

# PROFICIENCY TESTING FOR PARASITIC HELMINTH EGGS ANALYSIS IN WATER SAMPLES

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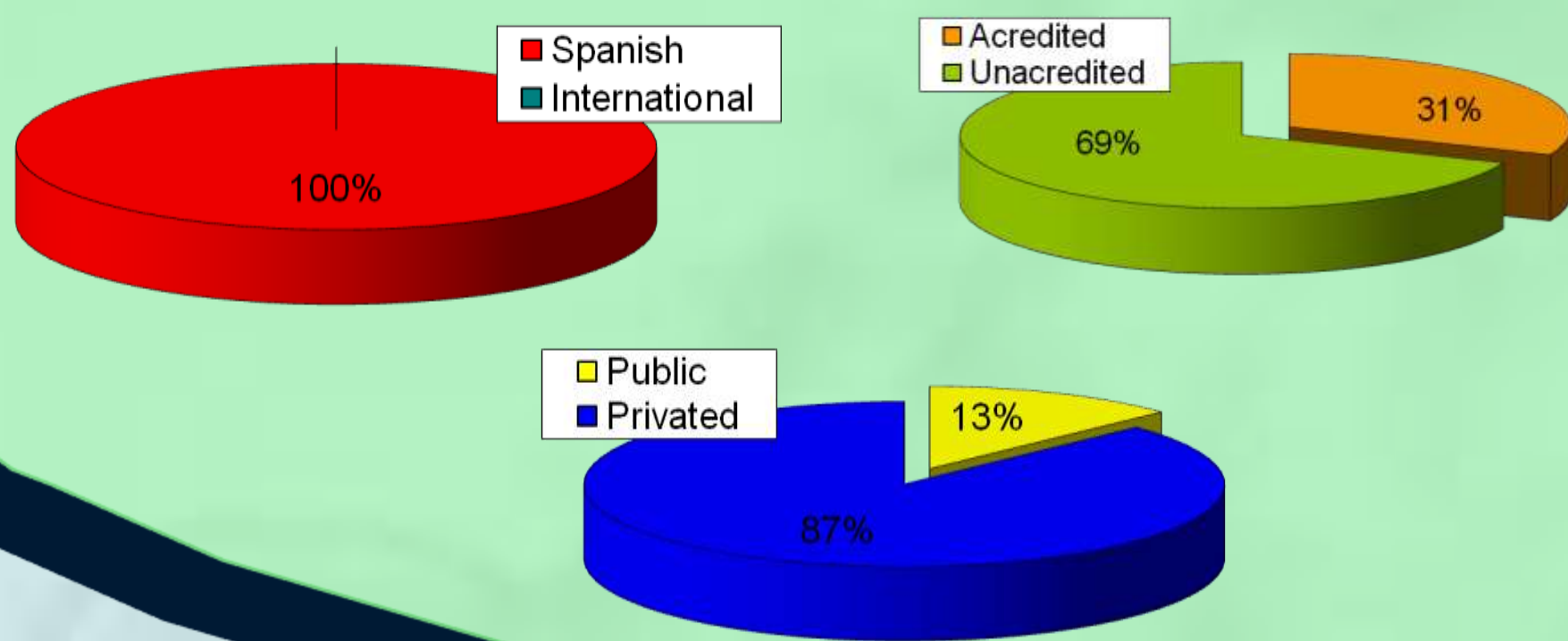
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The use of wastewater (with or without treatment) for agricultural purposes represents a risk for the human health. According to the WHO, helminth ova are one of the main targeted pathogens. In order to prevent the transmission of these diseases, its necessary to analyse the wastewater before to be reused.

Proficiency Testing (PT) allows to the laboratories to check their results and have objective evidence of their technical performance. This activity allows comparing the results of participating laboratories to assess their reliability, improve the test procedures and develop new methods in line with continuous improvement.

Technical training of the participating laboratories in the first PT of parasitic helminth eggs is higher in the detection and identification in the quantification of these, so we conclude that the quantification technique requires improvements to increase the recovery rate of helminth eggs.

