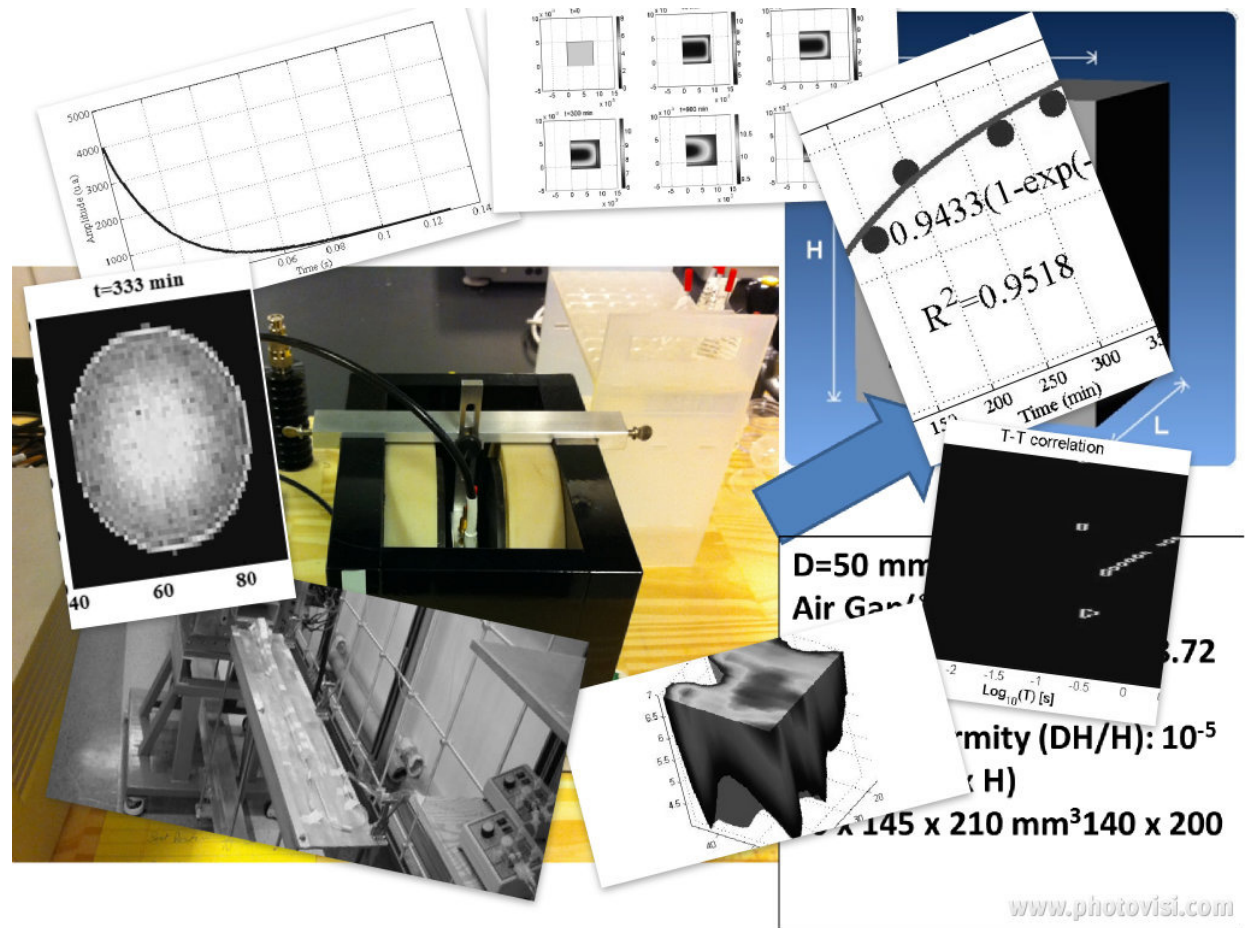




11. Türkiye Gıda Kongresi
10-12 Ekim 2012
Hatay , Türkiye



MRG nedir?

MANYETİK REZONANS GORUNTULUME

Tahribatsız
Boyutsal rezolüsyon

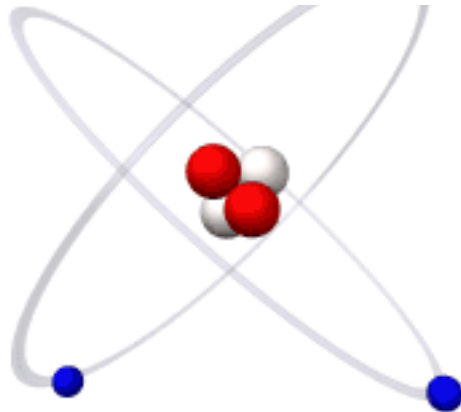


Giriş

- Nükleer Manyetizma
- Nükleer Manyetizma her atomda görülmez; atomun belli bazı özellikleri nükleer manyetizmanın oluşup oluşmayacağını belirler.
- NMR aktif atomlar

Atom Numarası (Z)	Nötron Numarası(N)	Kütle Numarası (A)	Nükleer Manyetizma
çift	çift	çift	(-)
çift	tek	tek	evet
tek	çift	tek	evet
tek	tek	çift	evet

Tablo: Proton ve nötron sayılarının çift sayıda olmaları halinde nükleer manyetizma (-) olmaktadır. Proton veya nötron sayıları tek olduğunda ise nükleer manyetizma (+) olmaktadır.

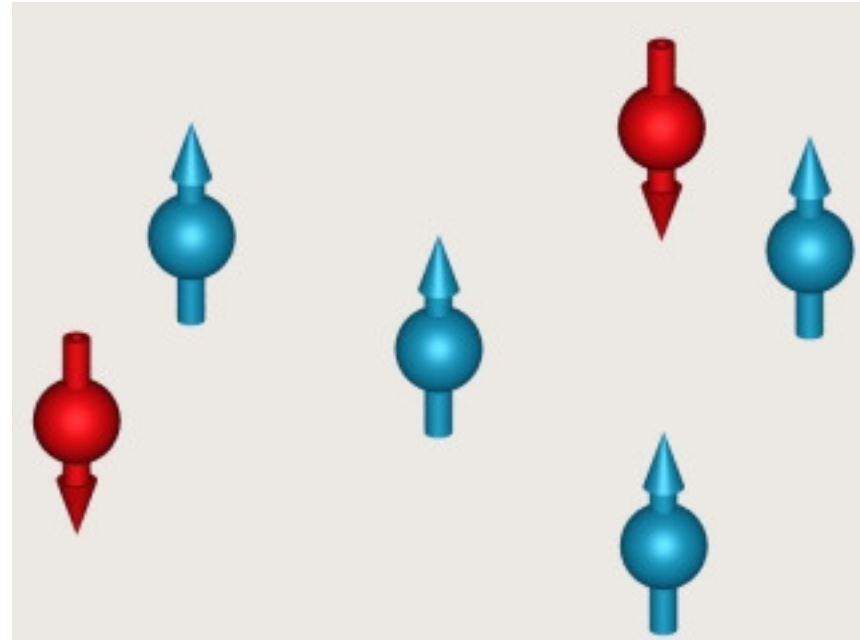
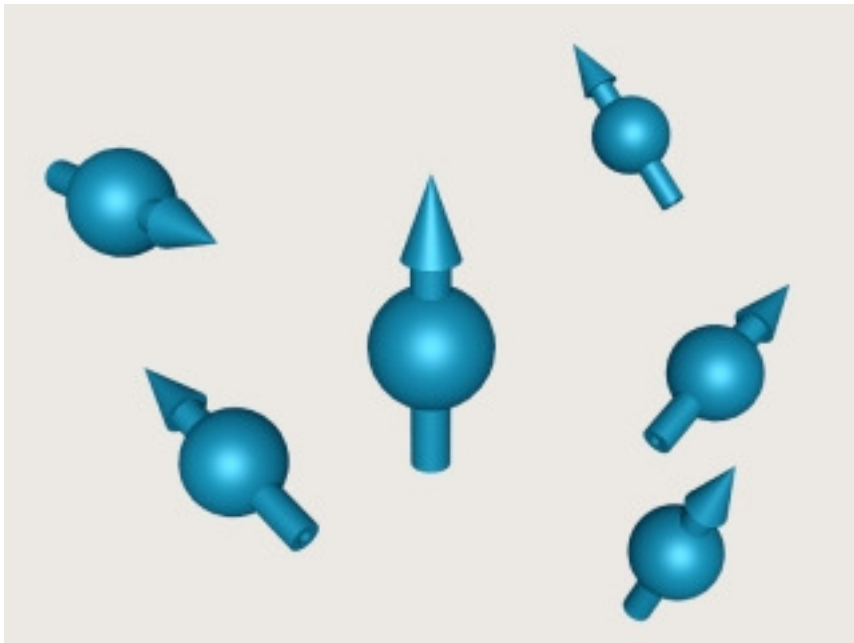


