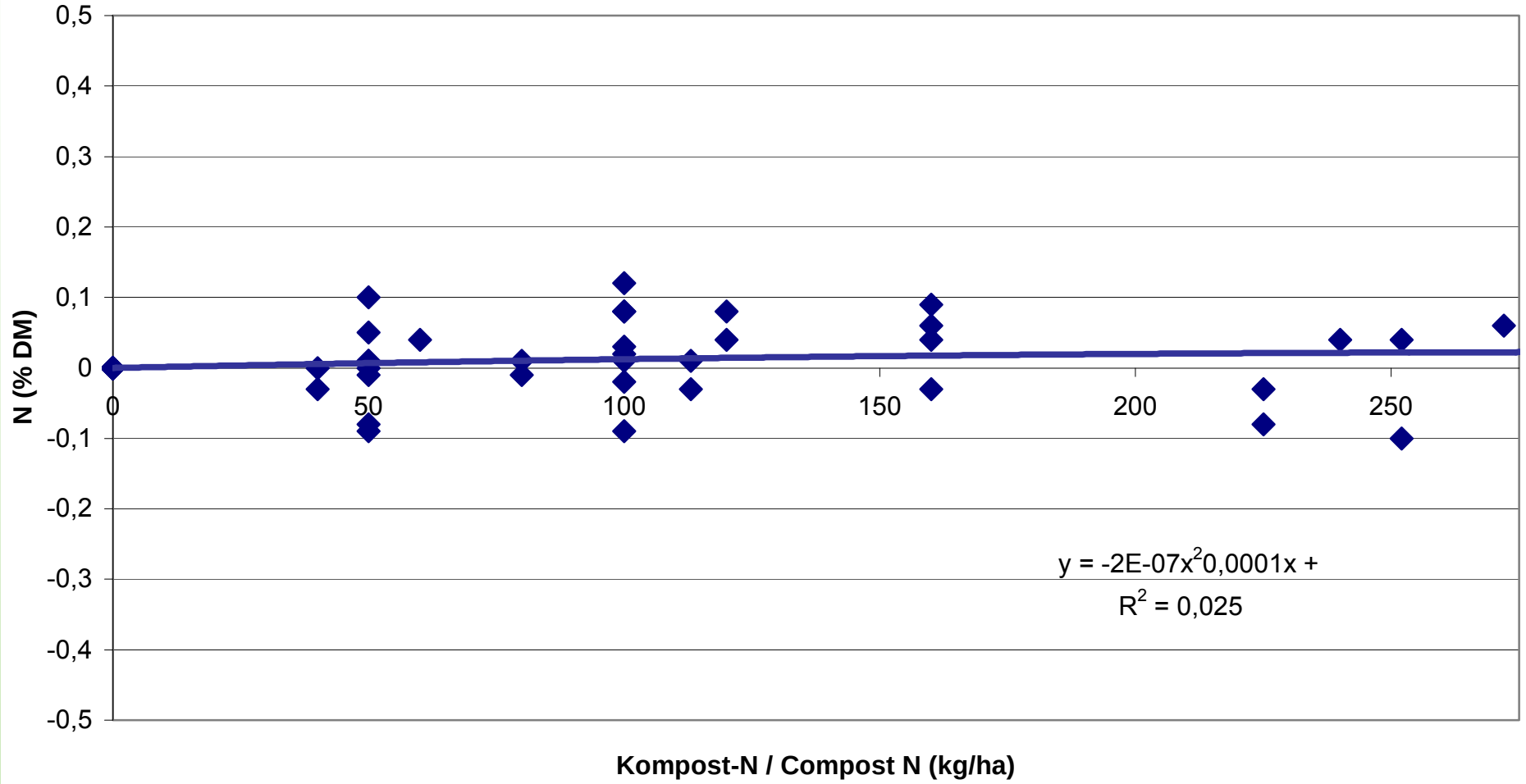


Einfluss von einmaliger und dauerhafter Anwendung von Kompost auf die Mehrerträge von Kartoffelknollen

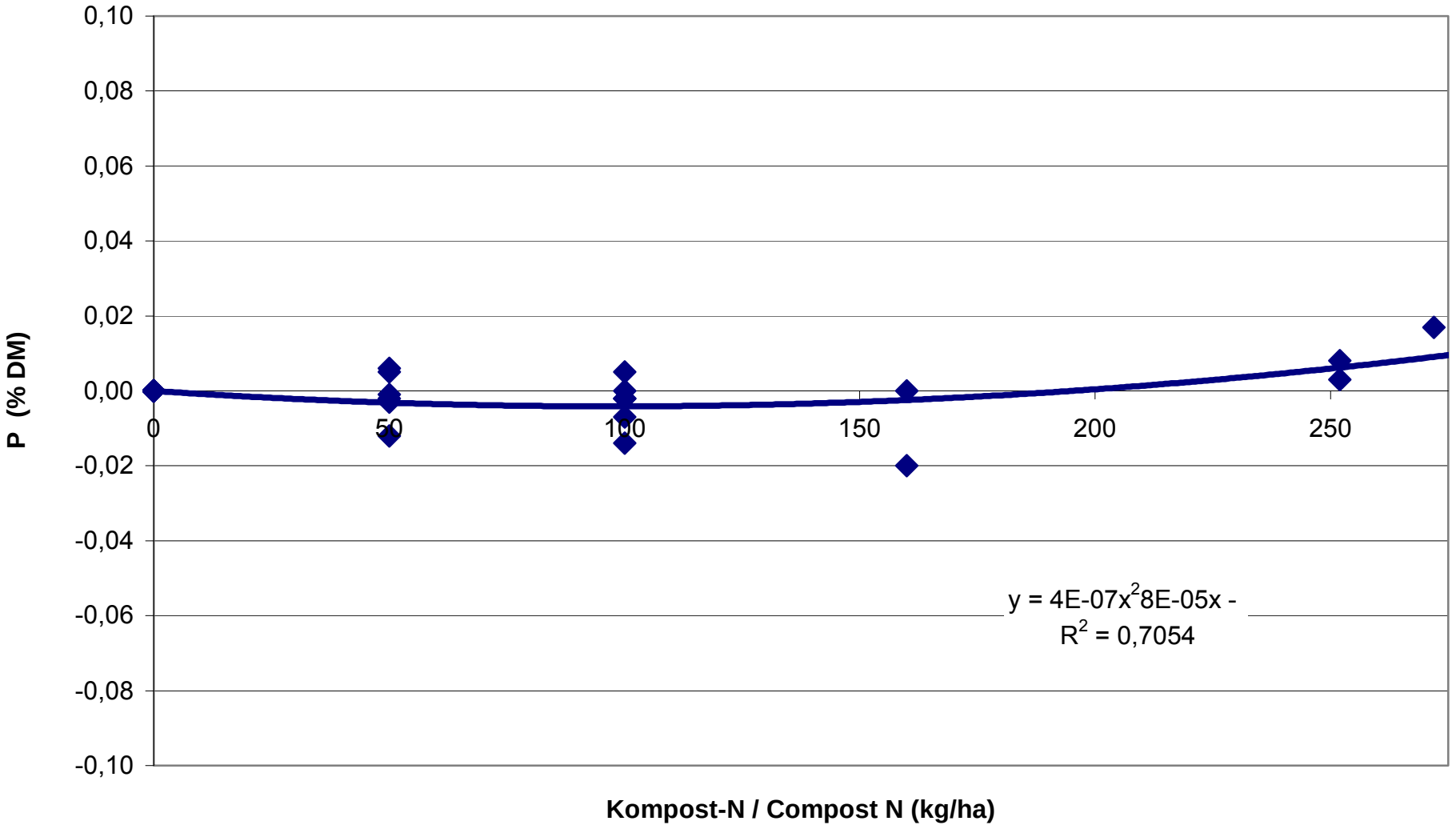
Effect of single and multiple application of compost on the additional potato tuber yield



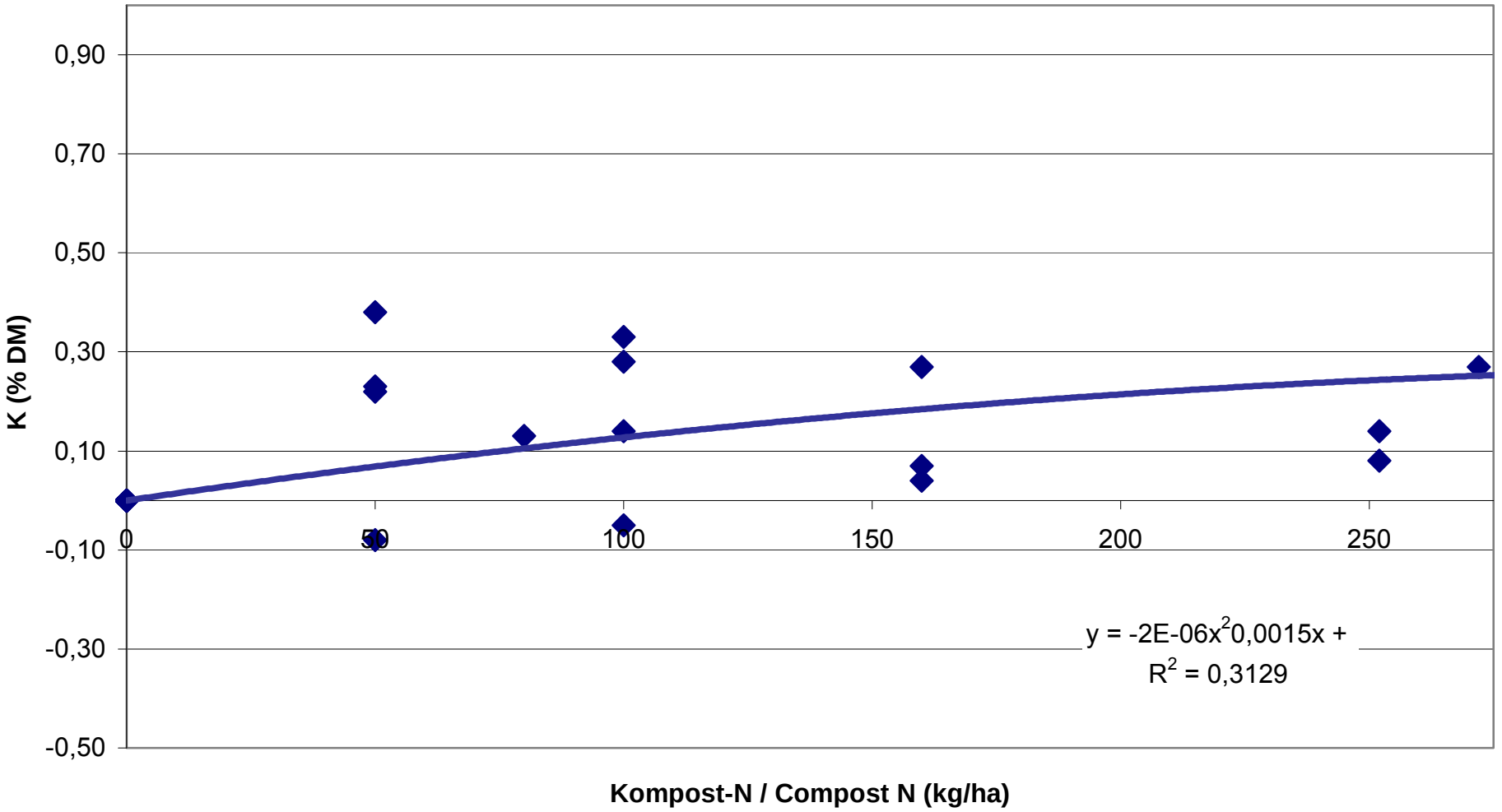
Einfluss von Kompost auf die N-Gehalte von Kartoffelknollen
Effects of compost application on the N concentration of potato tubers



