



شركة الباسقات للانتاج الزراعي والتصنيع الغذائي محدودة المسؤولية
الزنتان، الجبل الغربي، ليبيا

Basekat Company for Agricultural, Animal Production
And Food Processing, LLC
Zentan, Libya

سجل تجاري 1598، سجل صناعي 26 / م. ص. ز



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Akkarama, Tripoli, Libya

18 June, 2025

Mr. David Baumann,

Optima Quanta OÜ,
Punane 16B, Office 514,
13619 Tallinn, Estonia.

Subject: Laboratory Trial of Grain Germination Using Quantum Entanglement Technique
(QET)

Dear Mr Baumann,

Following is our grain germination trial final report.

1. Trial Description

This germination study investigated three grain types: two wheat cultivars (Karim and an uncertified cultivar designated W1) and an uncertified barley cultivar. The objective was to evaluate the effect of quantum entanglement technique (QET) on **seed germination rate (GR)** and **seedling vigor index (VI)**. The trial was conducted in Tripoli, Libya by Dr. Mohamed Fennir (University Professor and Partner at Basekat Agricultural and Food Production Company, Zintan, Libya).

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2. Protocol

1. Seed Selection:

- 60 seeds per cultivar were randomly selected and divided into two groups (30 seeds each).

2. Treatment Groups:

- QET-treated:** Kept in a sealed room for 72 hours.
- Control:** Kept in a separate sealed room 1.5 km away.

3. Germination Phase:

- Post-treatment, seeds were distributed equally into three Petri dishes lined with medical cotton.
- All dishes were hydrated uniformly and maintained under identical temperature/light conditions for 10 days.

4. Data Collection:

- Germination Rate (GR):** Recorded per dish.
- Vigor Index (VI):** On Day 10, three seedlings per dish were measured for shoot length (SL) and root length (RL). VI was calculated using the following relation
$$VI = (SL + RL) \times GR$$

3. Data Analysis

- Statistical Method:** Two-way ANOVA using SPSS v.20 software.
- Factors:**
 - Treatment (QET vs. Untreated)
 - Cultivar (Karim, W1, Barley)
- Dependent Variables:** GR, VI.
- Significance Threshold:** $p \leq 0.05$.
- Post-Hoc Test:** LSD for multiple comparisons.



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4. Results

A. Germination Rate (GR)

- **Treatment Effect:** Significant level ($p < 0.05$)

Cultivar	QET -Treated (%)	Untreated (%)	Increase (%)
Karim	66.67 $\pm$ 5.78	46.67 $\pm$ 20.82	20.0
W1	96.70 $\pm$ 5.78	83.30 $\pm$ 11.55	13.4
Barley	100.00 $\pm$ 0.00	76.67 $\pm$ 5.77	23.3

- **Cultivar Effect:** Significant ($p < 0.05$), mean GR: Karim (56.67%) < Barley (88.33%) $\approx$ W1 (90.00%).

B. Vigor Index (VI)

- **Treatment Effect:** Significant level ($p < 0.05$)

Cultivar	QET-Treated	Untreated	Increase (%)
Karim	11.41 $\pm$ 5.38	8.18 $\pm$ 3.50	39.5
W1	26.37 $\pm$ 6.46	19.65 $\pm$ 4.55	34.2
Barley	26.82 $\pm$ 0.88	19.04 $\pm$ 3.96	40.4

- **Cultivar Effect:** Significant level ($p < 0.05$), mean VI: Karim (9.80) < Barley (22.93) $\approx$ W1 (23.01).

C. Overall Treatment Efficacy

- **GR:** 87.78% (QET) vs. 68.89% (Untreated).
- **VI:** 21.53 (QET) vs. 15.62 (Untreated).



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5. Conclusion

- QET significantly enhanced **germination rates** (20.0–23.3% increase) and **vigor indices** (34.2–40.4% increase) across all cultivars.
- Cultivar performance: **W1 and Barley** outperformed Karim in both GR and VI.

6. Recommendations:

- Conduct trials on additional seed varieties.
- Validate results in field conditions.

7. Attachments:

- ANOVA table
- Germination photos

Please find the results of this trial attached. We look forward to a productive collaboration and exploring business opportunities together.

Sincerely, yours

Mohamed A. Fennir (Ph.D)

Basekat Company for Agricultural, Animal Production
and Food Processing LLC.

ANOVA Table:

Source	Dependent variable	SS	df	MS	F	P value
Treatment	GR	1605.56	1	1605.56	14.45	0.0025
	VI	157.06	1	157.06	7.85	0.0156
Cultivar	GR	4233.33	2	2116.67	19.05	0.0001
	VI	694.34	2	347.17	17.35	0.0003
Treatment* Cultivar	GR	77.78	2	38.9	0.35	0.712
	VI	17.067	2	8.53	0.43	0.662
Error	GR	1333.33	12	111.11		
	VI	240.105	12	20.00		
Total	GR	117700.00	18			
	VI	7321.35	18			

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Photos