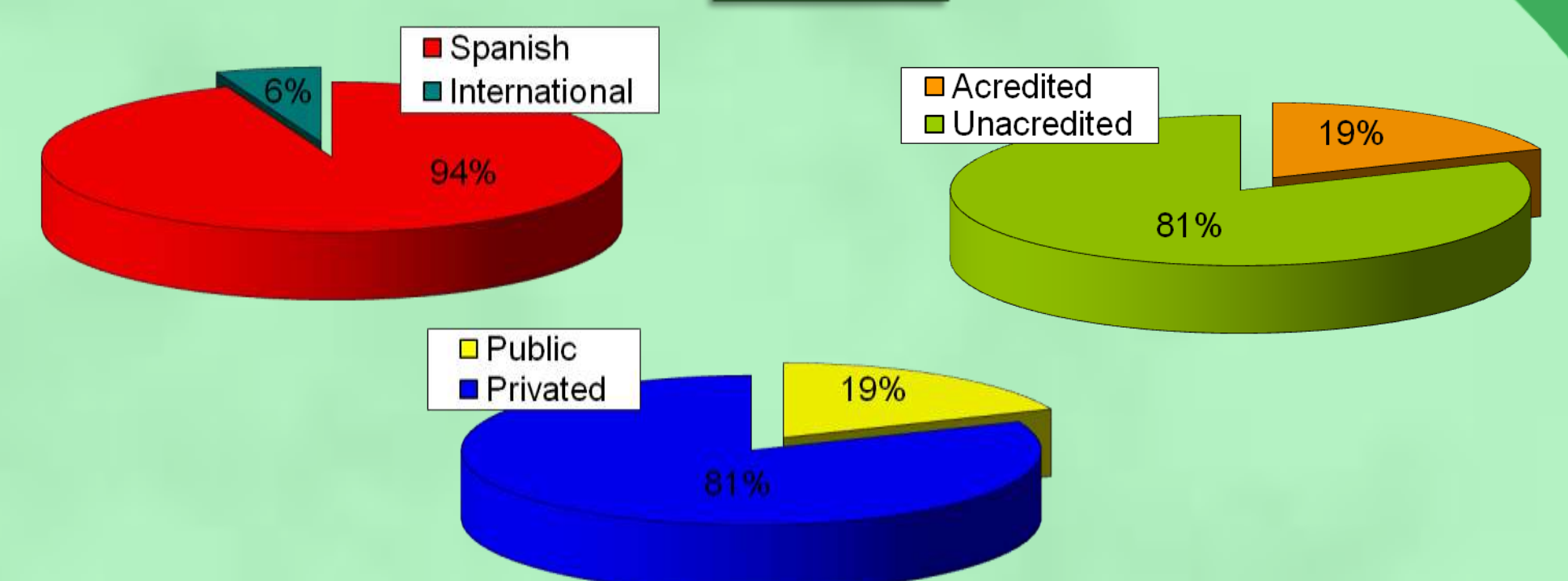
## Round 1



## PT participants

	Round 1	Round 2
Date	Feb 2010	Sept 2010
Technicians	17	16

## Round 2



## Quantitative Samples

(vial of 50 ml)