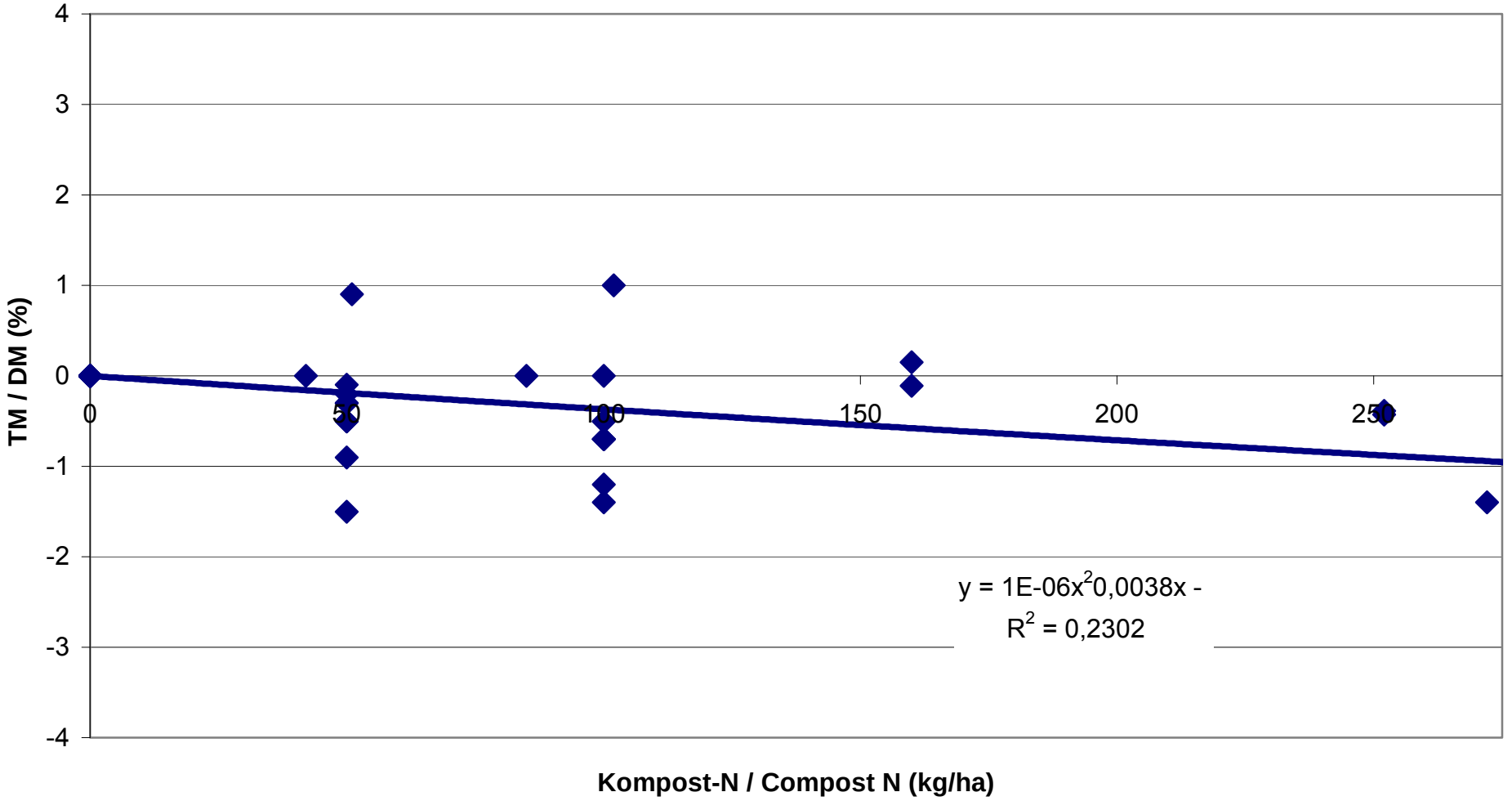
Einfluss von Kompost auf die P-Gehalte von Kartoffelknollen
Effect of compost application on the P concentrations of potato tubers



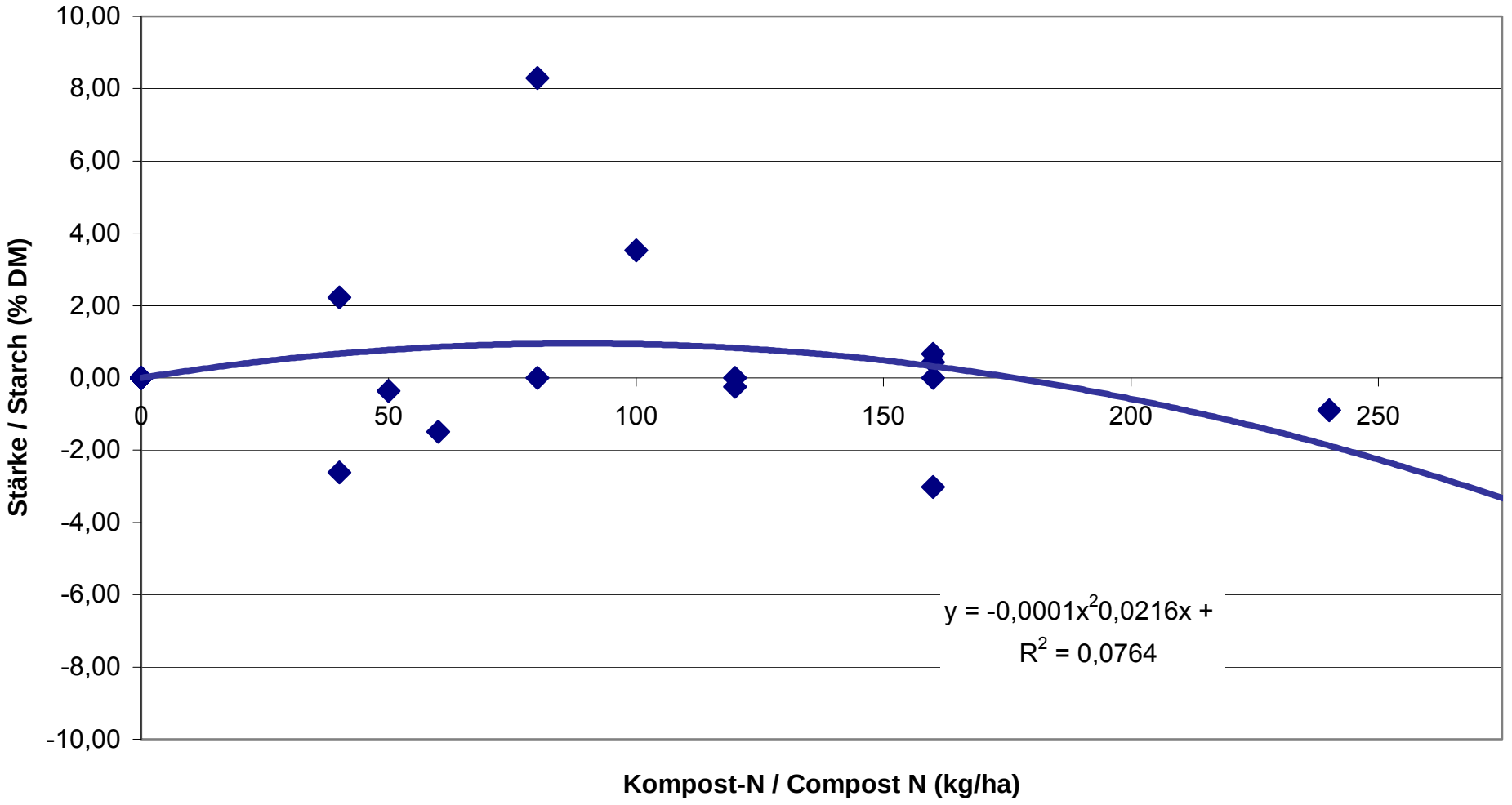
Einfluss von Kompost auf die K-Gehalte von Kartoffelknollen
Effects of compost application on the K concentration of potato tubers



Einfluss von Kompost auf die TM-Gehalte von Kartoffelknollen
Effects of compost application on the DM content of potato tubers