Giriş

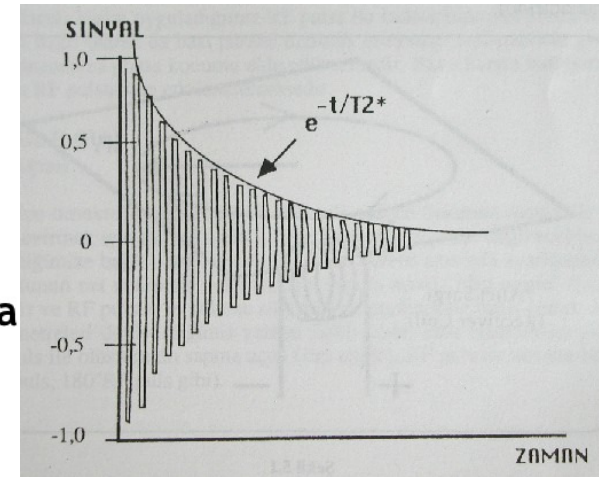
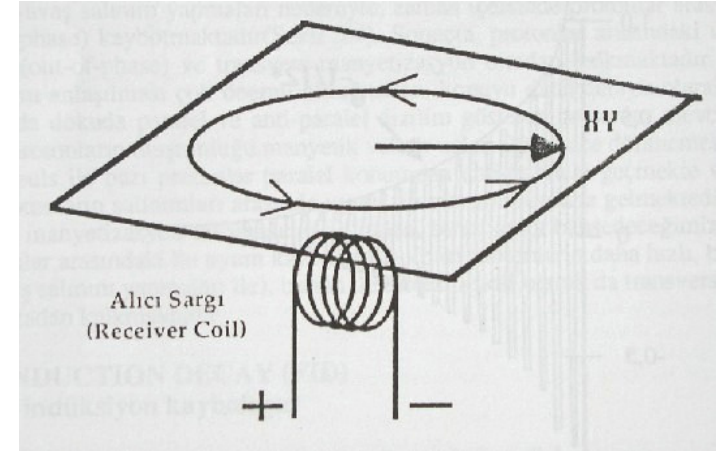
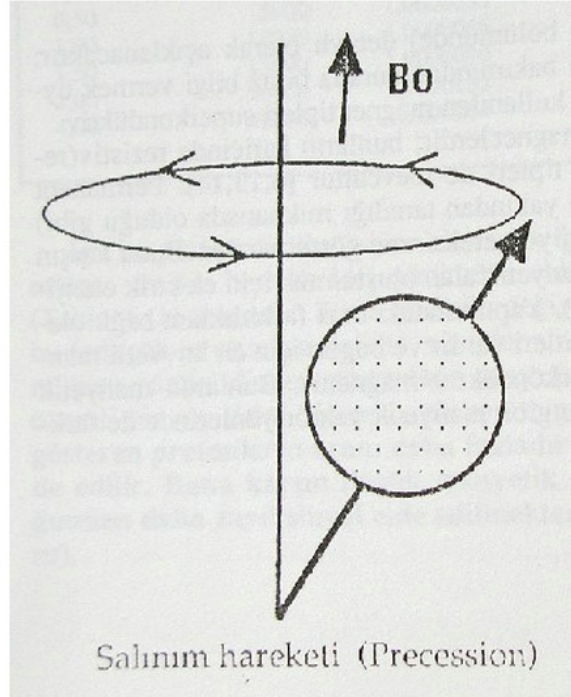
N	Z	Izotop	Element	% Abundance
1	0	H1	Hidrojen	99,98
1	1	H2	Hidrojen	0,02
6	7	C13	Karbon	1,10
7	7	N14	Nitrojen	99,62
7	8	N15	Nitrojen	0,38
8	9	O17	Oksijen	0,039
9	10	F19	Florin	100,0
11	12	Na23	Sodyum	100,0
12	13	Mg25	Magnesium	11,50
15	16	P31	Fosfor	100,0
17	18	C135	Klor	75,40
17	20	C137	Klor	24,60
19	20	K39	Potasyum	93,38

Tablo: Atom numaraları aynı, kütle numaraları farklı olan atomlara izotoplar denmektedir. Örneğin hidrojenin izotoplarından H1'de 1 proton, H2'de 1 proton ve 1 **Nötron** vardır.

Spinler



Salınım



Proton B_0 çevresinde bu salınım hareketini ne kadar hızla

Buna cevap MRG'nin temeli olan "Larmor denklemi" ile verilebilir:

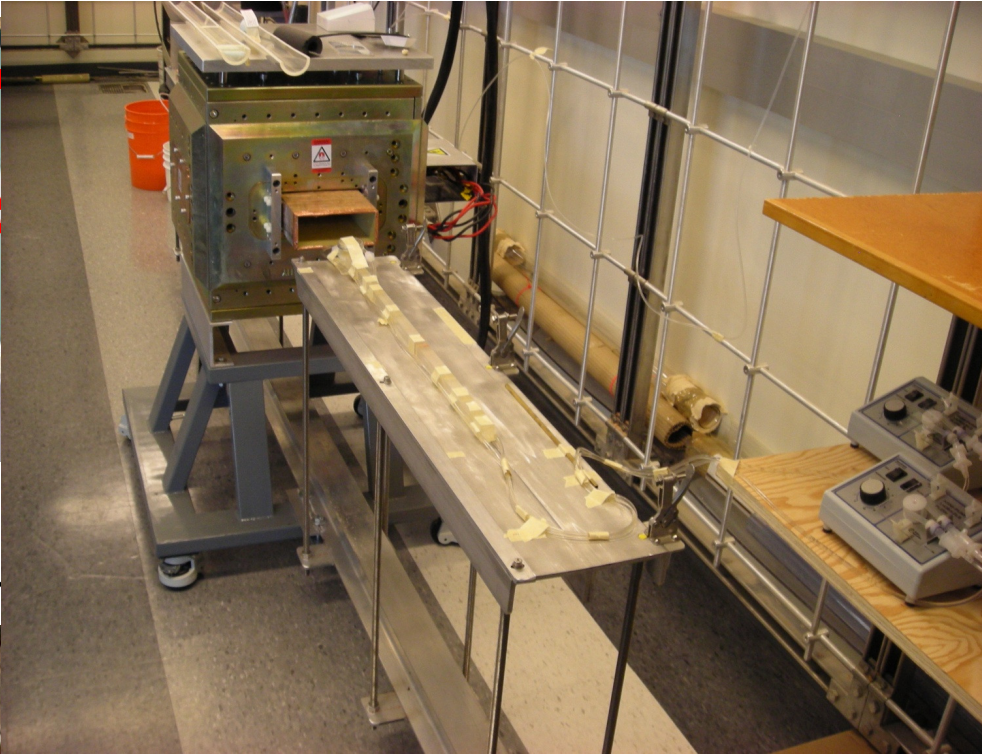
$$\omega_0 = \gamma \cdot B_0$$

ω_0 : Salınım (precession) frekansı

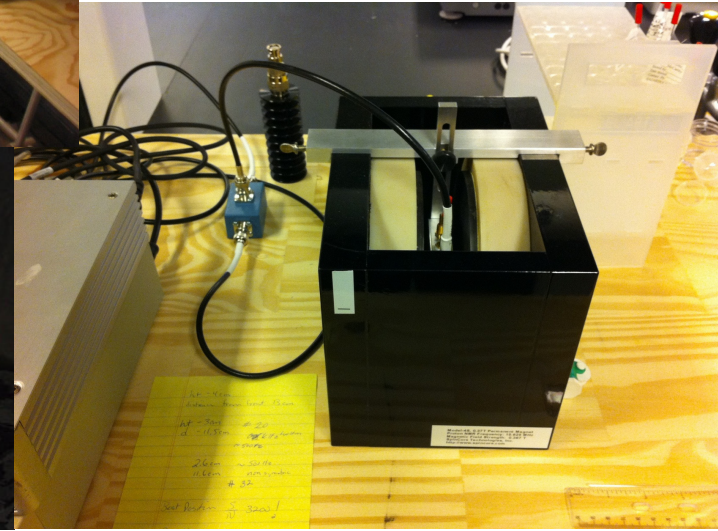
B_0 : Magnet gücü

γ : Gyromanyetik sabite

Kullanılan Ekipmanlar

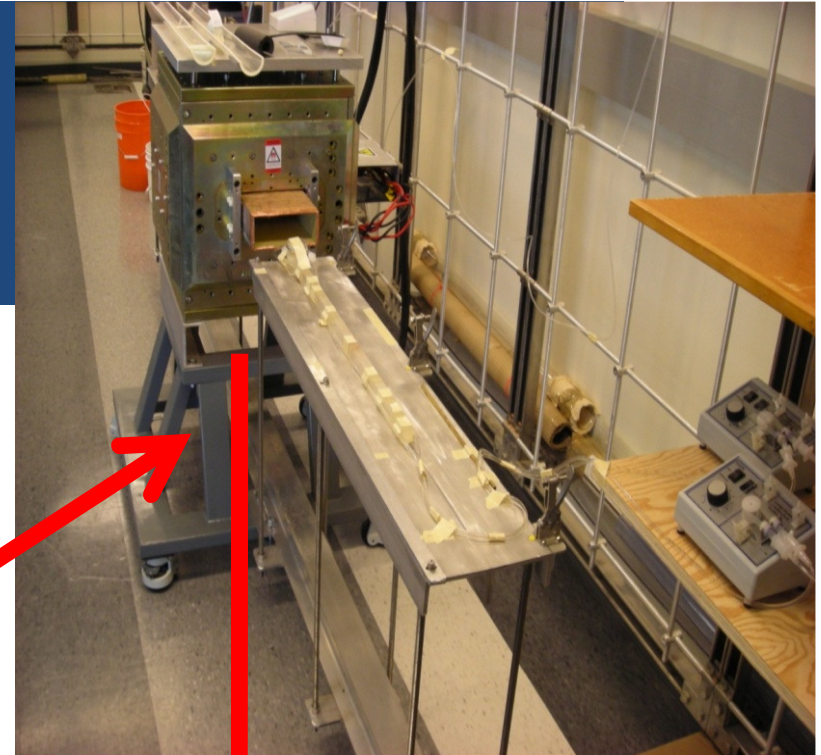
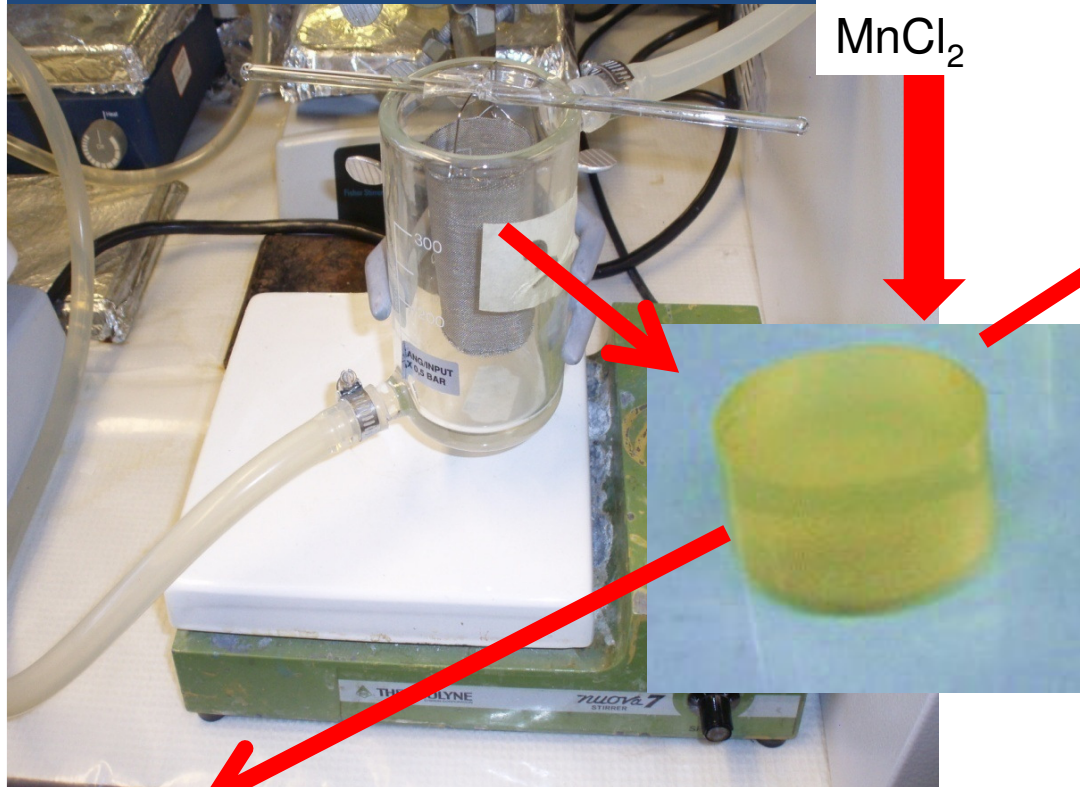