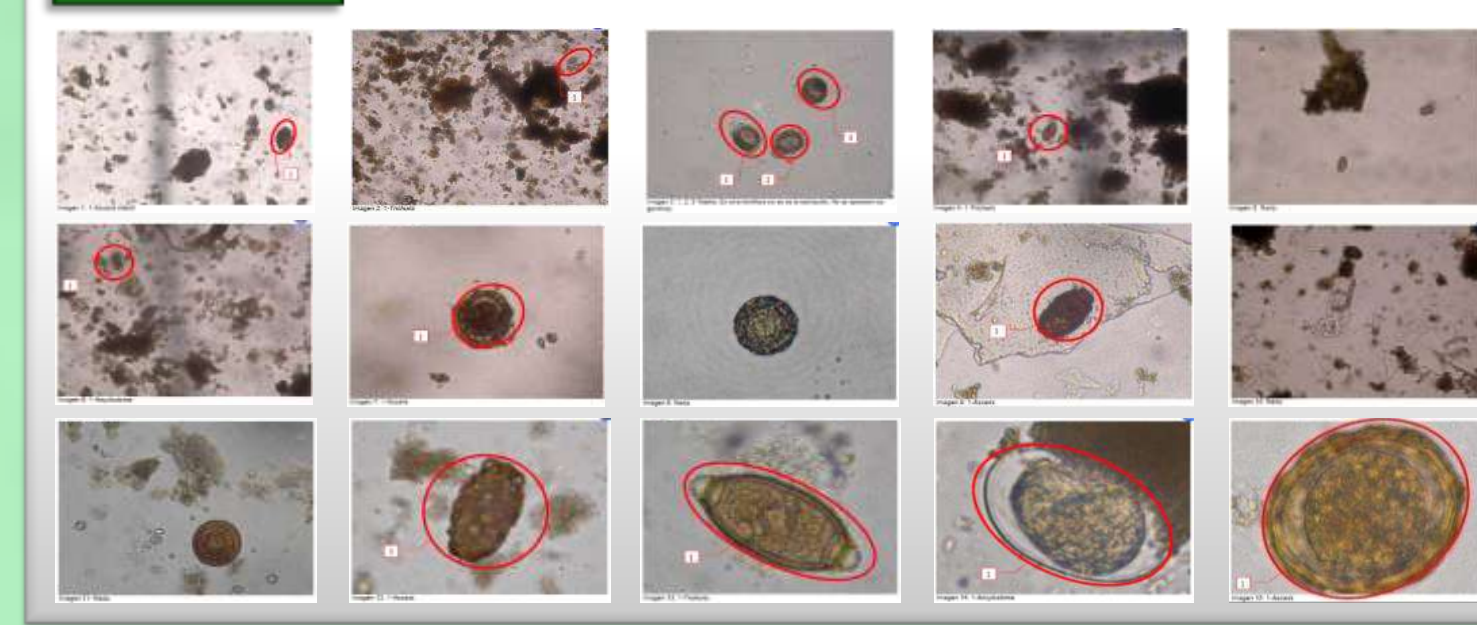


	Round 1	Round 2
<b>Preparation</b>		
Efficiency	95%	95%
False positive rate interspecific	8%	8%
<b>Sample</b>		
Titled (eggs/sample)	20	37
Lot units	27	27
<b>Homogeneity</b>		
Samples analyzed	10	10
Average recovery (eggs/sample)	18	35,4
RSD	7,40%	4,00%
Stability	2 months (NMX-AA-113-SCFI-1999)	6 months (RSD 7,4%)
User	Resuspend the entire content of sample in drinking water by several washes to retrieve the entire contents, obtaining a sample of 10 liters.	