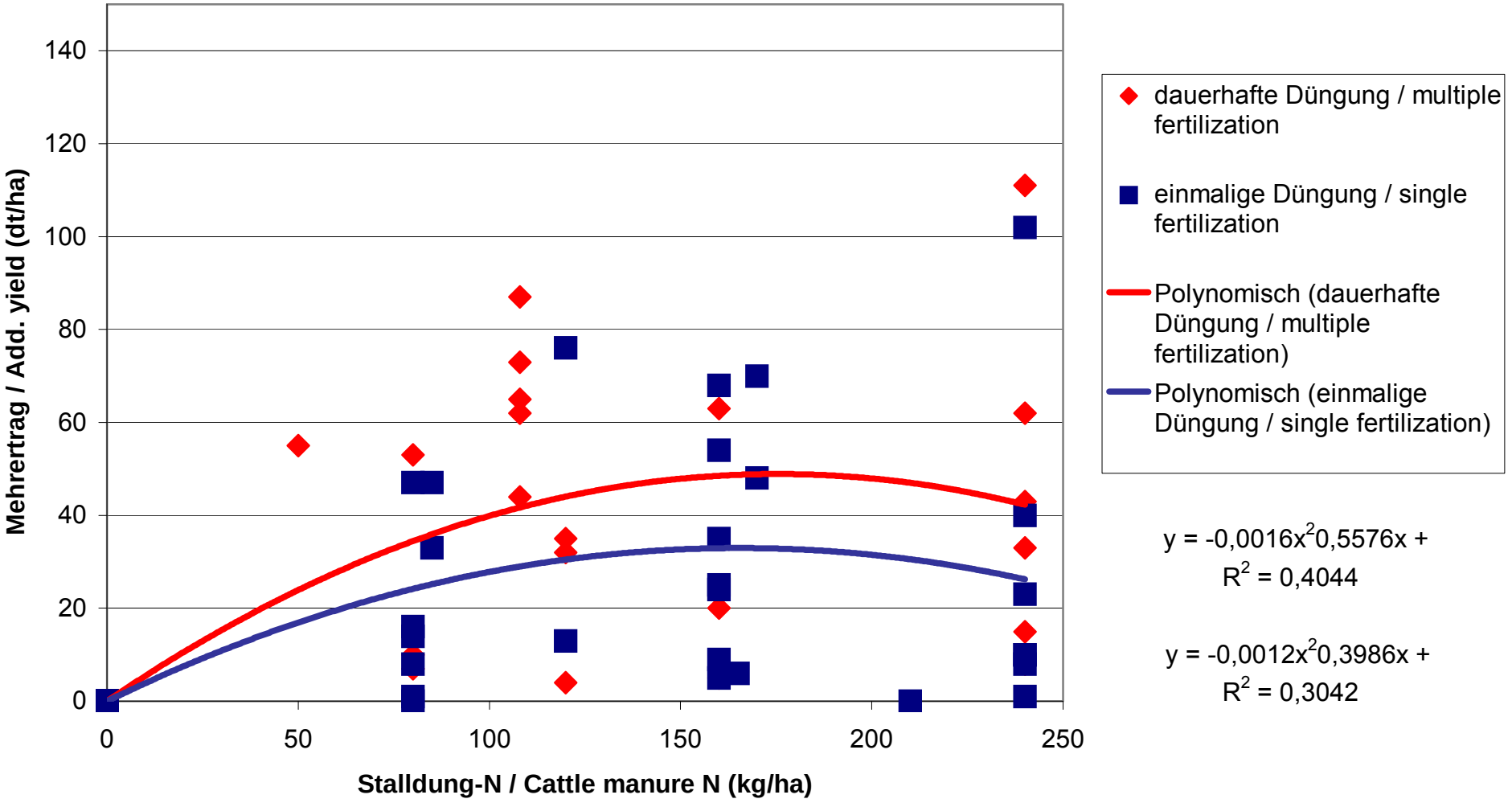


Einfluss von Kompost auf die Stärke-Gehalte in Kartoffelknollen
Effects of compost application on the starch content of potato tubers

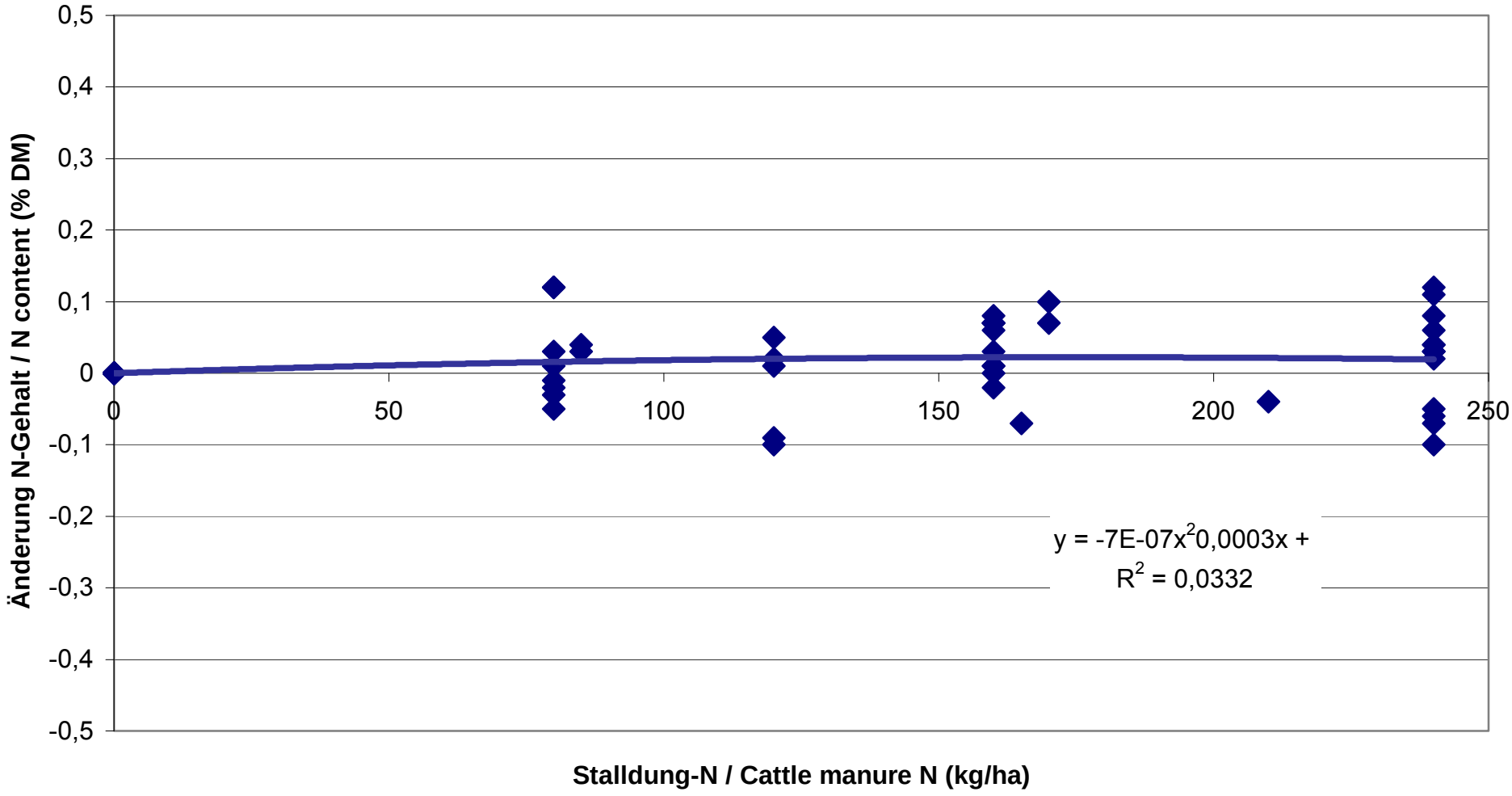


Einfluss einmaliger und dauerhafter Anwendung von Stalldung auf den Mehrertrag von Kartoffelknollen

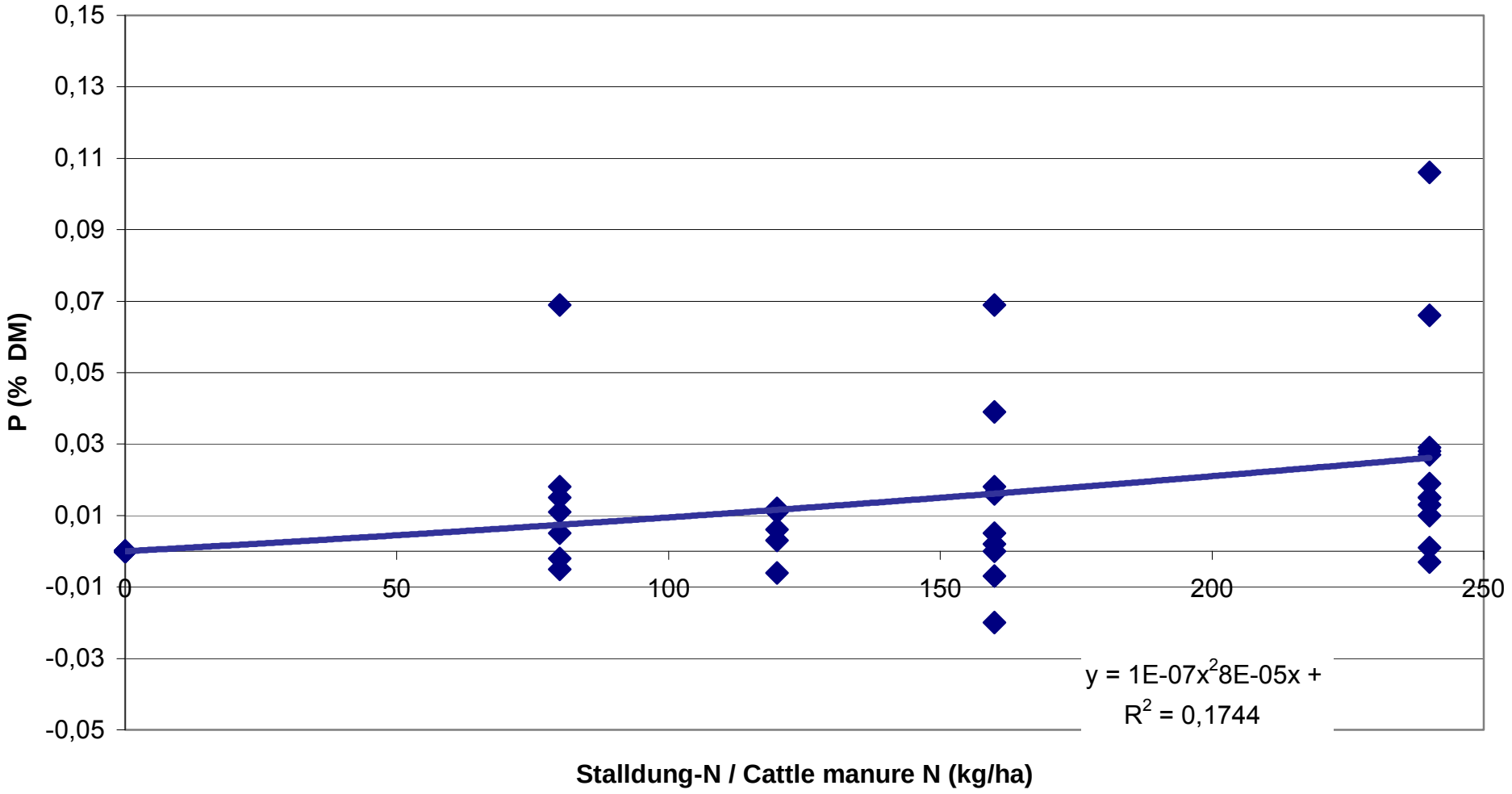
Effect of single and multiple application of cattle manure on the additional potato tuber yield



