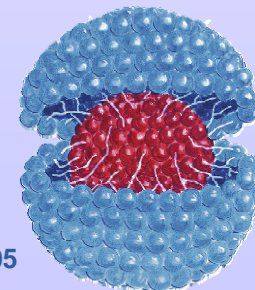


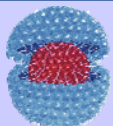


Summary BV – Study CoQ 10

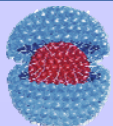
Conducted by BioTeSys, Esslingen, Germany
Principal Investigator: Prof. Dr. HK Biesalski

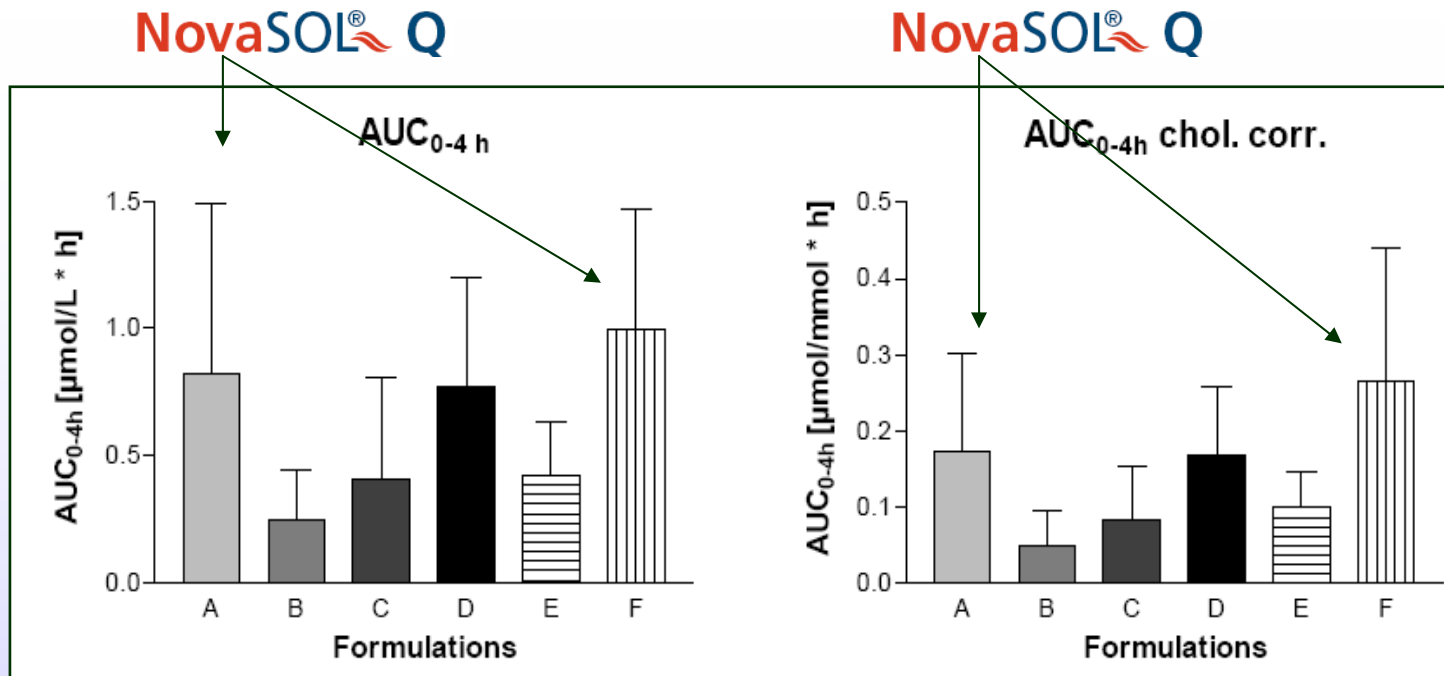


- Title: Comparative bioavailability of six different CoQ10 – formulations
- Design: Open, comparative, randomized, monocentric
- Trial Population: 60 male subjects, 18 – 50 years, BMI 19 – 30
- Dosage: 60 mg CoQ10/d for 14 days
- Objectives:
 - Plasma CoQ10 for pharmacokinetic parameters AUC, C_{max} and T_{max}.
 - Plasma CoQ10 after repeated supplementation on days 7 and 14, resp. (steady state)

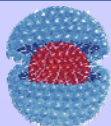


- Straight CoQ10 (B)
- Supplement I. Solubility & bio-availability claim (C)
- Supplement II. Oily dispersion (E)
- Supplement III. Solubility & bio-availability claim (D)
- NovaSOL Q 5% (A)
- NovaSOL Q 3% (F)