Gr



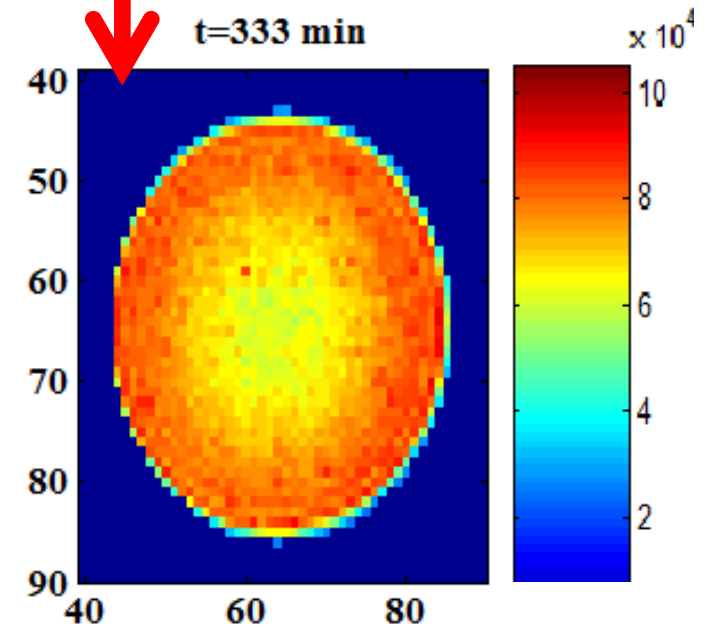
MRG kullanarak PAST hidrojellerinden hazırlanmış kontrollü salınım sistemlerinin incelenmesi

Deney Düzenegi

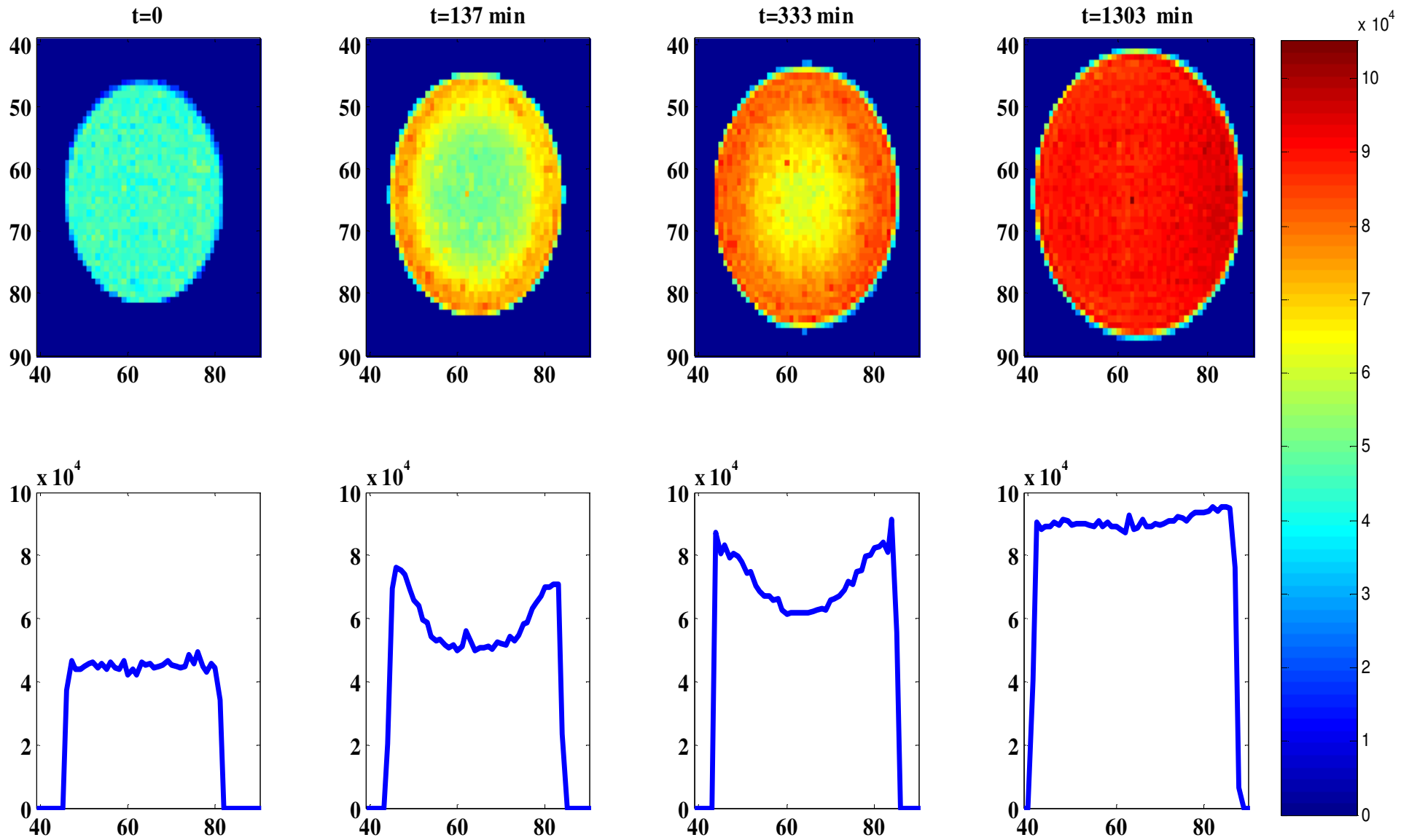


?? Grams

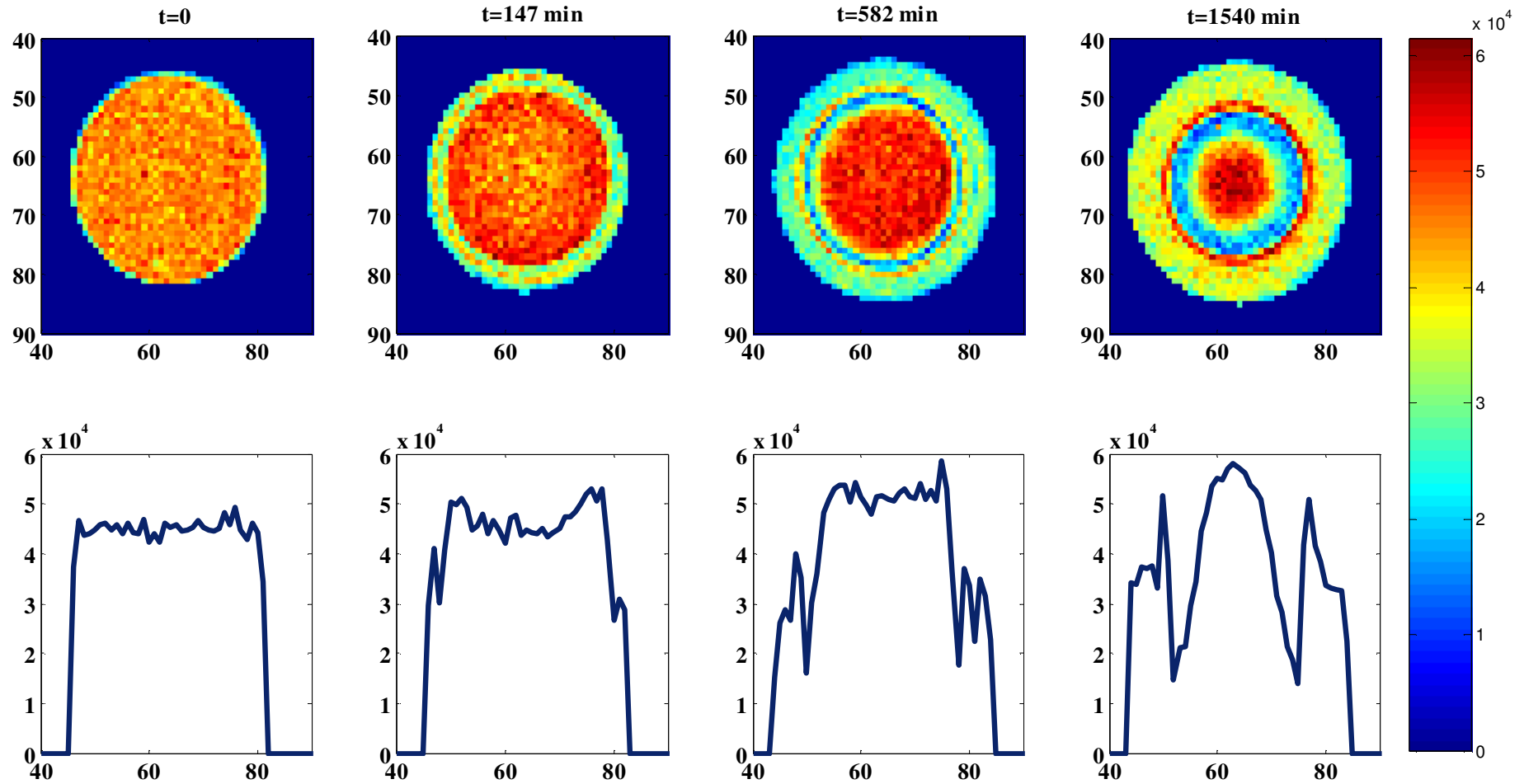
Şişme Oranı %: $[\text{Mt}-\text{M0}]/\text{M0}$
Mt-> mass at time t
M0-> mass at time 0