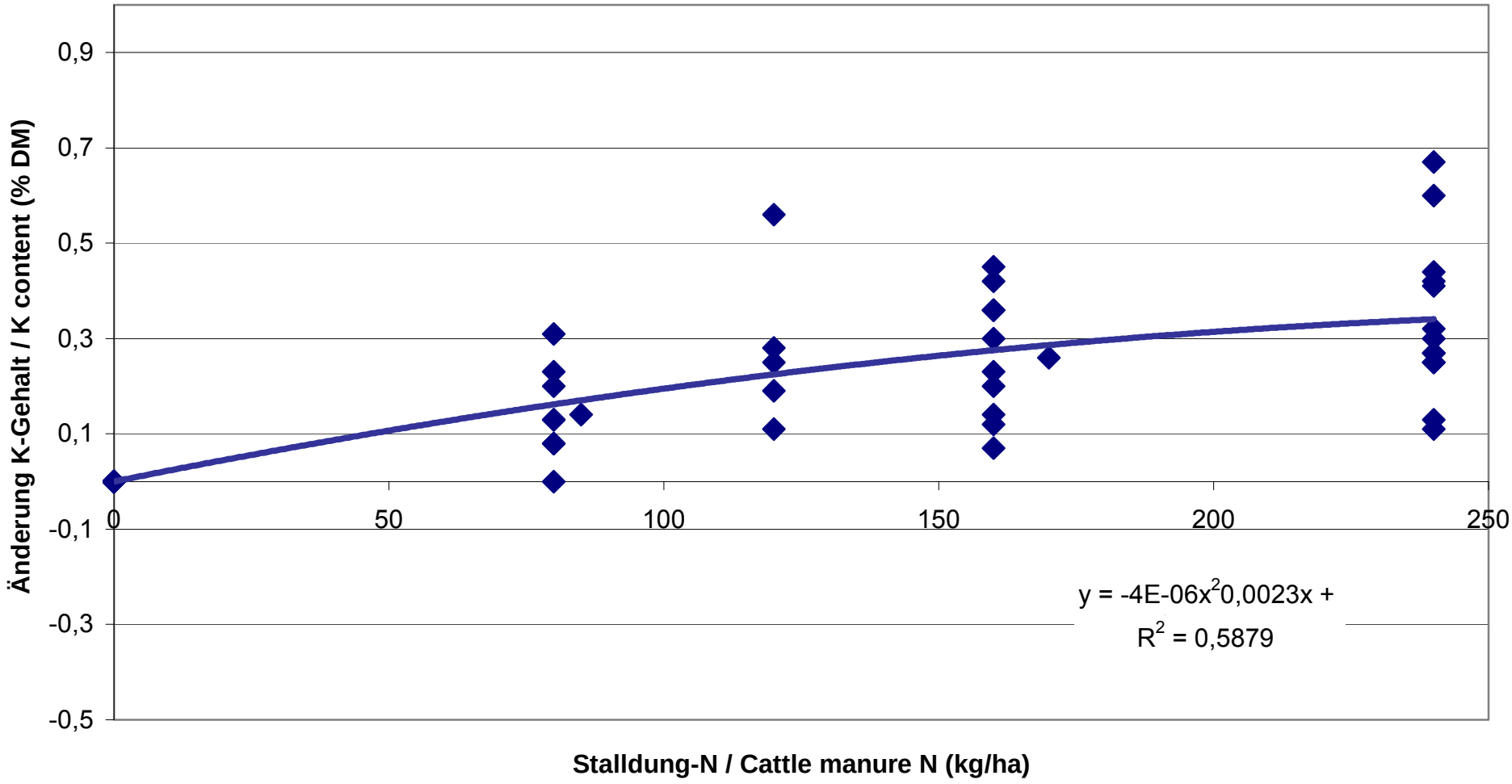
Einfluss der Stalldung-Anwendung auf die N-Gehalte von Kartoffelknollen
Effect of cattle manure application on the N concentration of potato tubers



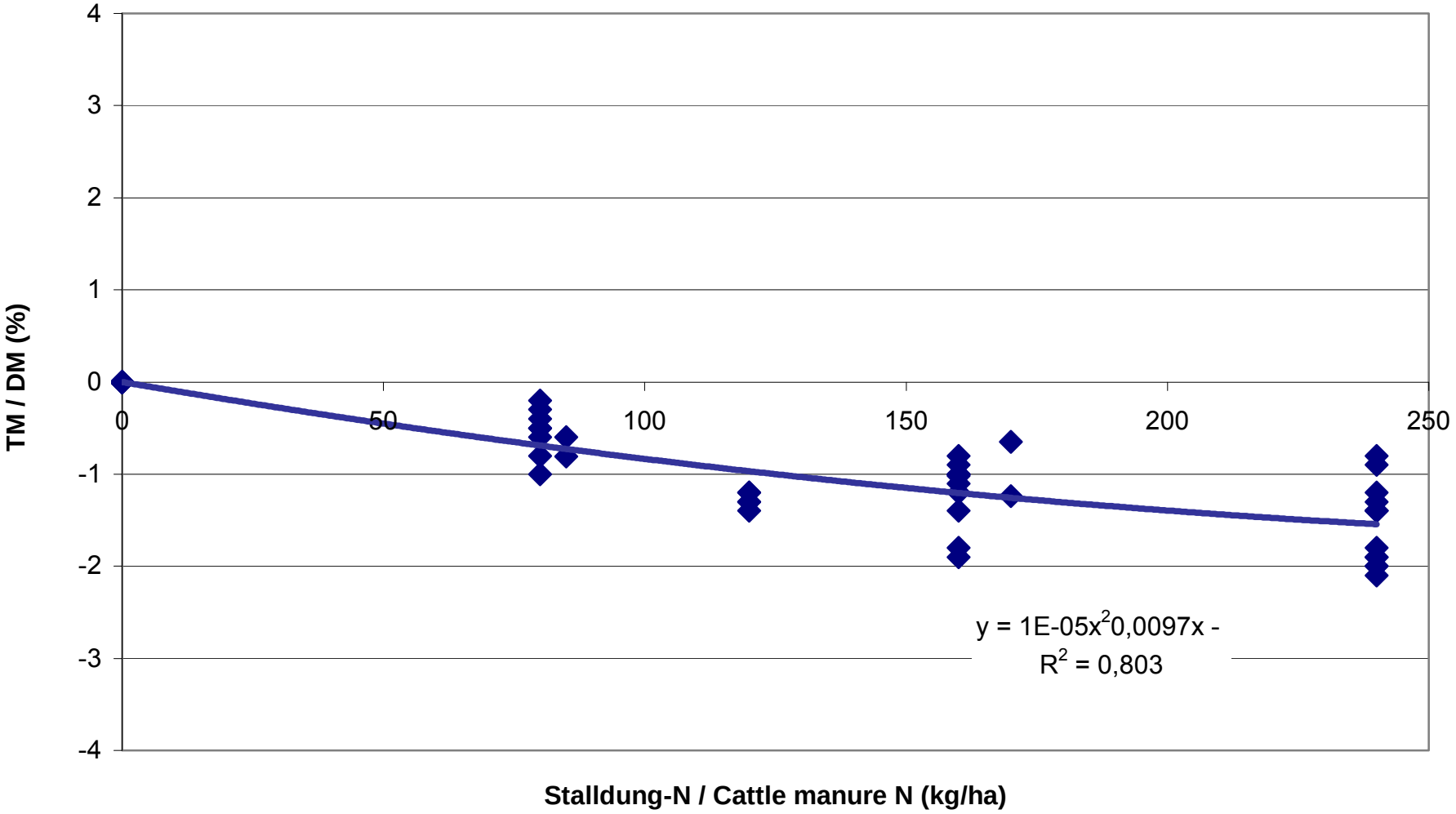
Einfluss von Stalldung auf die P-Gehalte von Kartoffelknollen
Effect of cattle manure application on the P content of potato tubers



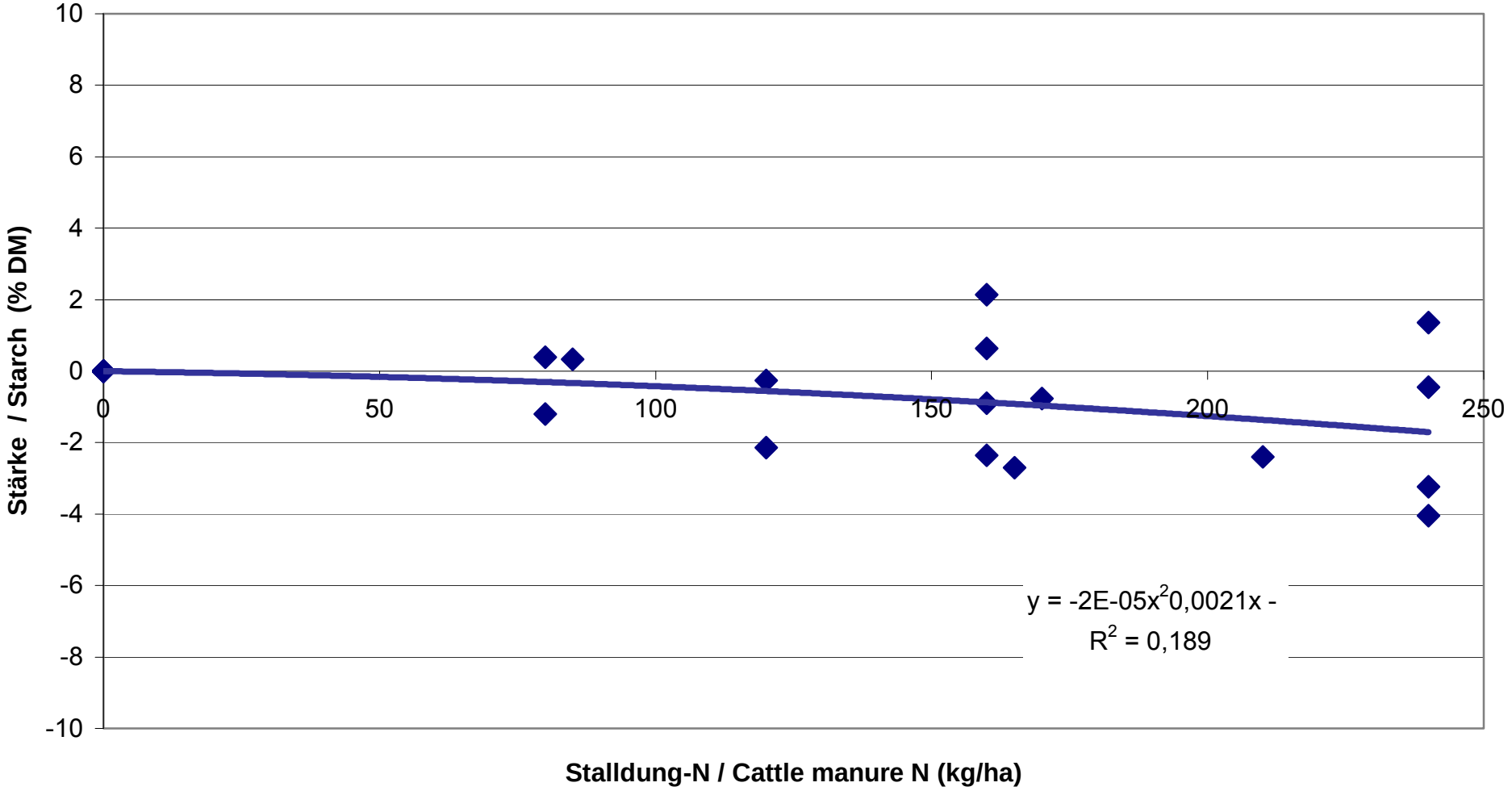
Einfluss der Stalldung-Anwendung auf die K-Gehalte von Kartoffelknollen
Effect of cattle manure application on the K content of potato tubers