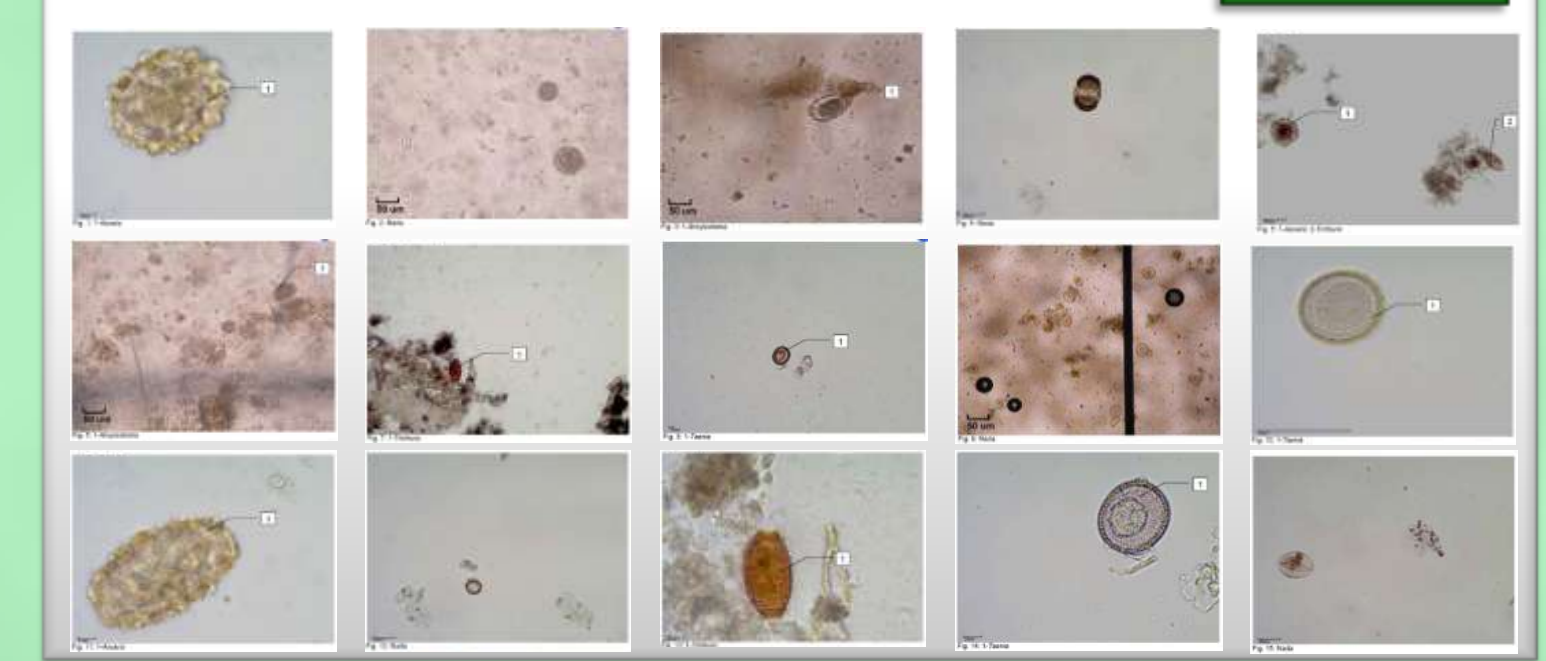
## Detection and identification

(15 images in Word document)