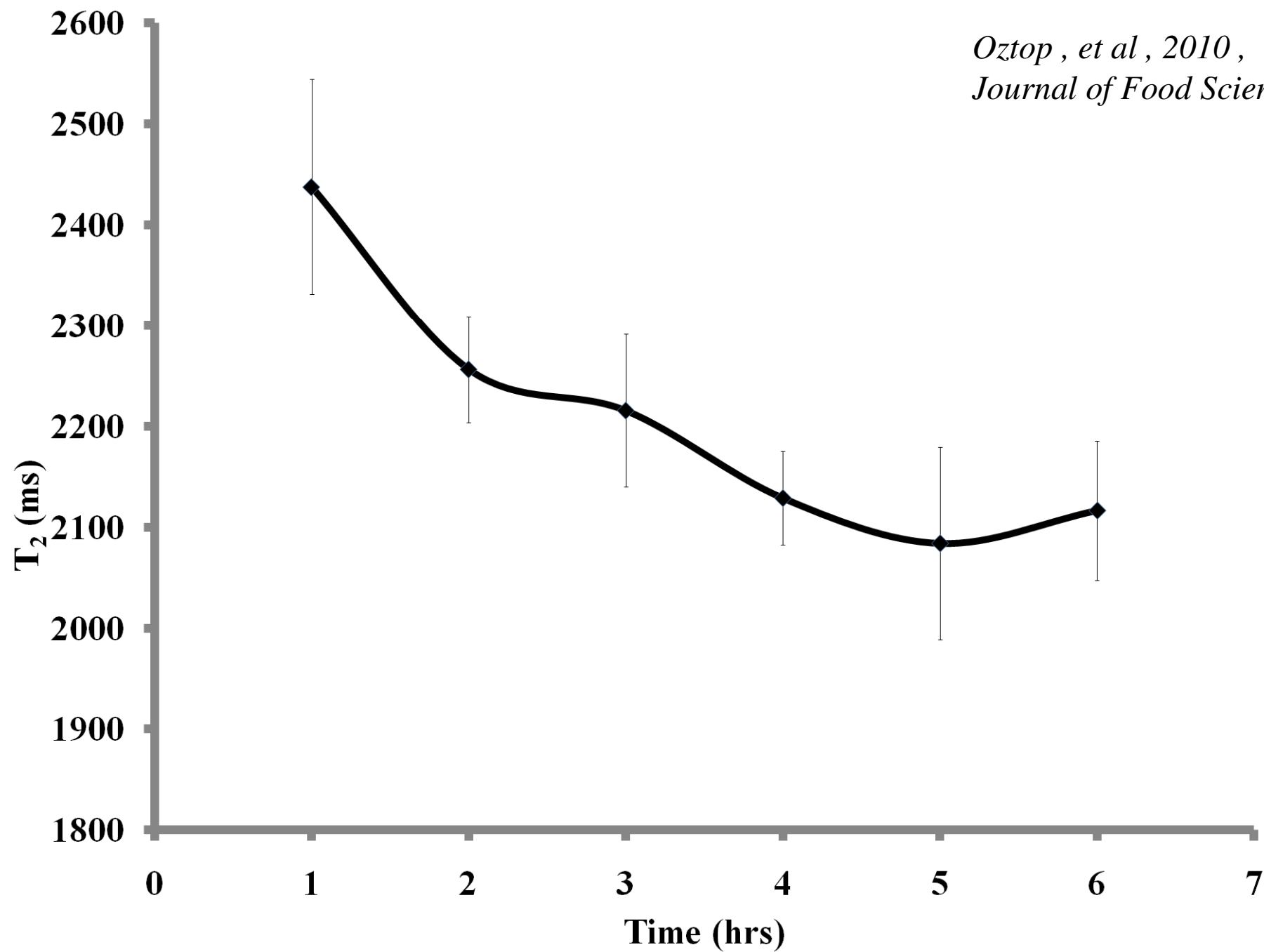
MR Görüntüleme : @ pH 7.0



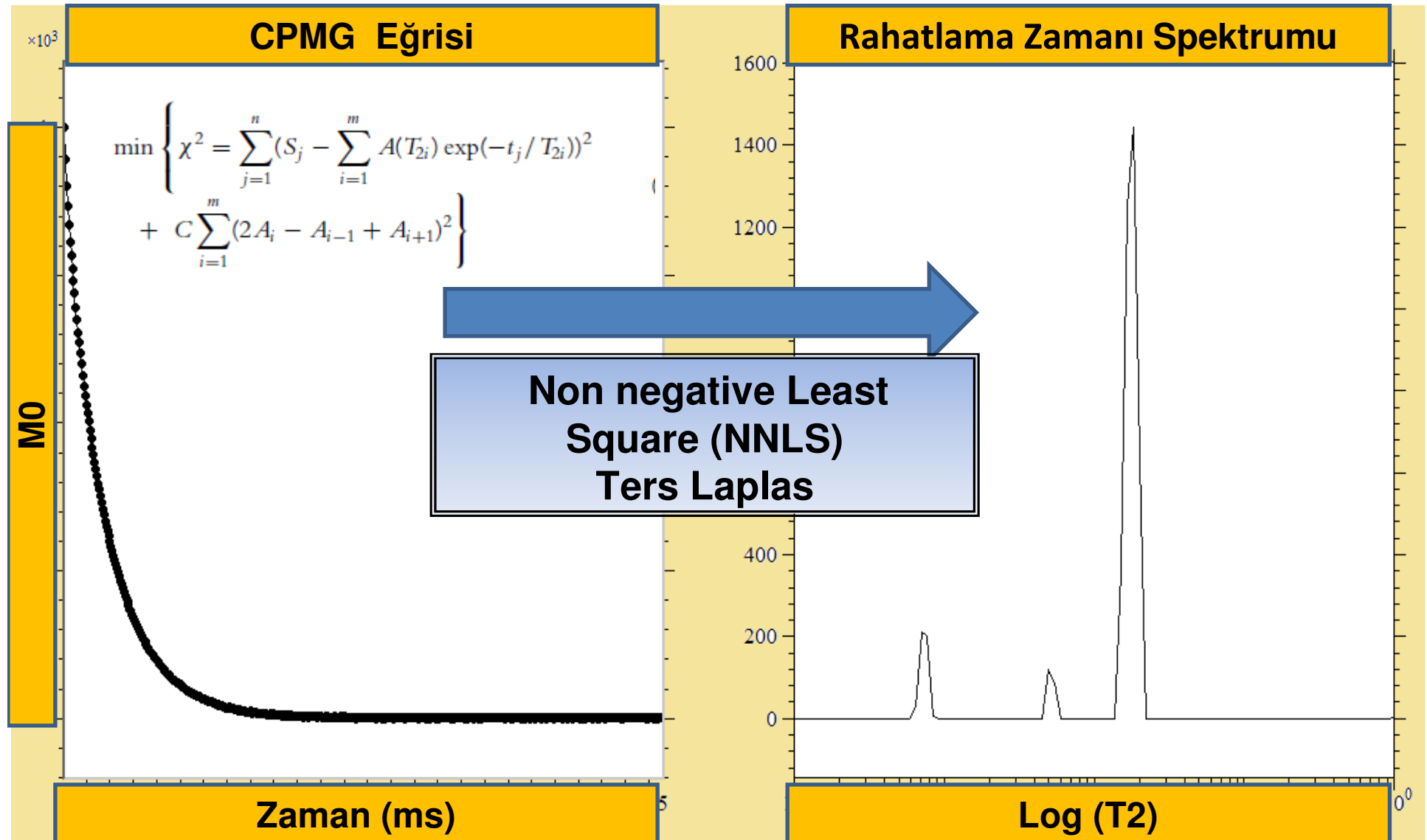
MR Görüntüleme : @ pH 2.5

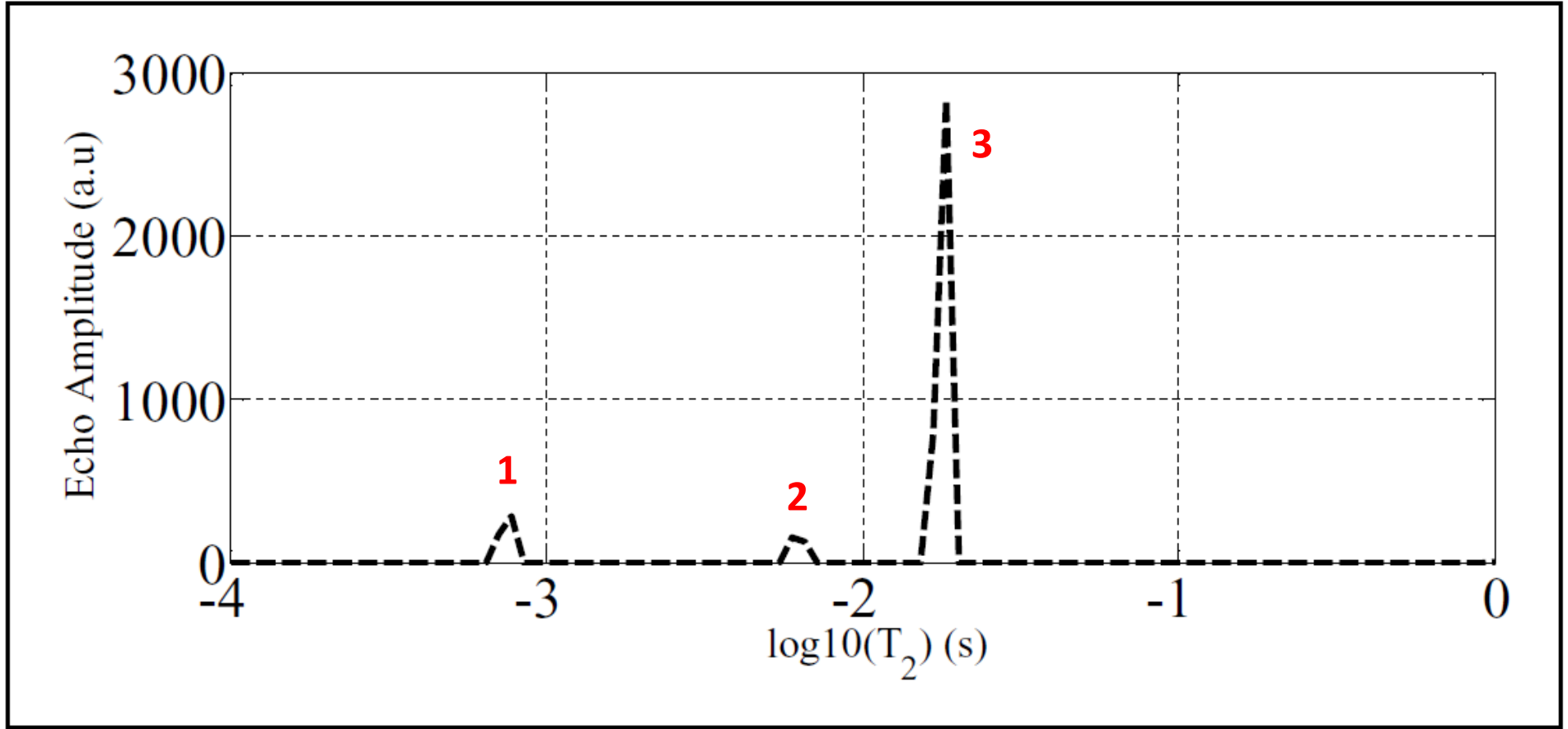


*Oztop , et al , 2010 ,
Journal of Food Science*



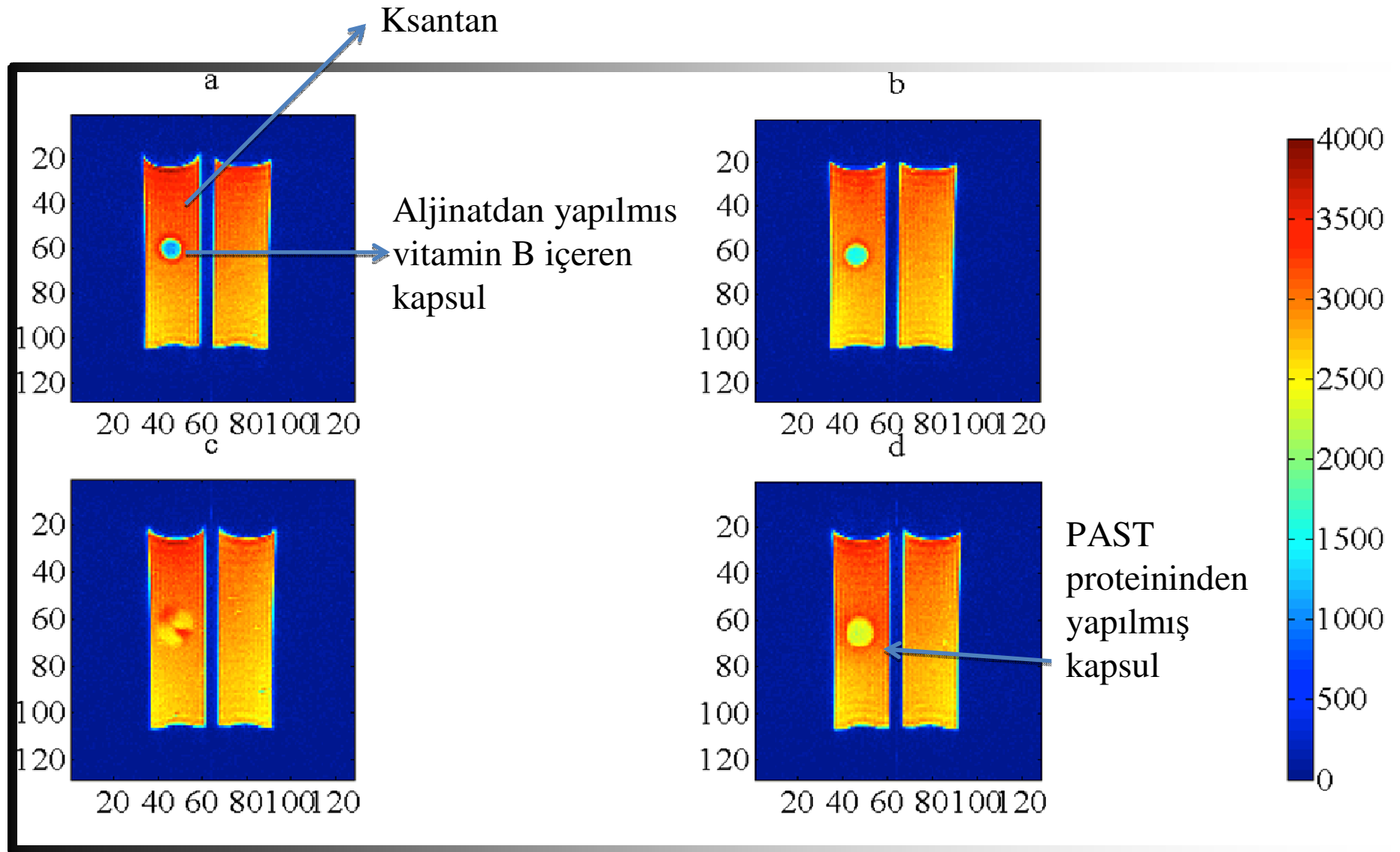
Transverse Rahatlama Zamani (T₂) Rahatlama Zamani Spektrumu





- (1) *Proteinlerle birebir etkileşime giren protonlar;*
- (2) *-OH, -NH₂, and -SH gibi gruplardan gelen protonlar ;*