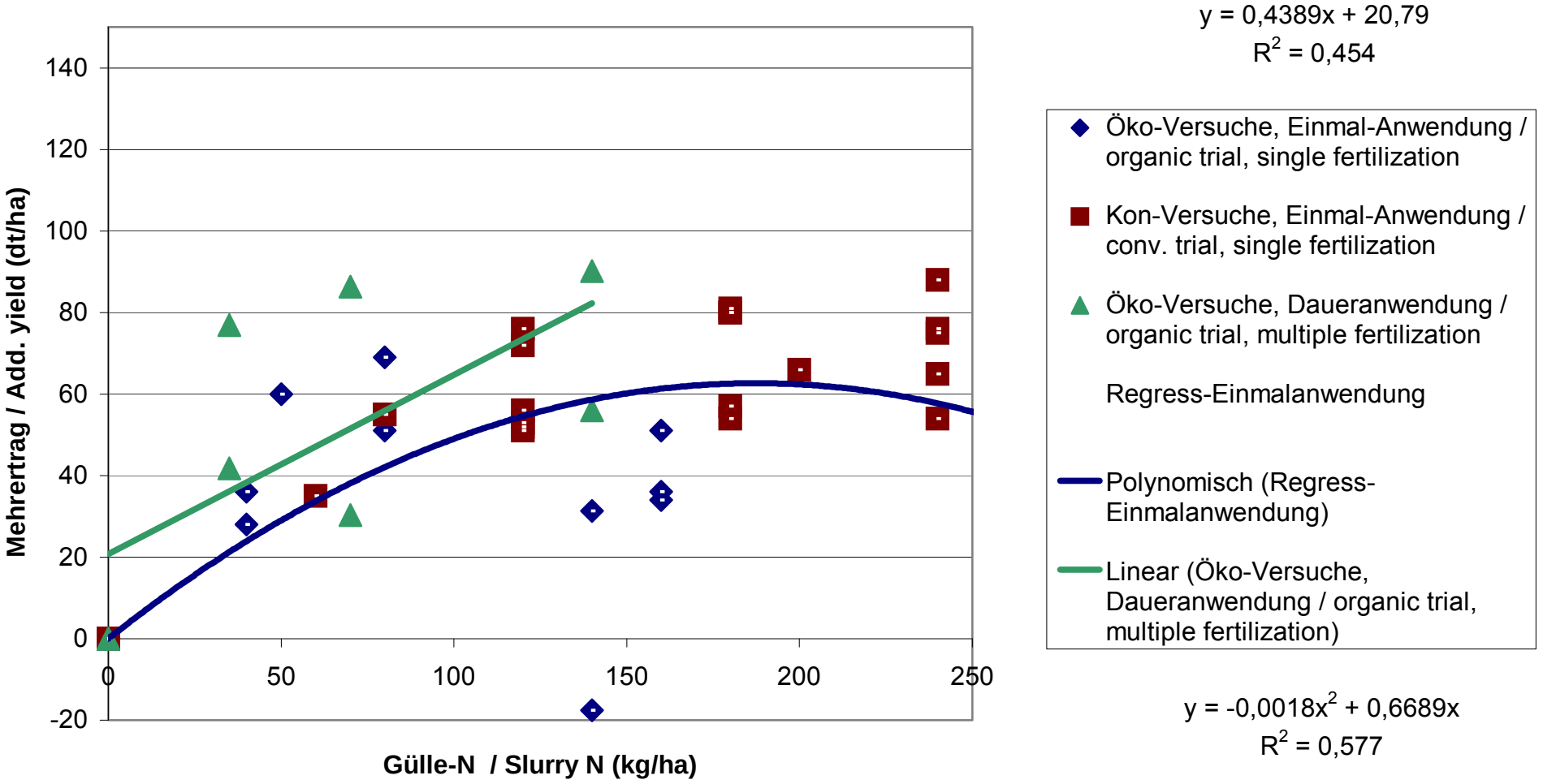
Einfluss von Stalldung auf die TM-Gehalte von Kartoffelknollen
Effect of cattle manure application on the DM content of potato tubers



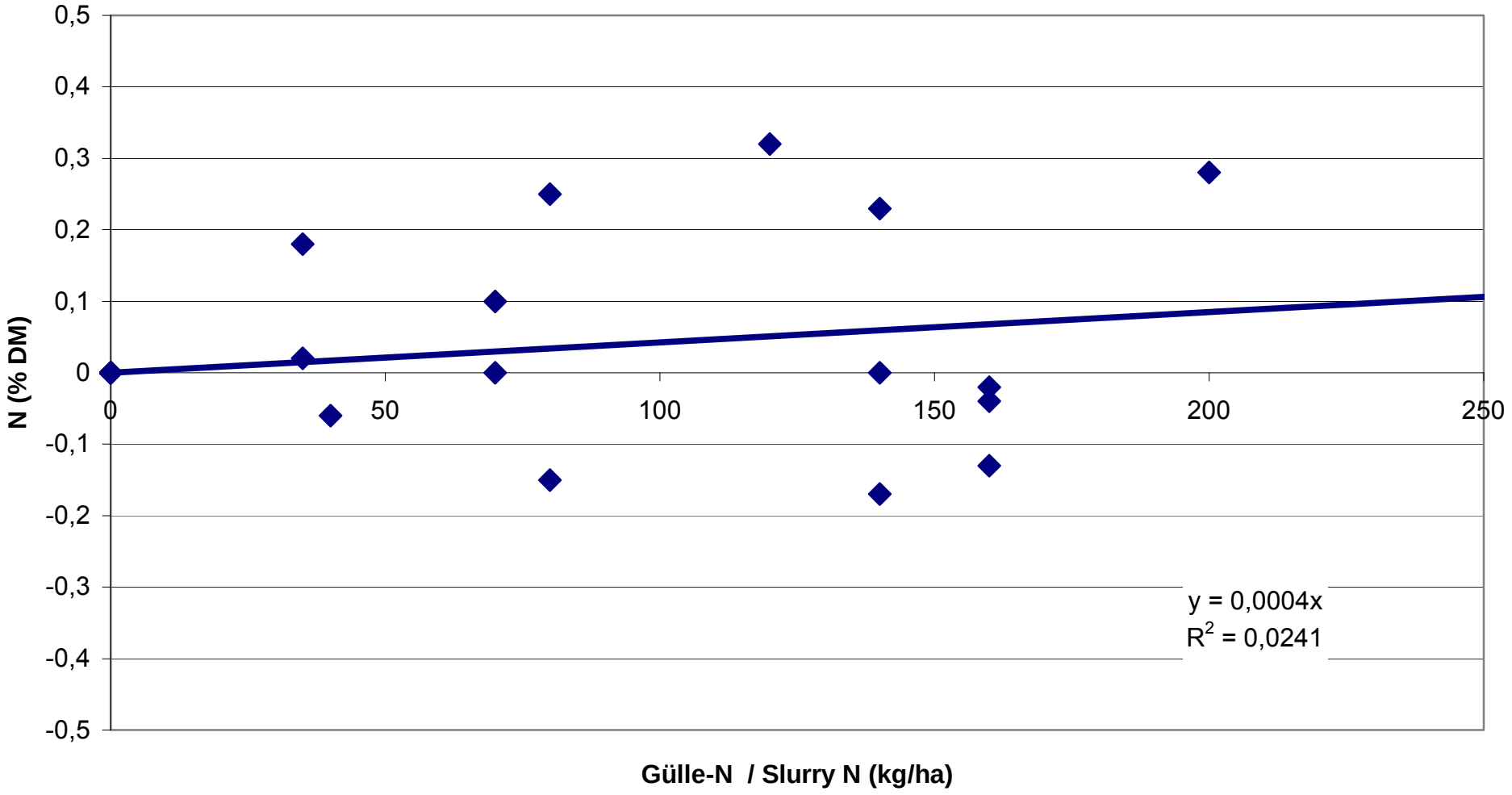
Einfluss der Stalldunganwendung auf die Gehalte an Stärke in Kartoffelknollen
Effect of cattle manure application on the starch content of potato tubers



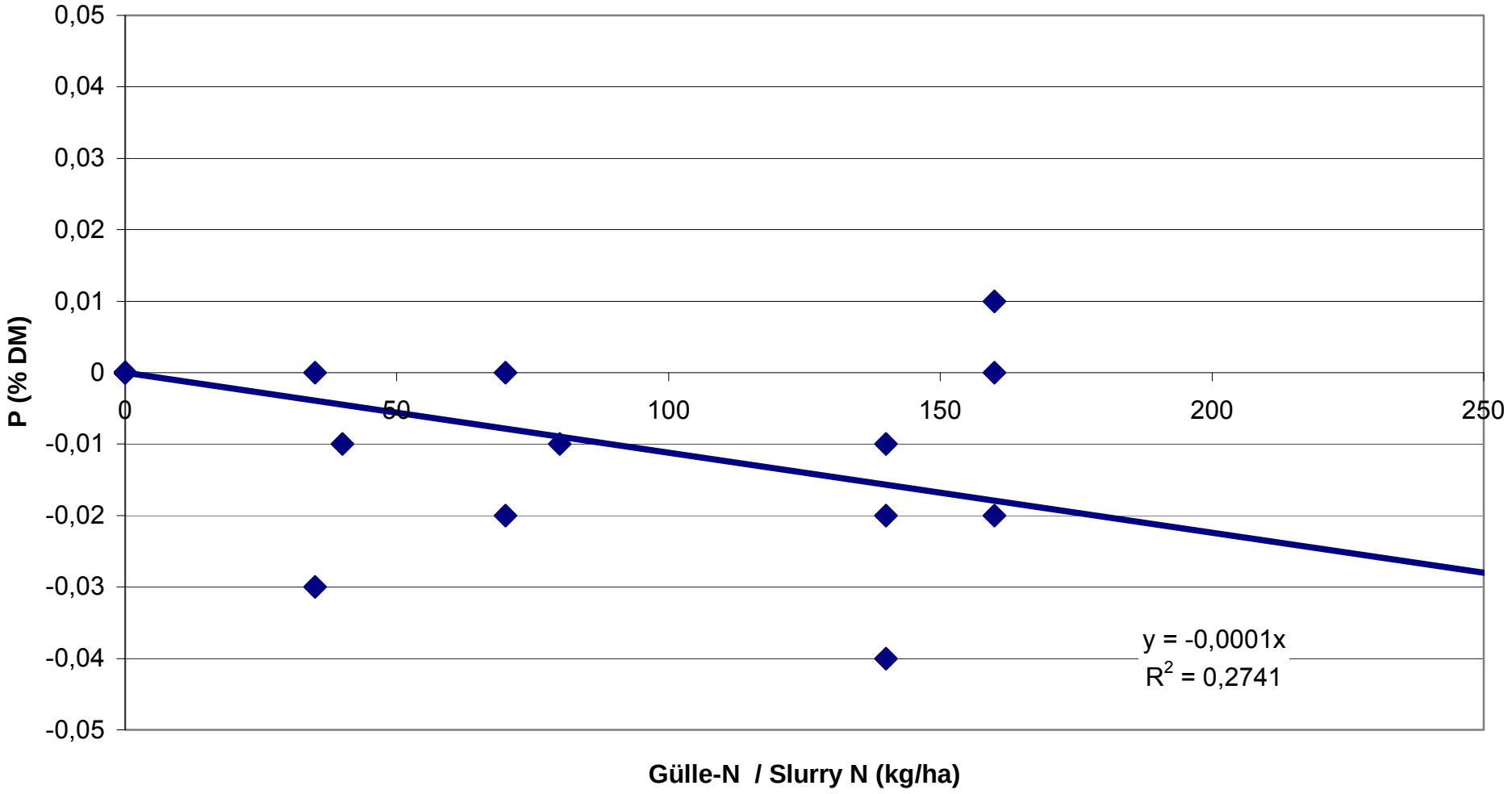
Einfluss von einmaliger und dauerhafter Anwendung von Gülle auf den Mehrertrag von Kartoffelknollen
Effects of single and multiple slurry application on the additional potato tuber yield