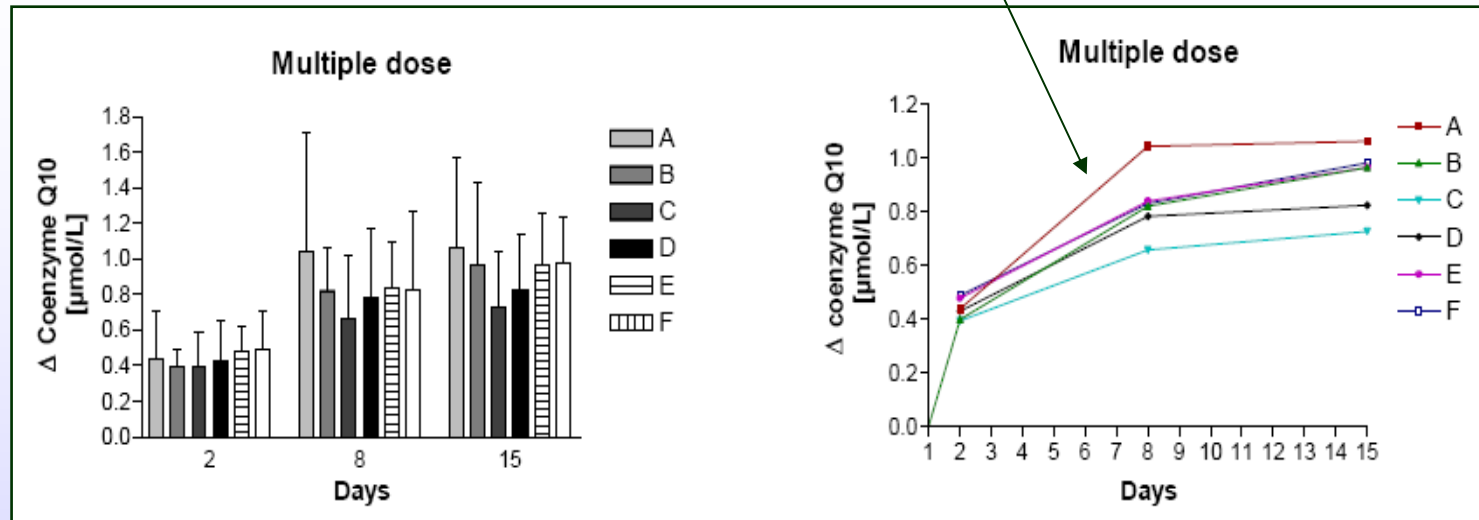




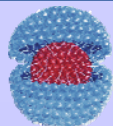
AUCs clearly show that the absorption rates of the water soluble formulations F, A and D are enhanced during early hours after supplementation.



NovaSOL[®] Q



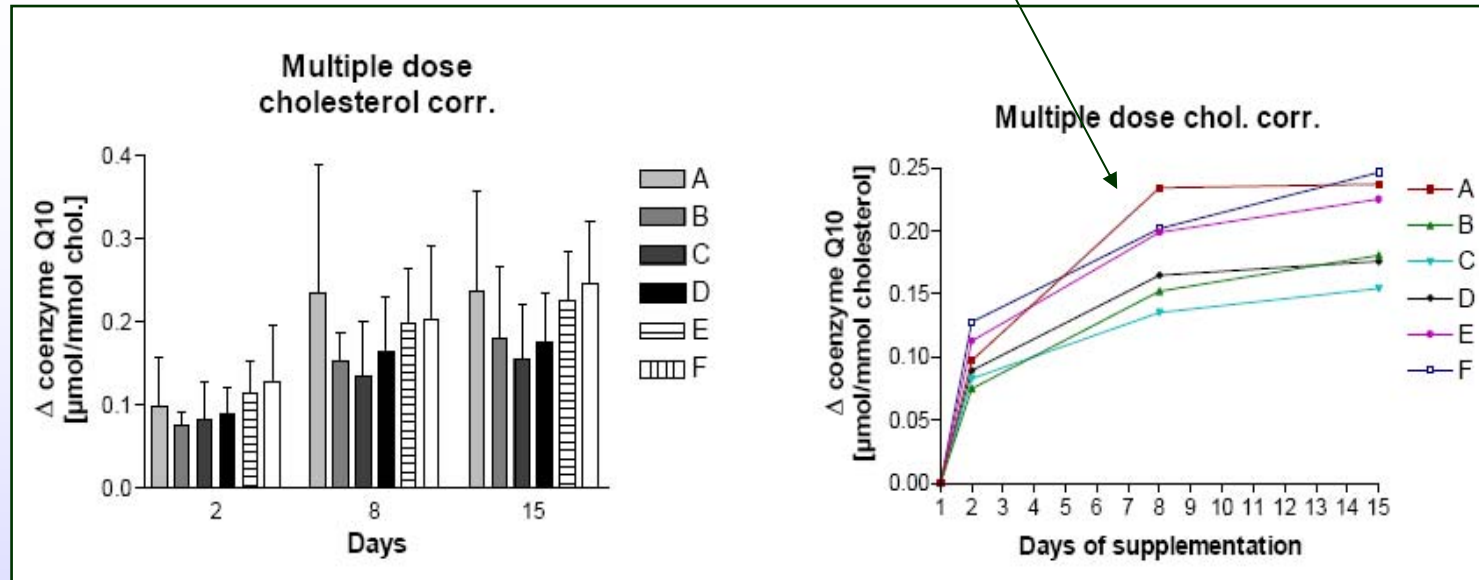
Cumulated increase in CoQ10 plasma levels after baseline correction after 1, 7 and 14 consecutive days of supplementation. NovaSOL Q 5% shows the fastest increase and reaches the steady state first.