- (3) *Serbest su moleküllerinden gelen protonlar*

Jel sistemlerinden salınımın incelenmesi



Use of whey protein/alginate beads to design a sustained release system in a viscous beverage

*S. Wichchukit, **M. H. Oztop**, M. J. McCarthy, K. L. McCarthy*

Submitted to Food Hydrocolloids

*Mide sıvısındaki sindirim simulasyonu
deneylerinin MRG ile incelenmesi*

Beyaz/Esmer Pirinç

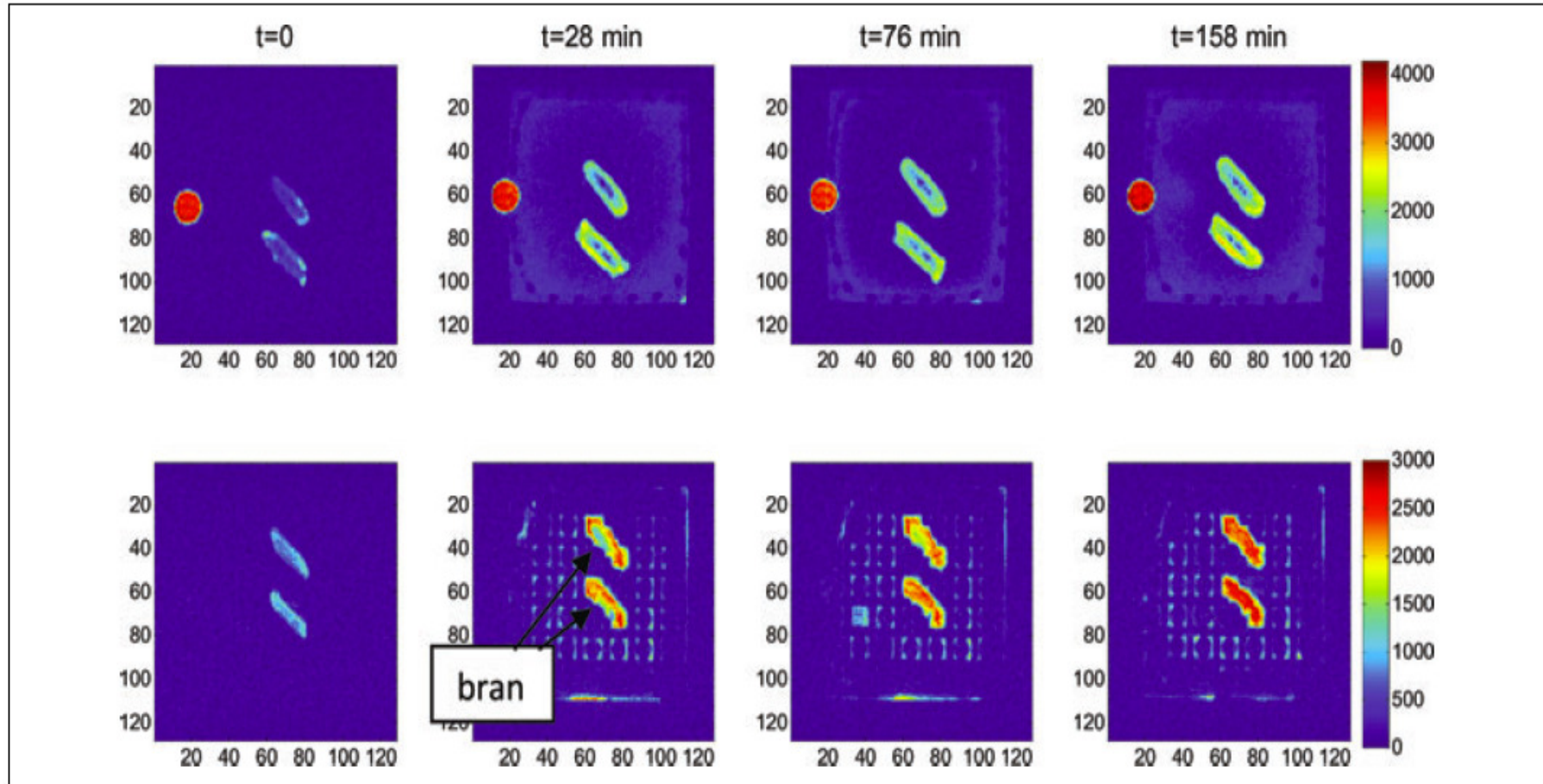
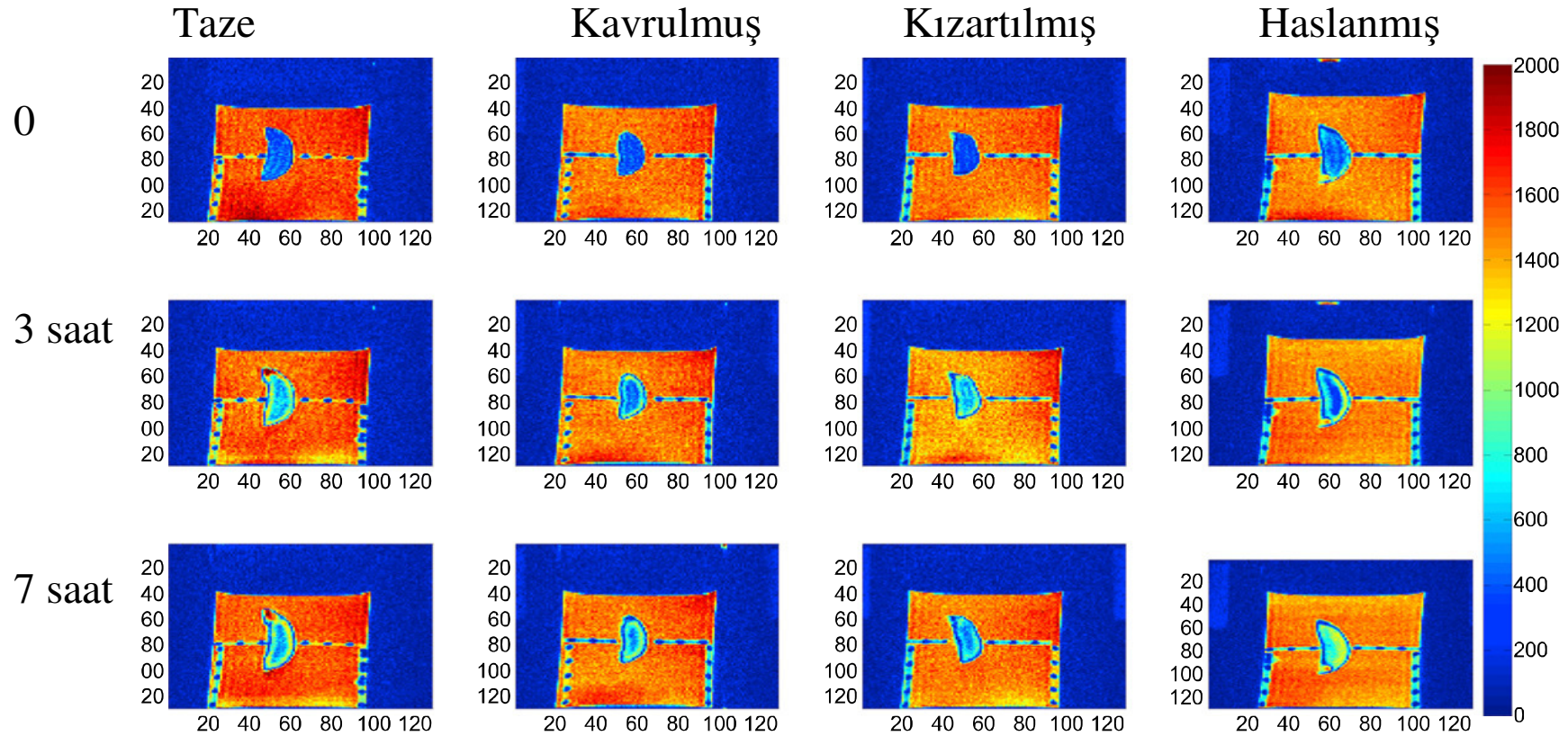
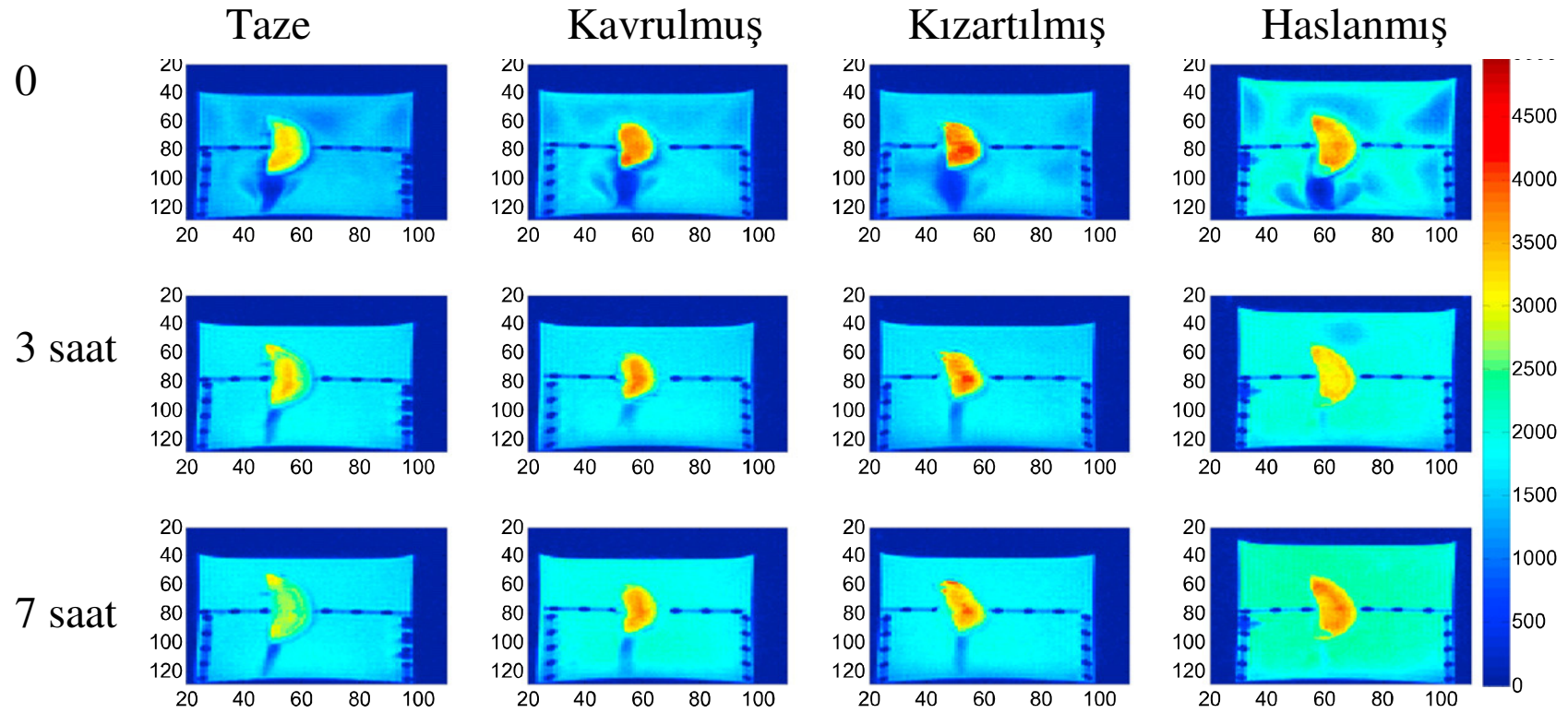