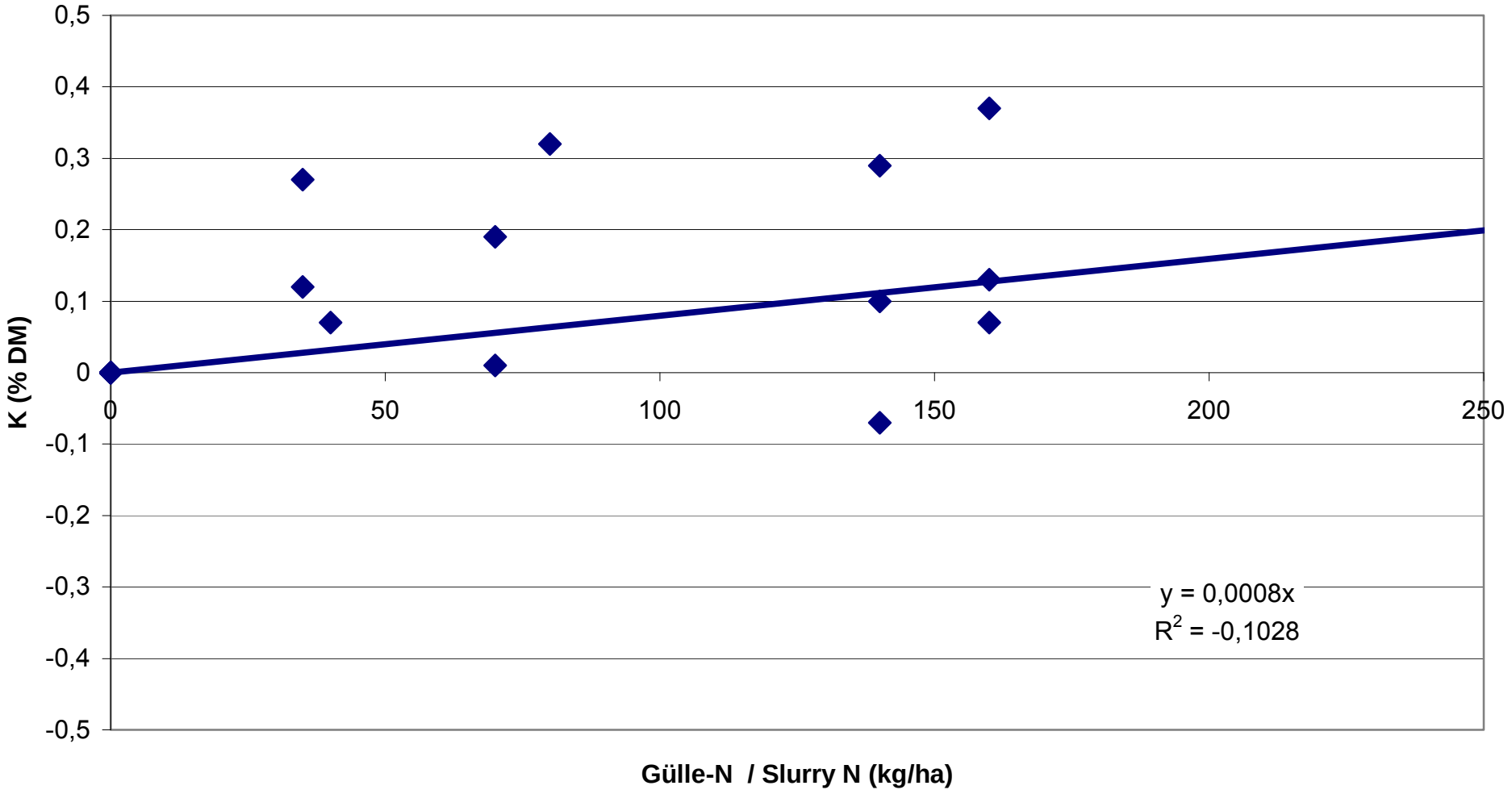
Einfluss von Gülle-Düngung auf die N-Gehalte von Kartoffelknollen
Effects of slurry application on the N concentrations of potato tubers



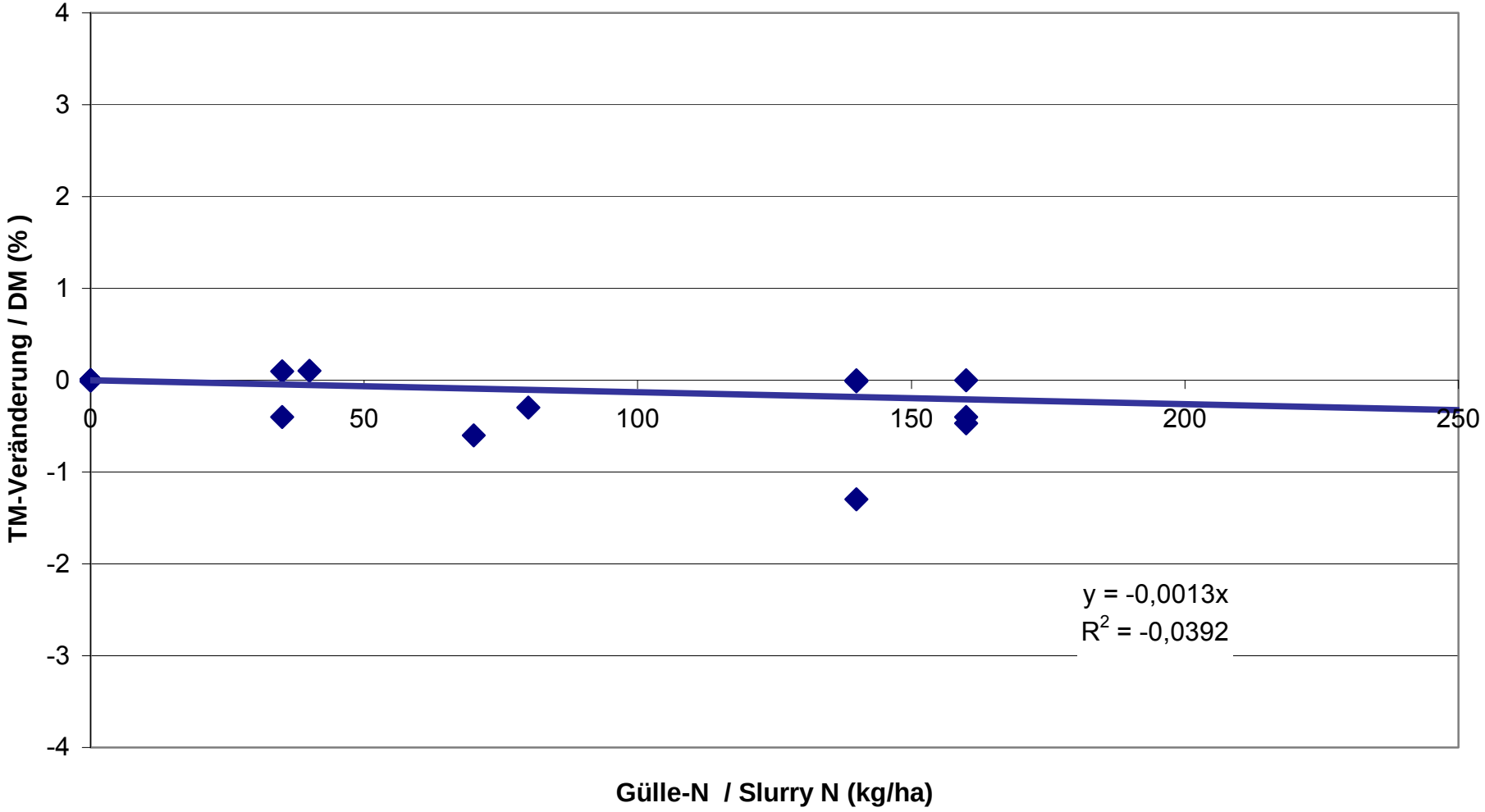
Einfluss von Gülle-Düngung auf die P-Gehalte von Kartoffelknollen
Effects of slurry application on the P concentrations of potato tubers



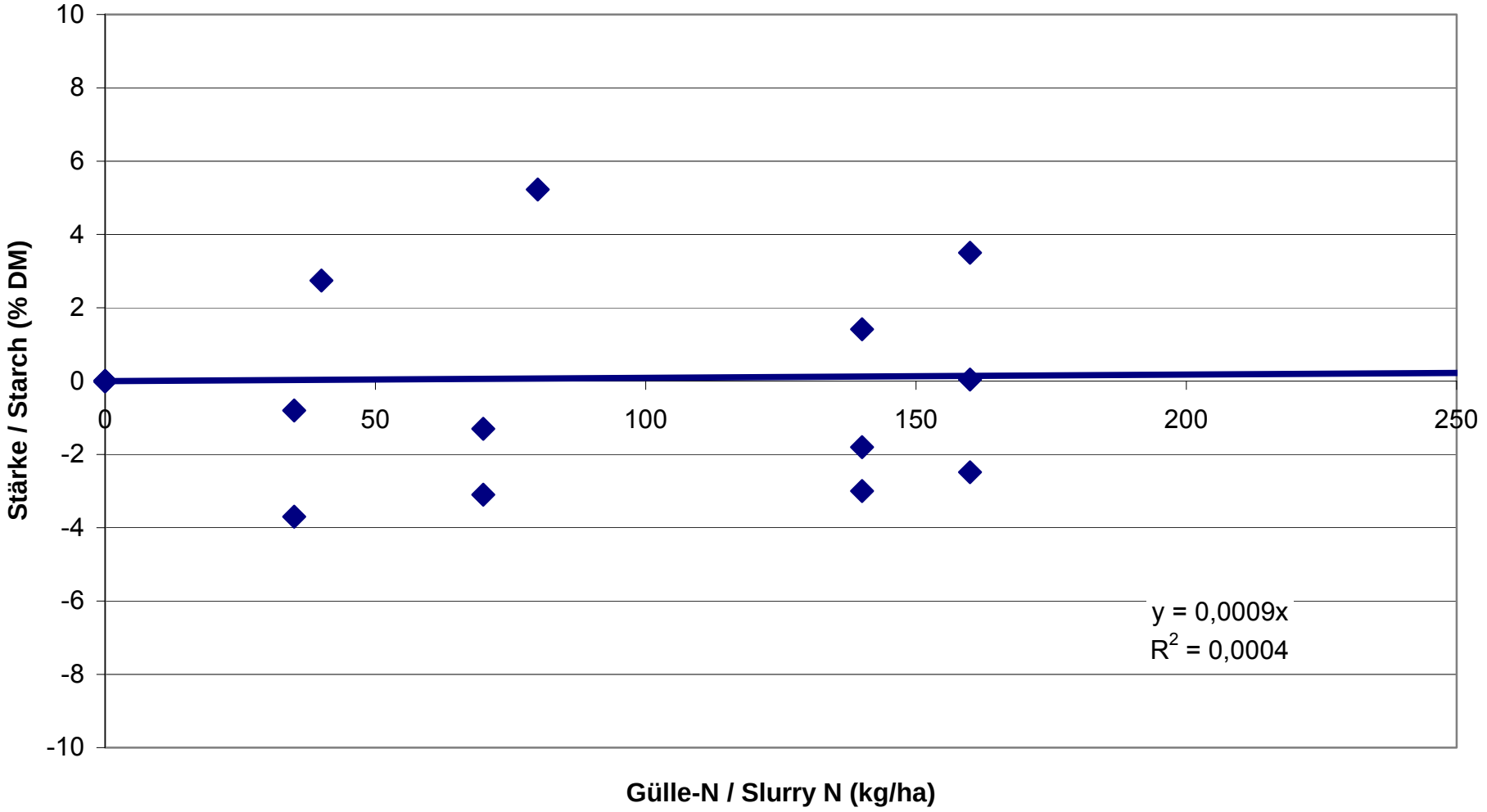
Einfluss der Gülle-Düngung auf die K-Gehalte von Kartoffelknollen
Effects of slurry application on the K concentration of potato tubers