### Round 1

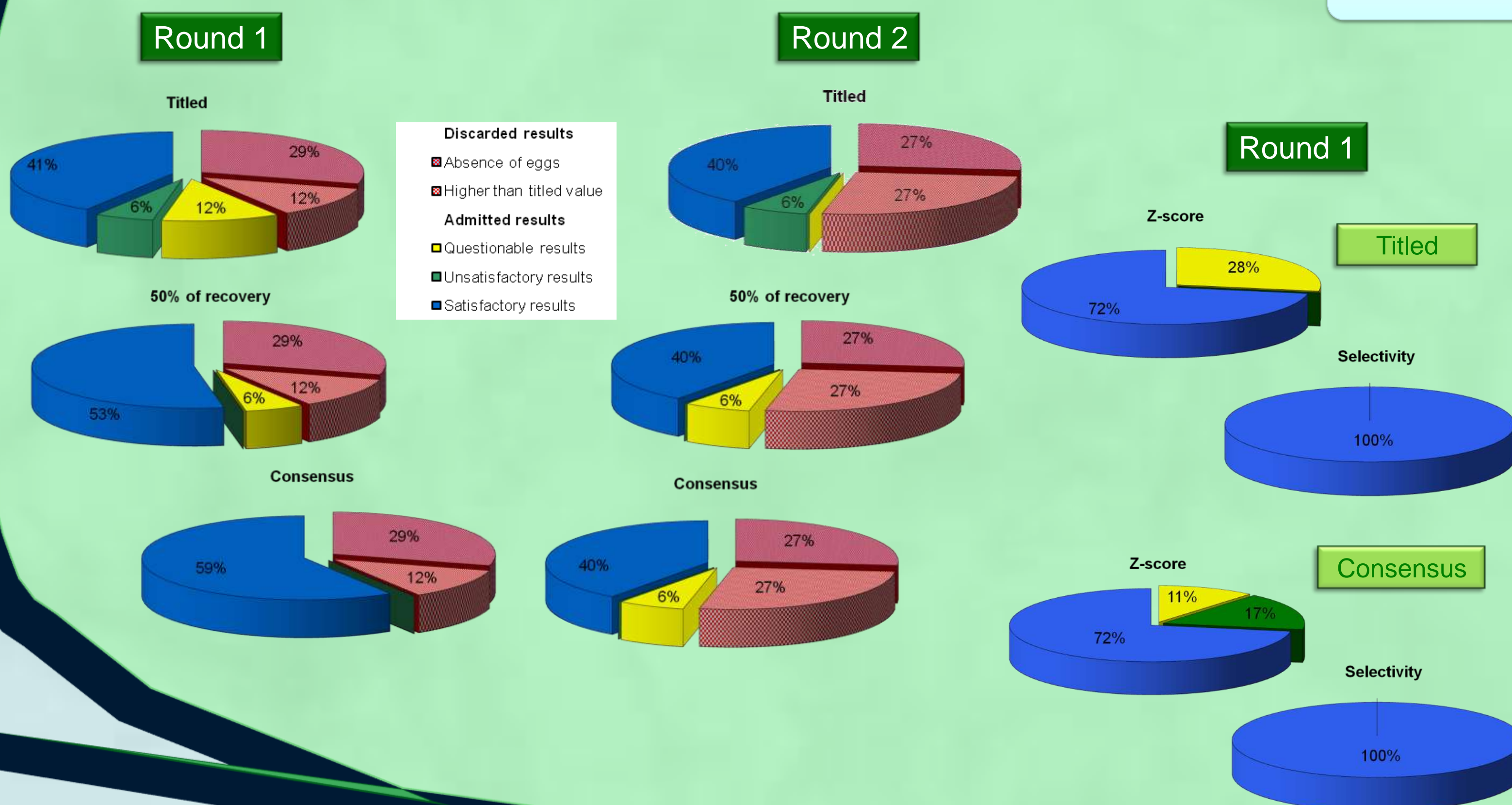


### Round 2

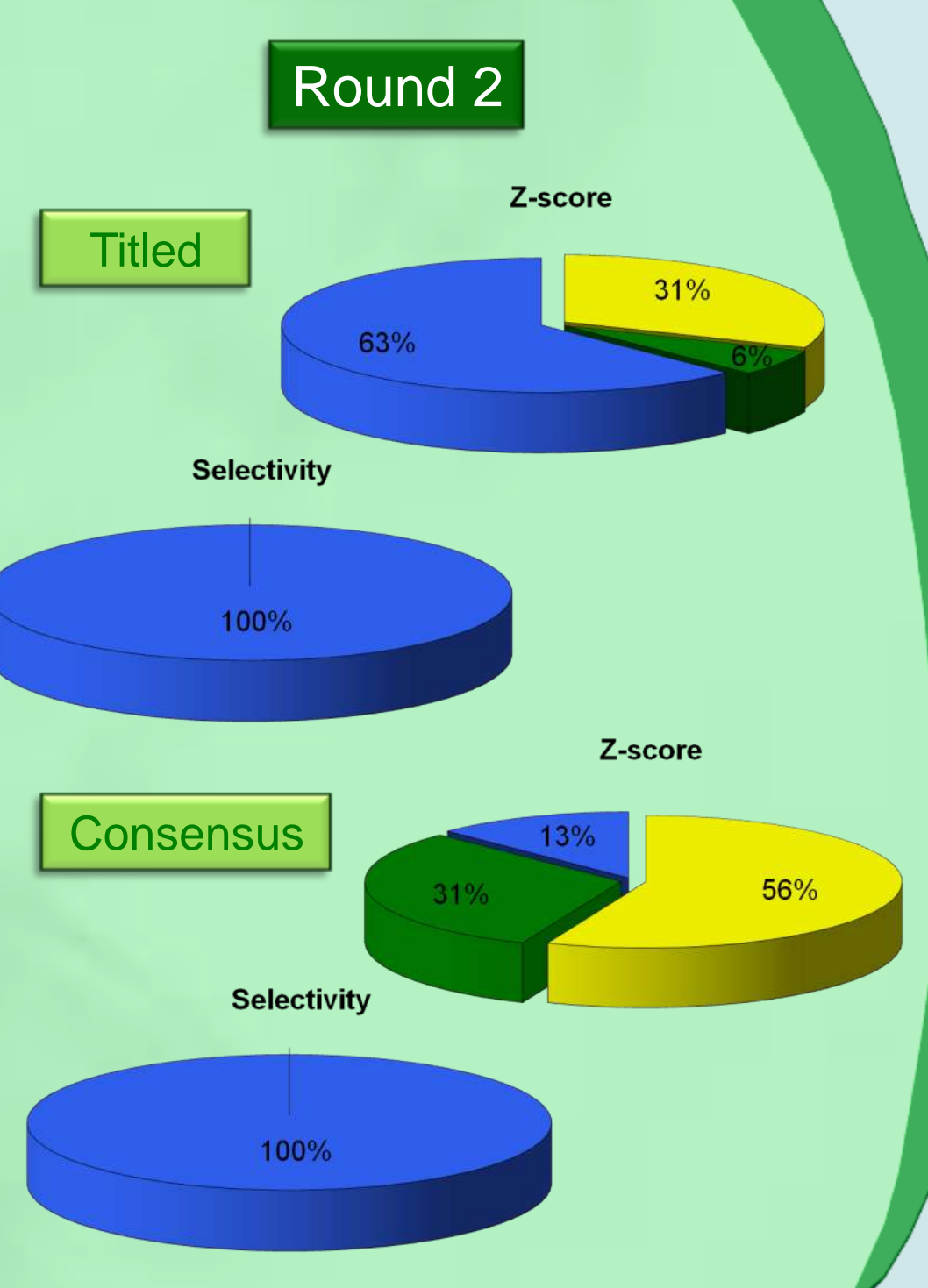


## Quantitative results

## Detection and Identification results



Helminth	Parameters	Round 1		Round 2	
		Titled	Consensus	Titled	Consensus
Ancylostoma	Sensitivity	89%	89%	53%	60%
	Specificity	100%	100%	100%	100%
	False positive rate	0%	0%	8%	8%
	False negative rate	1%	1%	6%	4%
	Efficiency	99%	99%	94%	96%
Trichuris	Sensitivity	94%	94%	96%	96%
	Specificity	100%	100%	100%	100%
	False positive rate	1%	1%	2%	2%
	False negative rate	1%	1%	1%	1%
	Efficiency	99%	99%	99%	99%
Ascaris	Sensitivity	79%	70%	67%	68%
	Specificity	93%	95%	89%	94%
	False positive rate	10%	7%	27%	12%
	False negative rate	7%	11%	3%	13%
	Efficiency	89%	87%	89%	85%
Taenia	Sensitivity	43%	50%	36%	50%
	Specificity	99%	93%	98%	98%
	False positive rate	8%	5%	13%	13%
	False negative rate	10%	3%	12%	6%
	Efficiency	89%	90%	87%	93%
Total	Sensitivity	86%	83%	75%	76%
	Specificity	89%	97%	78%	81%
	False positive rate	3%	1%	15%	9%
	False negative rate	17%	26%	29%	35%
	Efficiency	87%	86%	76%	77%



## Conclusions

- The titled of the samples proved to be adequate.
- 41% of the results received in the exercise of quantifying in the first round and 50% in the second round were previously rejected.
- Accepted result in an exercise to quantify, for the assigned value of 50% recovery, 90% were satisfactory and the remaining 10% are questionable in the first round and 86% were satisfactory and the remaining 14% questionable to the second round.
- The percent recovery of helminth eggs (34% in the first round and 49% in the second) was low, below 50% average recovery reported in the literature.
- In the exercise of detection and identification were not accepted the incomplete results or without explicit answer.
- From the results of selectivity, it was noted that there are difficulties in detection/identification of *Taenia* eggs, being easily identifiable *Trichuris* eggs.
- The technical competency of the participants is significantly higher in the detection and identification of helminth eggs than in their quantification. We conclude that technical analysis of helminth eggs requires improvements in concentration phases of the assay protocol.

## References

- Ayres, R.; Mara, D. 1996. *Analysis of wastewater for use in agriculture. A laboratory manual of parasitological and bacteriological techniques*. World Health Organization, Ginebra.
- Real Decreto 1620/2007, de 7 de diciembre, por el que se establece el régimen jurídico de la reutilización de las aguas depuradas. BOE núm.294, sábado 8 de diciembre de 2007, p.50639.
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