Figure 11–MRI images of rice kernels after immersion in gastric juice (pH = 1) at 37 °C for different time periods. Top: white rice, bottom: brown rice.

Yerfıstığı



Yerfıstığı

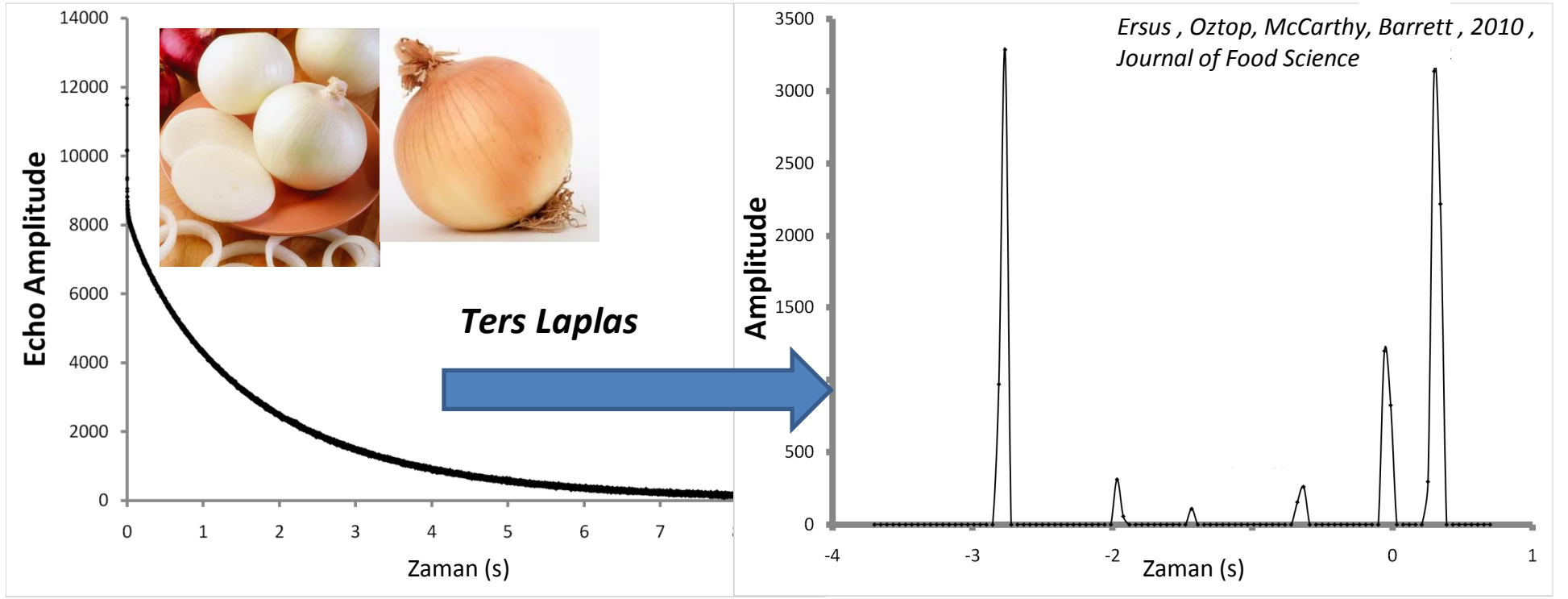


Effect of boiling, roasting and frying on disintegration of peanuts in simulated gastric environment

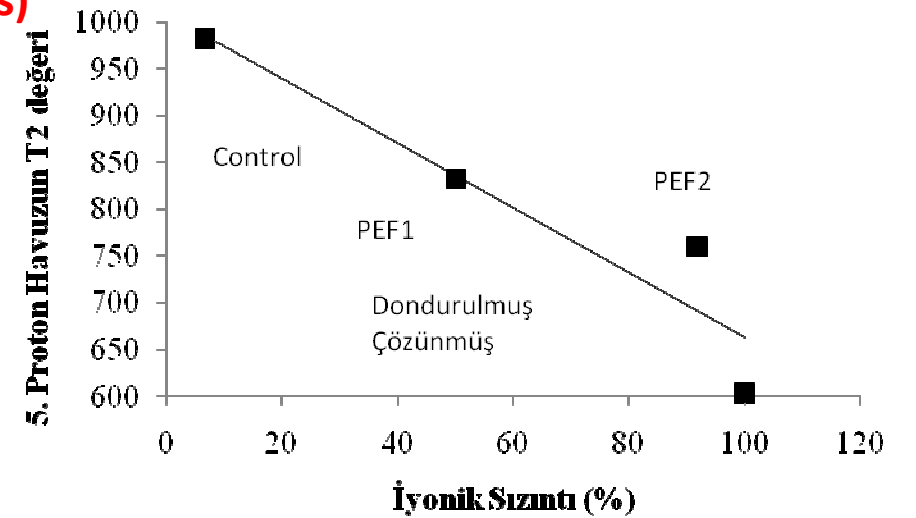
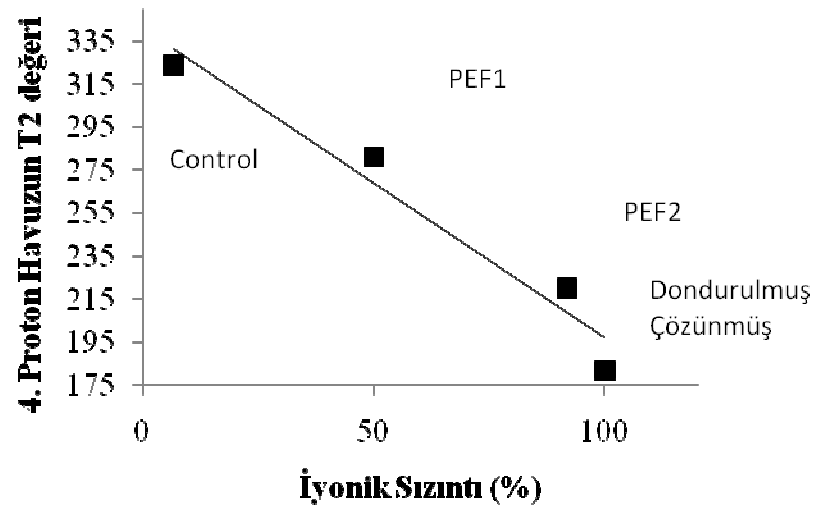
Fanbin Kong Mecit Halil Oztop R. Paul Singh, Michael J. McCarthy