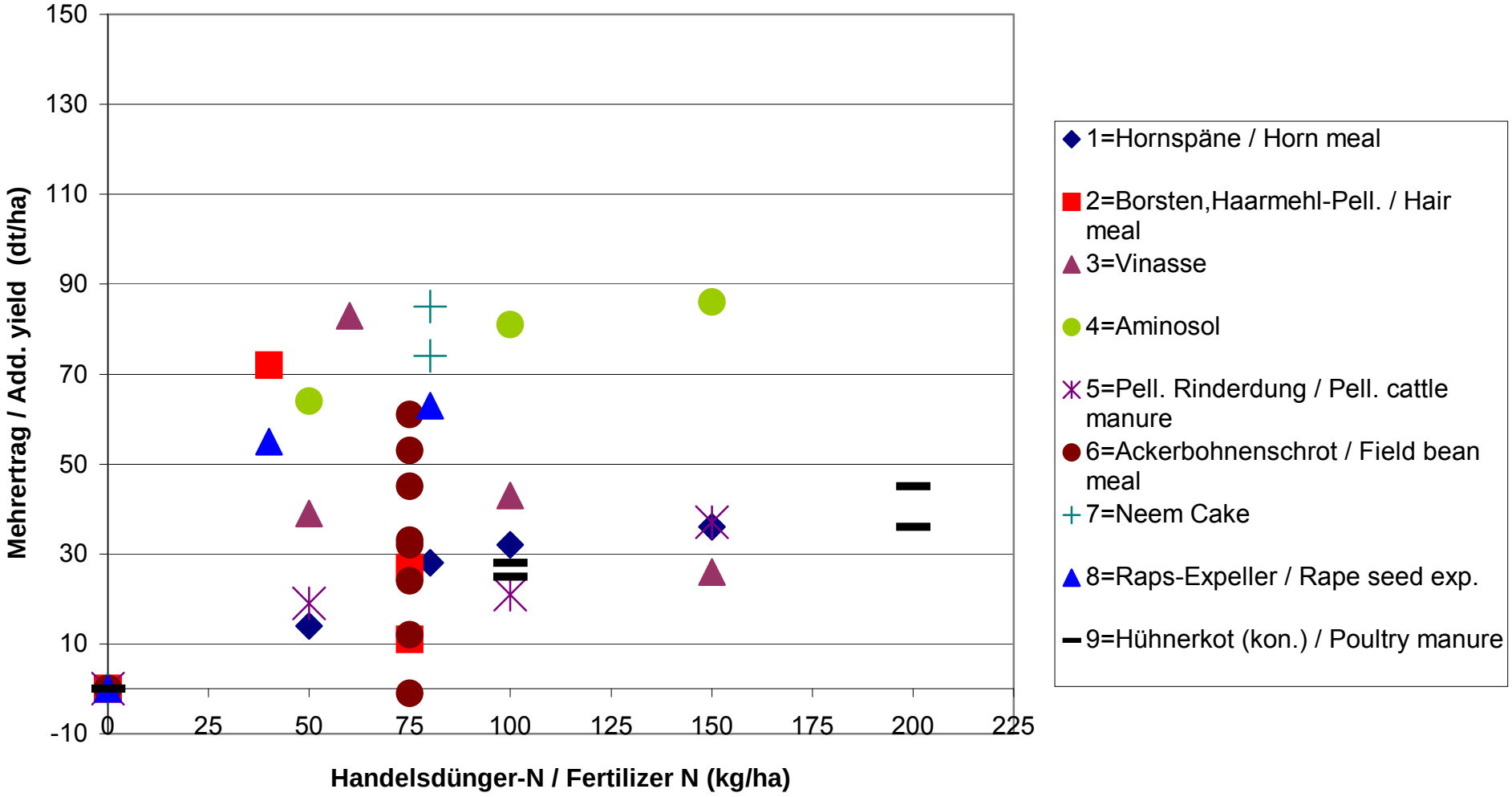
Einfluss von Gülle-Düngung auf dieTM-Gehalte von Kartoffelknollen
Effects of slurry application on the DM content of potato tubers



Einfluss der Gülle-Düngung auf die Gehalte an Stärke in Kartoffelknollen
Effects of slurry application on the starch concentration of potato tubers

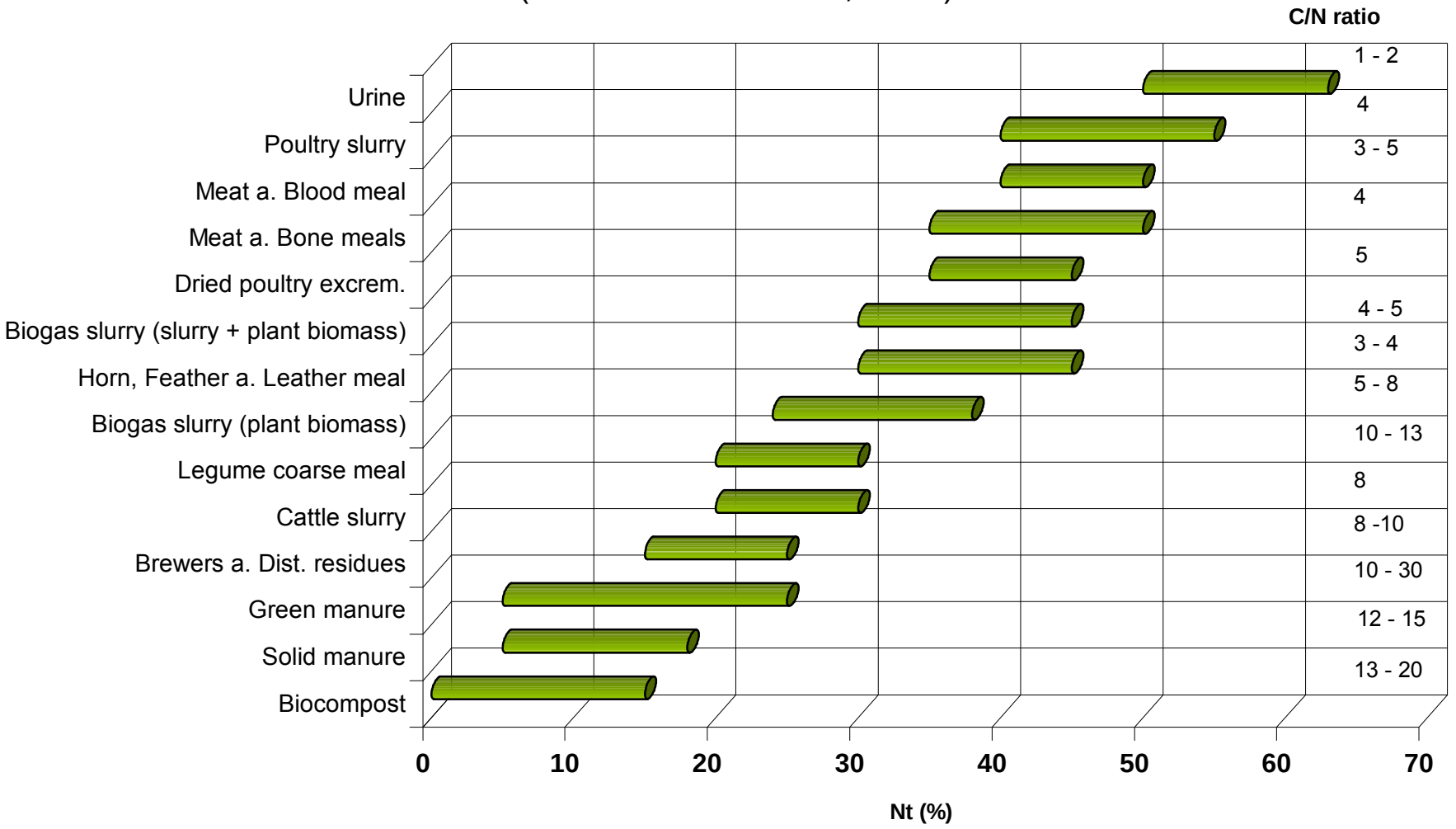


Einfluss organischer Handelsdünger auf den Mehrertrag von Kartoffelknollen
Effects of organic commercial fertilizer on the additional yield of potato tubers