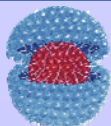
Steady State Cholesterol Corrected

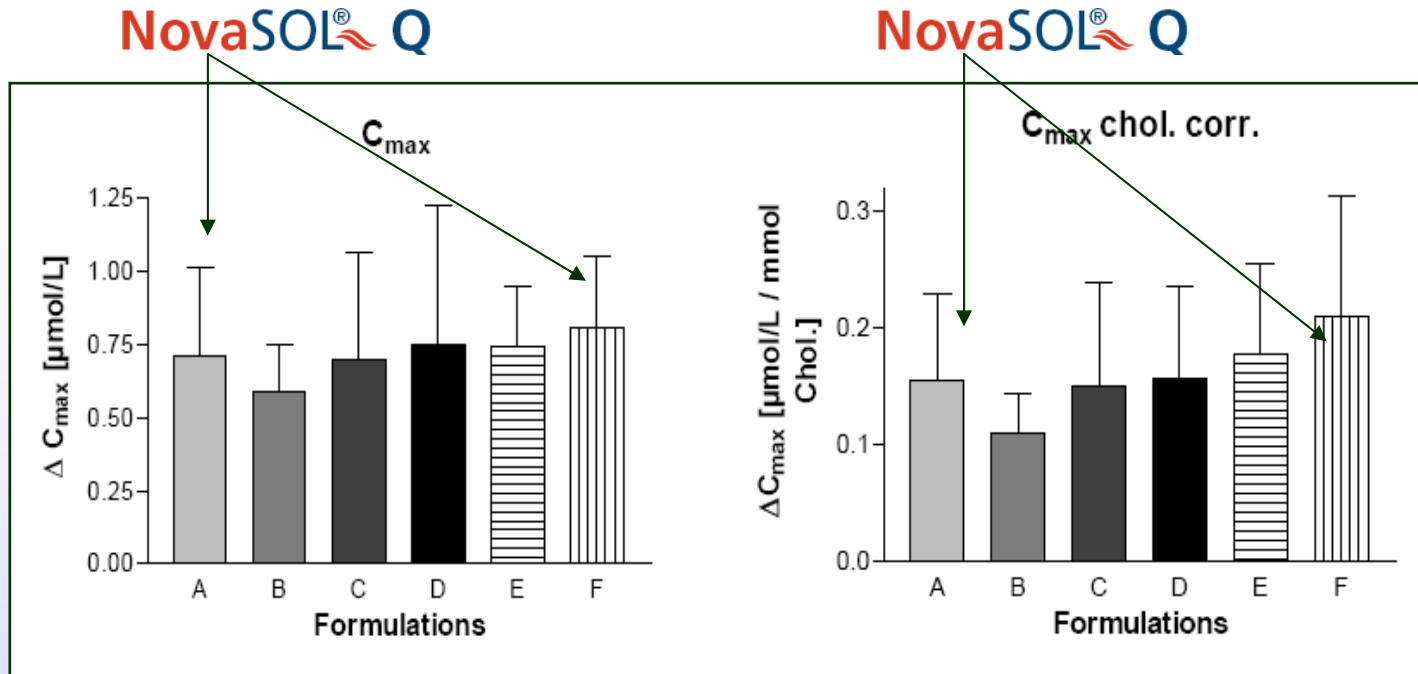


NovaSOL[®] Q

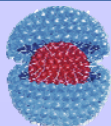


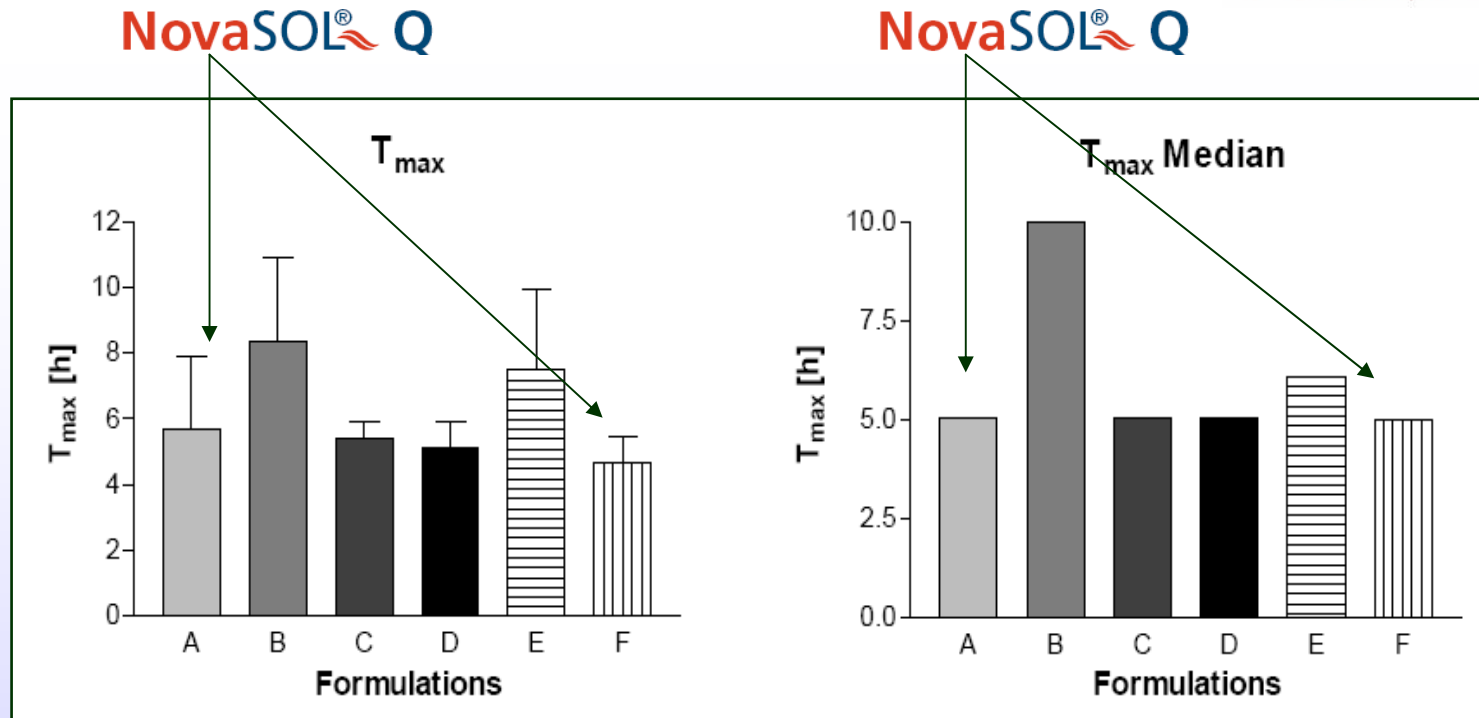
Cumulated increase in CoQ10 plasma levels after baseline and total cholesterol correction after 1, 7 and 14 consecutive days of supplementation. NovaSOL Q 5% shows the fastest increase and reaches steady state first.



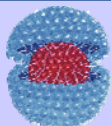


NovaSOL Q 3% has the highest, straight CoQ10 the lowest C_{max}. Statistically not significant





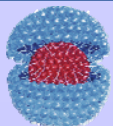
NovaSOL Q 3% reaches C_{max} after the shortest, straight CoQ10 after the longest time. Difference statistically significant (p=0.0483)



Overall, based on all data generated, clear differences in bioavailability between the formulations have been found, although, in contrast to other studies, standardized conditions for all formulations, whether fat or water soluble, were guaranteed, resulting in equal absorption opportunities for all of them.

Looking at the AUC, the major indicator for bioavailability, NovaSOL Q 3% (F) is superior followed by NovaSOL Q 5% (A) and Supplement III (D). The results show clear superiority of the water soluble solutions over oil based suspensions, i.e. Supplement I (C) and Supplement II (E) as well as over straight CoQ 10 (B)

Looking at long time supplementation and the rate at which the steady state is reached, NovaSOL Q 5% (A) is clearly superior to all other formulations.



- Straight CoQ10 (hard gels) has the slowest absorption and the lowest bio-availability (BV) although given with fat
- NovaSOL Q has overall the best BV of all preparations
- AUC0-4h ratios between formulations and straight CoQ10:
 - Straight CoQ10: 1.0
 - Supplement I. Solubility & bio-availability claim: 1.6
 - Supplement II. Oily dispersion: 1.7
 - Supplement III. Solubility & bio-availability claim: 3.1
 - NovaSOL Q 5%: 3.3
 - NovaSOL Q 3%: 4.0
- NovaSOL Q 5% (E) shows the fastest increase in the blood and reaches the steady state first (7days) followed by C > A = D > B

