CONCENTRATION OF STOOL SAMPLES IN PARASITOLOGY LABORATORY: COMPARISON OF THREE METHODS FOR EFFICACY AND COST-EFFECTIVENESS

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Summary

OBJECTIVE: To compare the efficacy and cost-effectiveness of three stool concentration methods [formalin ethyl acetate concentration (FEAC), Parasep® and Feconomics®] in a double-blind, randomized trial.

METHODS: A total of 102 stool samples were initially assessed with saline-Lugol preparation, FEAC and both trichrome and Kinyoun acid-fast stained smears prepared from the concentrated stool samples. Then all samples were concentrated with Parasep® and Feconomics®, and their saline-Lugol preparations together with trichrome and Kinyoun acid-fast stained smears were examined microscopically.

RESULTS: All three methods identified the cysts of *Giardia lamblia* and *Entamoeba histolytica/dispar* in the same samples.

• Number of cysts were comparable with FEAC and Parasep®, but lower with Feconomics® (p>0.05).

• The morphological integrity and visual appearances of the cysts- but not trophozoites - were well-preserved in all methods.

• Different forms of *Blastocystis spp.* were identified in 20 stools with Feconomics®, while 10 and 9 samples with FEAC and Parasep®, respectively.

CONCLUSION: All methods were found to be comparably effective for the identification of parasitic cysts, while trophozoites were identified only with Feconomics®.

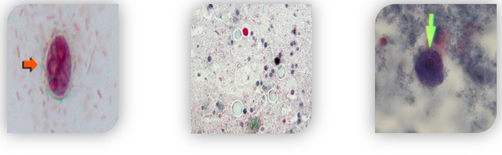
• This is probably due to the fact that there is no centrifugation while processing the samples with Feconomics®.

• Methods also varied in terms of detecting *Blastocystis spp.*

• This may be due to the loss of the morphological integrities of some forms of *Blastocystis spp.* during centrifugation.

• In terms of cost-effectiveness, FEAC was found to be significantly more cost-effective than the other two methods for a routine Parasitology laboratory.

• Elimination of centrifugation, which saves time and labor, is a major advantage of Feconomics®.

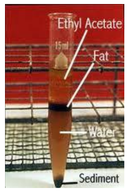


Introduction

• The concentration of stool samples allows detection of parasites in low numbers in the specimen.

• Formalin ethyl acetate concentration (FEAC) has been used as a routine method in many parasitology laboratories;

• However, like other concentration methods, FEAC is labor-intensive and requiries a relatively long time and a specific device for centrifugation.



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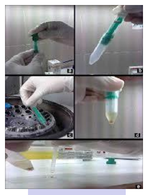


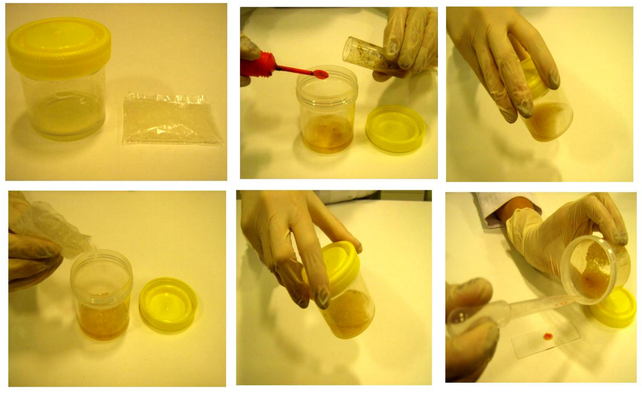
Parasep®

• Standard commercial fecal concentration products are available for over two decades since 1978, with improved parasite recovery, at least comparable to FEAC.

• Parasep® has been a preferred commercial product in Turkey. It contains formalin, which preserves the morphology of parasites for long time, and uses centrifugation for concentration.

• Feconomics® is a novel fecal concentration technique for routine laboratory.

• It contains small-sized, specially-designed absorbent beads, which eliminate the need for centrifugation and floatation, and it produces no sediment or debris in the examined stool sample.



Concentration of stool samples with Feconomics®

Materials & Methods

• A total of 102 stool samples submitted for routine parasitological examination were initially assessed with: saline-Lugol, FEAC and with trichrome and Kinyoun smears prepared from the concentrated stool samples.

• All samples were then concentrated with Parasep® and Feconomics®, and their saline-Lugol preparations together with trichrome and Kinyoun smears were examined.

• The efficacies of three methods were compared by calculating their concentration powers.

CONCENTRATION POWER: => Total number of cysts and trophozoites in the concentrated solution counted in 50 microscopic fields under x400 magnification.

Results

• All methods identified the same cases of *Giardia intestinalis* and *Entamoeba histolytica/dispar* in the study.

• Feconomics® doubled the number of *Blastocystis spp.* cases, compared to Parasep® and FEAC (Figure 1).

• Concentration power of Feconomics® for *Blastocystis spp.* was greater than other methods (Figure 2).

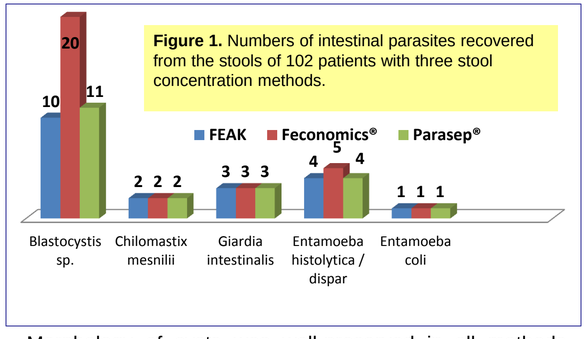


Figure 1. Numbers of intestinal parasites recovered from the stools of 102 patients with three stool concentration methods.

• Morphology of cysts was well-preserved in all methods, while their numbers were comparable with FEAC and Parasep®, but lower with Feconomics® (p>0.05).

• FEAC was found to be more cost-effective than the other two methods for a routine parasitology laboratory admitting more than 10 patients/day (Figure 3).

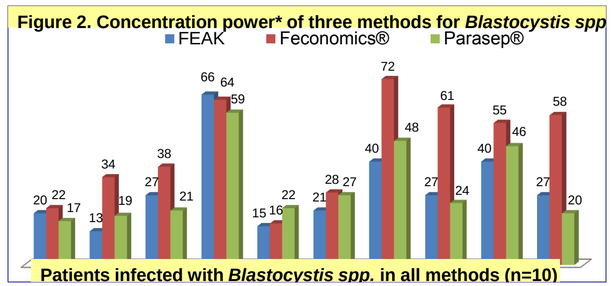


Figure 2. Concentration power* of three methods for *Blastocystis spp* **Patients infected with *Blastocystis spp.* in all methods (n=10)**

Discussion

• A significant difference was noted in the present study, in terms of the recovery numbers of *Blastocystis spp.* between the concentration methods tested.

•This may be due to the loss of the morphological integrities of some forms of *Blastocystis spp.* during centrifugation.

• For a routine parasitology laboratory that admits ≥10 patients/day, FEAC is still the most cost-effective method.

• In conclusion, all methods were effective for the identification of parasitic cysts, while trophozoites were identified only with Feconomics®. Elimination of centrifugation is a prominent advantage for Feconomics® that saves time and labor.

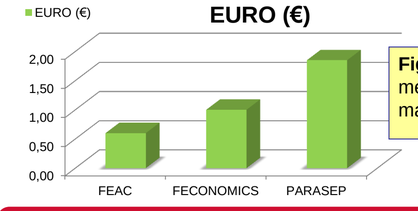


Figure 3. Costs of the methods in Turkish market per patient

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