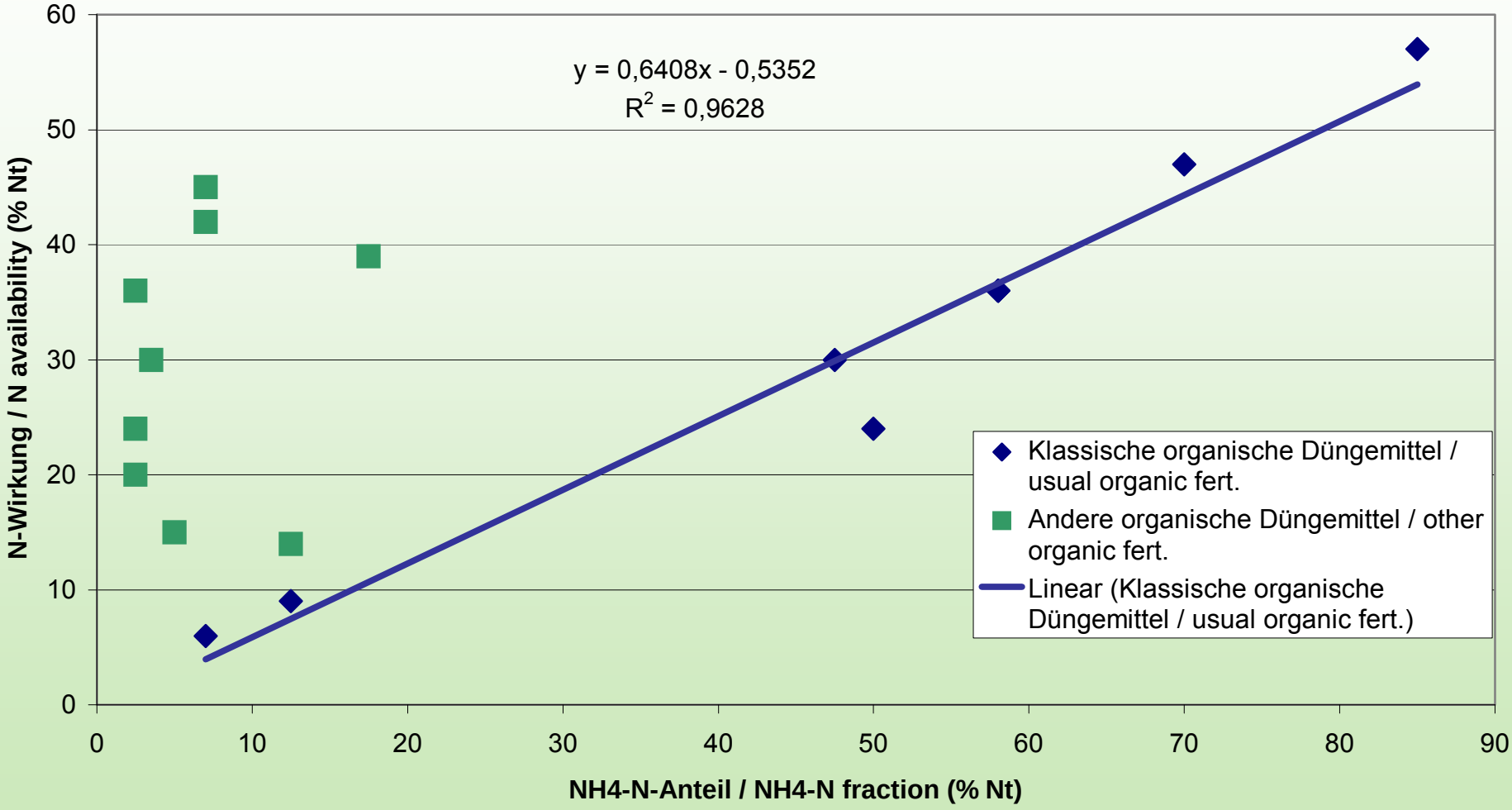


N availability of organic fertilizer in the year of application

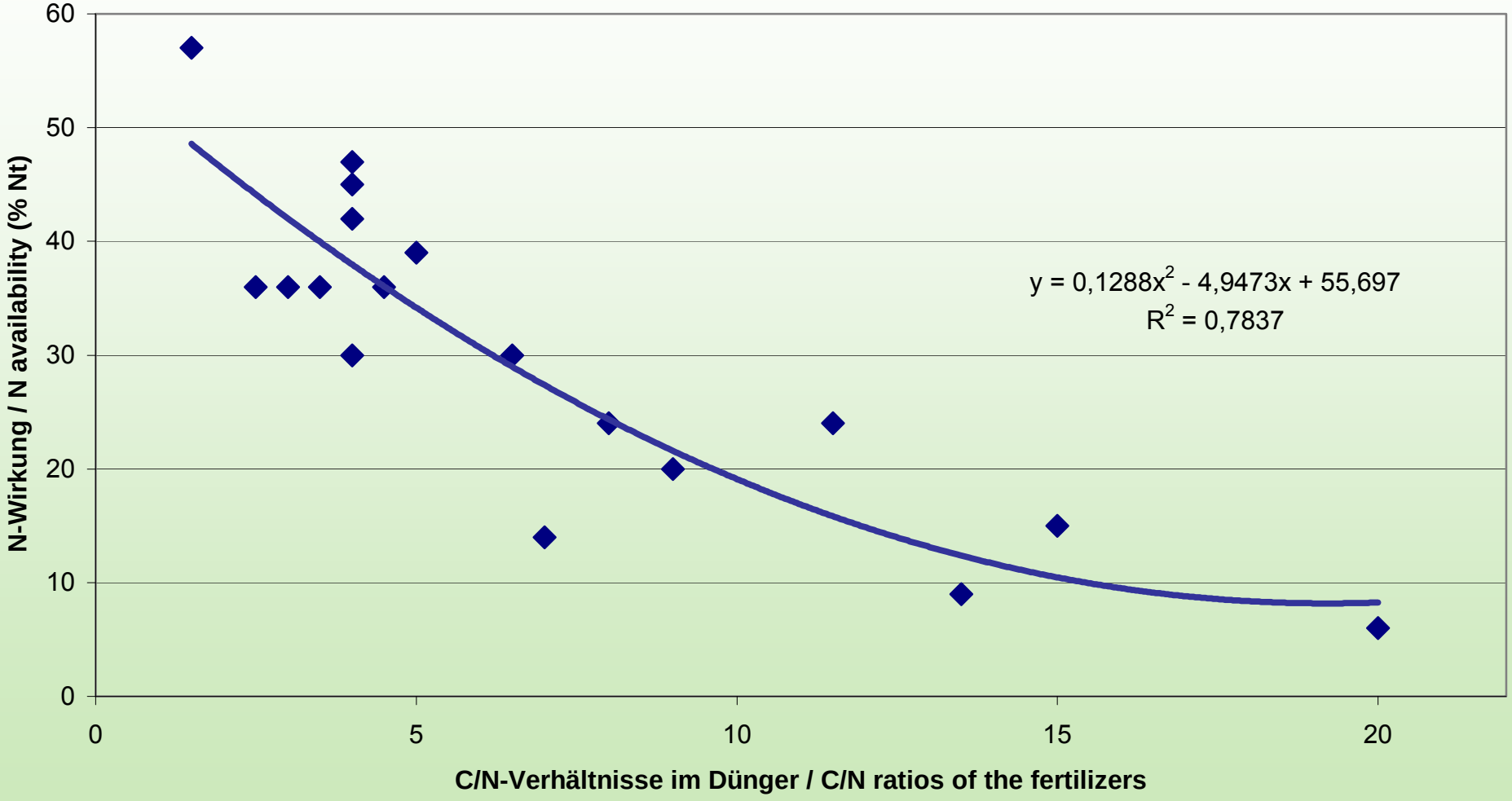
(after GUTSER et al., 2005)



Beziehung zwischen den NH4-N-Anteilen und der N-Wirkung von organ. Düngemitteln
Relationship between the NH4-N fraction and the N availability of organic fertilizer



Beziehung zwischen den C/N-Verhältnissen und der N-Wirkung von organischen Düngemitteln
Relationship between C/N rations and the N availability of organic fertilizers



Favourable application amounts for organic fertilizers, nutrient efficiencies, yield and quality effects for potato tubers

Fertilizer type	Dur-ation of appl.	Optimum application amounts		Tuber yield and ingredient effects						
		Fertilizer amount (dt/ha FM or m³/ha a. year)	Nt (kg/ha a. year)	Add. Tuber yield (dt/ha FM)	N efficiency (dt FM/kg Nt x ha)	N	P	K	DM	Starch
Compost	Short	100 – 300	75 – 200	20 – 30	0,20 – 0,17	0	0	+	-	(+)
	Long	75 – 220	50 – 150	ca. 35 – 75	ca. 0,70 – 0,50					
Stable manure	Short	150 – 300	75 – 150	25 – 35	0,28 – 0,22	0	+	++	--	-
	Long	100 – 300	50 – 150	25 – 50	0,48 – 0,32					
Slurry (cattle)	Short	15 – 35	50 – 100	30 – 50	0,58 – 0,50	+	-	+	-	0
	Long	ca. 15 – 40	ca. 50 – 120	ca. 40 – 60	0,85 – 0,60					
Dried poultry excrem.	Short		50 – 100	ca. 25 – 45		(++)		(+)	(-)	
Pell. Cattle manure	Short		50 – 100	ca. 20 – 30		(+)		(+)	(-)	
Vinasse	Short		50 – 100	ca. 35 – 45		(+)	?	(+)	(-)	?
Rape seed exp.	Short		50 – 100	ca. 55 – 65		(+)		(-)	?	
Horn meal	Short		50 – 100	ca. 15 – 35		(++)		(-)	(+)	
Hair meal	Short		50 – 100	ca. 30 – 70		(++)		(-)	(+)	

Legend: 0 = no effect; + = positive, increasing, ++ = positive, distinct increasing effect;
- = negative, decreasing, -- = negative, distinct decreasing effect; ( ), ? = unclear effects

DM- and nutrient concentrations of potato tubers and foliage (kg/dt FM)

Type	DM	N	P	K	Mg	Ca	S
Removal tuber	21,0	0,32	0,06	0,50	0,03	0,009	0,03
Removal foliage	25,0	0,36	0,07	0,50	0,13	0,56	0,04
Removal in relation to tuber yield (tuber : foliage = 1:0,3)	-	0,43	0,08	0,65	0,07	0,18	0,04

Nutrient concentration of organic fertilizers
(after HÜNSCHE 1995, DEWES & HÜNSCHE 1998, KOLBE 2003, STEIN-BACHINGER, person. commun.)

Fertilizer type	DM (%)	N (kg/dt)	P (kg/dt)	K (kg/dt)	Mg (kg/dt)
Stable manure					
Stable manure compost (cattle)	25	0,45-0,55	0,12-0,15	0,50-0,60	0,10-0,15
Staple manure (cattle)	25	0,30-0,60	0,15-0,20	0,60-0,90	0,05-0,15
Staple manure (pig)	25	0,55-0,65	0,25-0,30	0,30-0,40	0,10-0,25
Further organic fertilizer and commercial fertilizer					
Green manure	15	0,3	0,05	0,35	0,03
Field bean coarse meal	86	4,2	0,47	1,13	0,16
Horn meal	-	8,0	6,42	0,13	0,27
Vinasse	-	3,5	0,72	6,31	0,13
Rap seed pellet cake	-	4,8	1,08	1,19	0,39
Slurry/Urine					
	DM (%)	**N (kg/m^3)**	**P (kg/m^3)**	**K (kg/m^3)**	**Mg (kg/m^3)**
Slurry (cattle)	8	3,0-4,0	0,60-0,70	4,9-5,0	0,73
Slurry (pig)	8	4,6-5,0	1,40-1,60	2,4-2,5	1,00
Urine	2	2,0	0,05-0,10	5,5-6,0	0,08