LWT - Food Science and Technology 50 (2013) 32:38

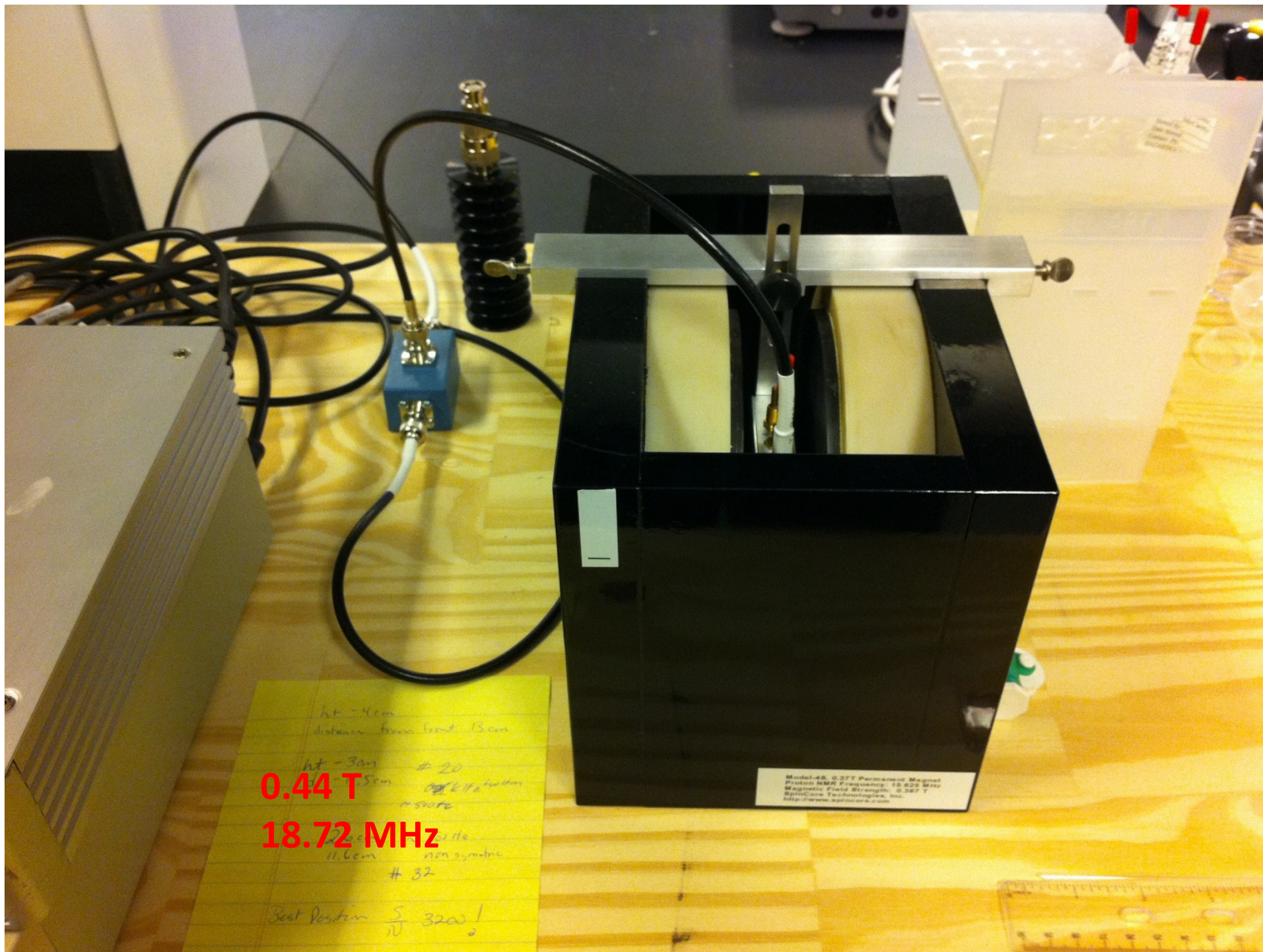
Bitki hücreleri



Korrelasyon : 4. ve 5. proton havuzlarının iyonik sızma değerleri ile T_2 değerleri arasında
PEF1: 500 V/cm ve, 50 μ s puls genişliği, 1 Hz, 10 puls,
PEF2: 500 V/cm, 100 μ s puls genişliği, 1 Hz, 10 puls)



Düşük Rezolüsyonlu Sistemler



0.44 T

18.72 MHz

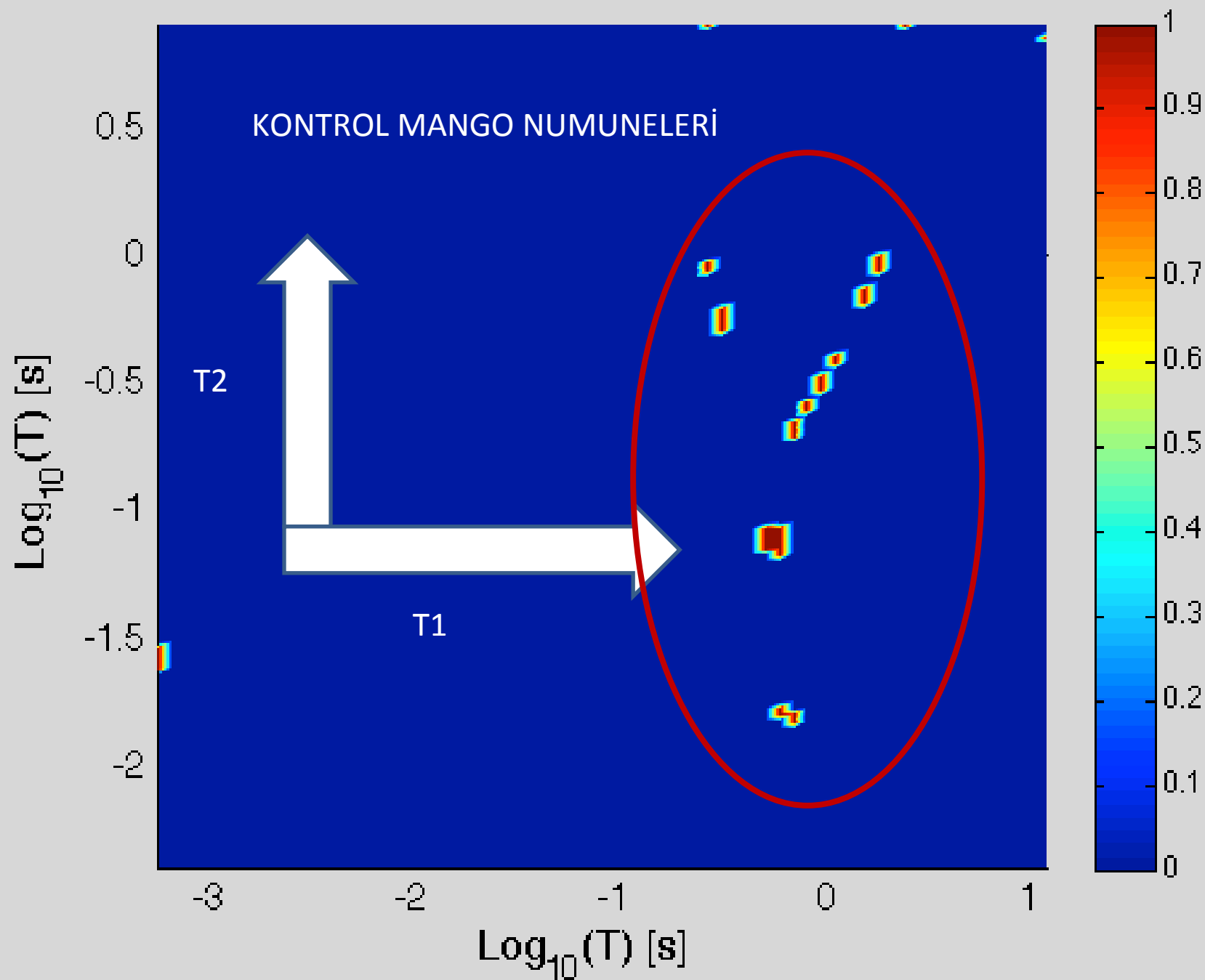
ht - 4cm
distance from front 13cm
ht - 3cm # 20
ht - 1.5cm # 21
32

Best Position 5 3200!

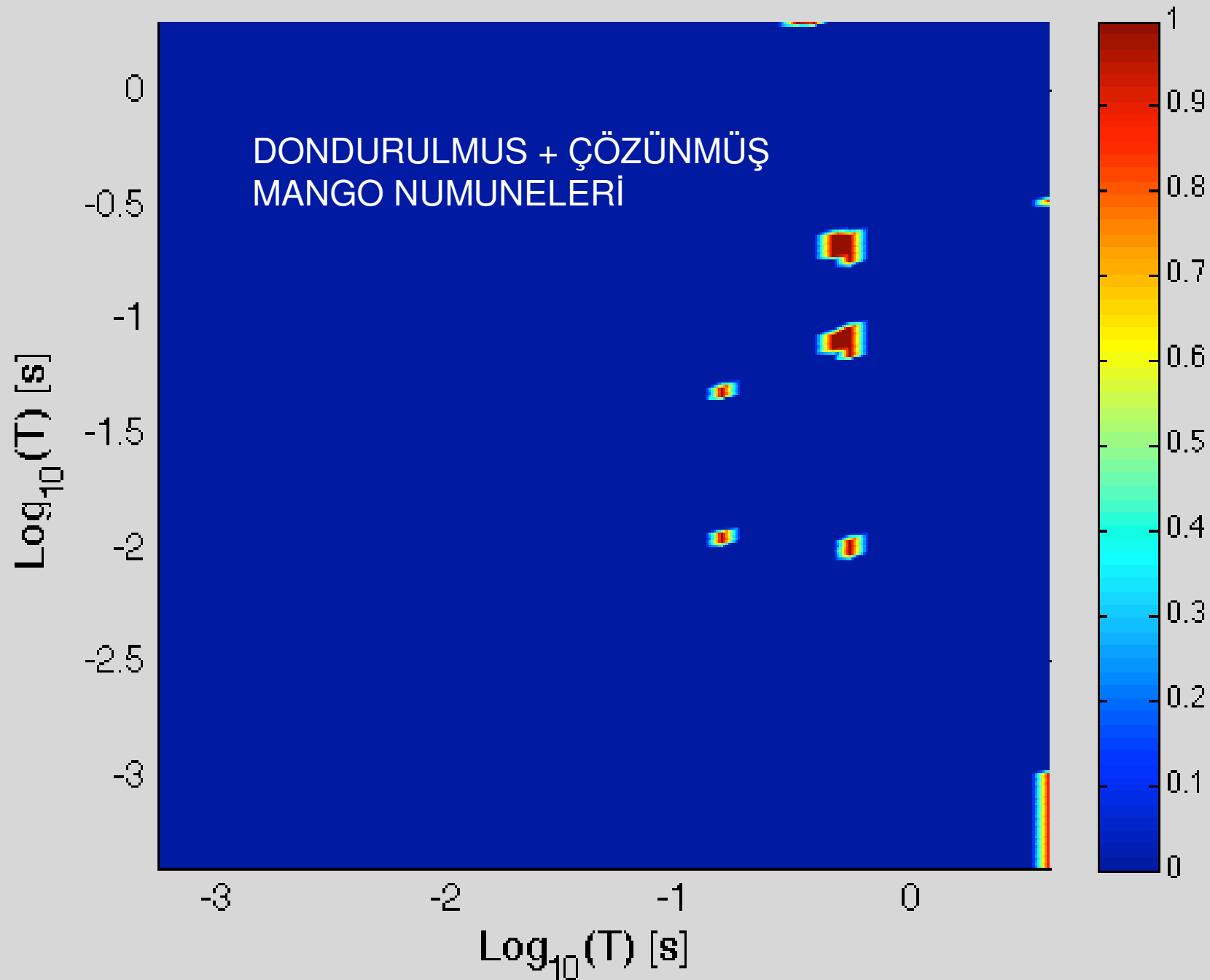
Model-45, 0.37T Permanent Magnet
Proton NMR Frequency: 15.025 MHz
Magnetic Field Strength: 0.347 T
SpinCore Technologies, Inc.
http://www.spincore.com



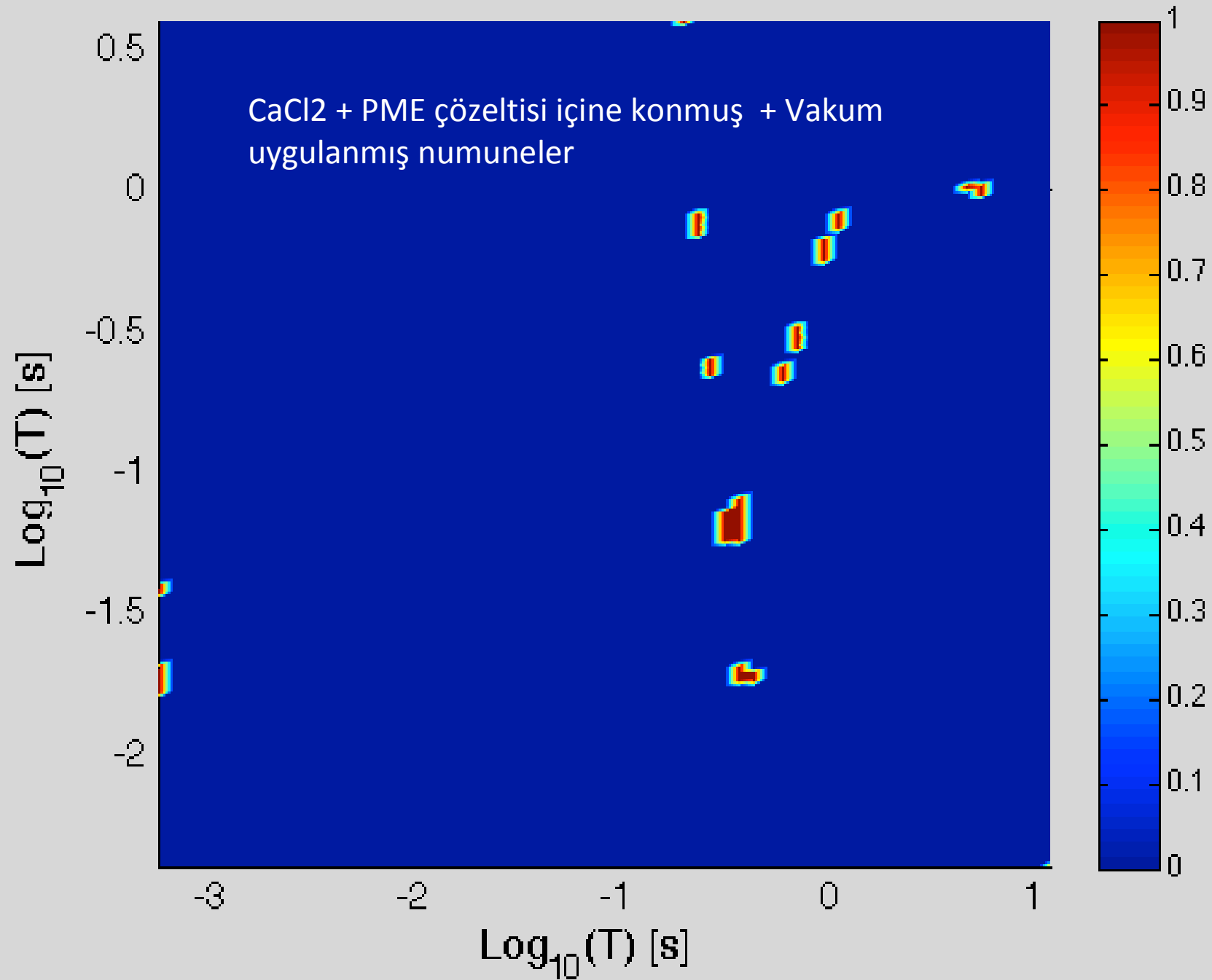
T-T correlation



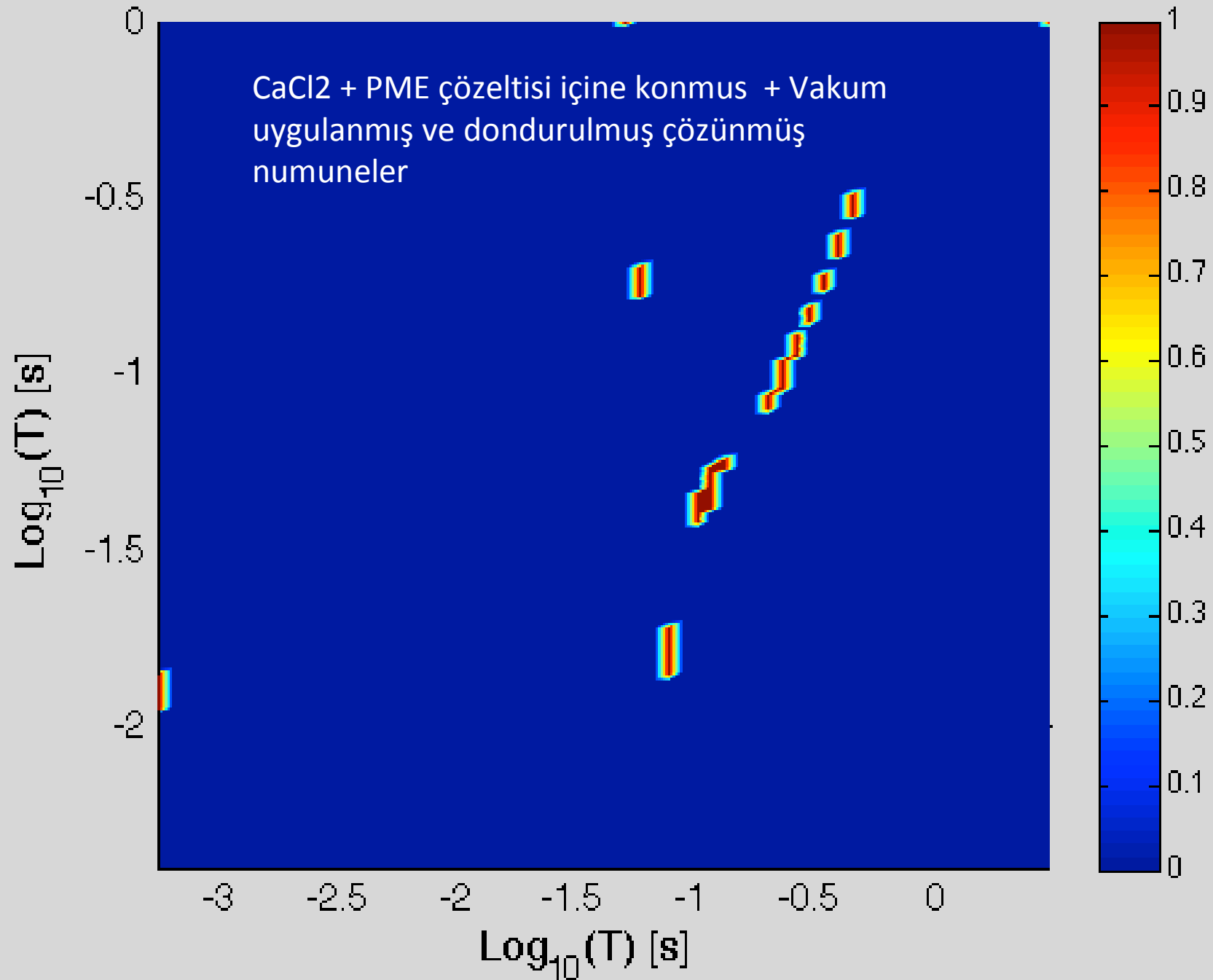
T-T correlation



T-T correlation



T-T correlation



Teşekkür

- **Prof Michael J. McCarthy**
- **Prof Kathryn McCarthy**
- **Prof Moshe Rosenberg**
- Yael Rosenberg
- Dr. Jeff Walton
- Prof. Diane Barrett
- Prof. Nitin Nitin
- Prof. Tina Jeoh
- Prof. Paul Singh
- Prof. Fanbin Kong
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- Nana Nishimura
- Alex Nguyen
- Tanya Antolin
- Kat Tom
- Wendy Zhai
- Virginia Chan

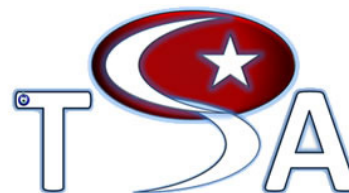


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