

## SHORT COMMUNICATION

# Inhibition of Enteric Parasites by Emulsified Oil of Oregano *in vivo*

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Oil of Mediterranean oregano *Oreganum vulgare* was orally administered to 14 adult patients whose stools tested positive for enteric parasites, *Blastocystis hominis*, *Entamoeba hartmanni* and *Endolimax nana*. After 6 weeks of supplementation with 600 mg emulsified oil of oregano daily, there was complete disappearance of *Entamoeba hartmanni* (four cases), *Endolimax nana* (one case), and *Blastocystis hominis* in eight cases. Also, *Blastocystis hominis* scores declined in three additional cases. Gastrointestinal symptoms improved in seven of the 11 patients who had tested positive for *Blastocystis hominis*. Copyright © 2000 John Wiley & Sons, Ltd.

**Keywords:** oregano; essential oil; *Blastocystis hominis*; enteric parasites; *Endolimax nana*; *Entamoeba hartmanni*.

## INTRODUCTION

There is continued interest in botanical alternatives to the drugs commonly used to treat enteric parasites. Essential oils of culinary herbs and spices may offer a different avenue for treating protozoal overgrowth. In this context, the oil of Mediterranean oregano, *Oreganum vulgare*, is of particular interest. This aromatic oil has been shown to inhibit the growth of several pathogenic bacteria and yeast (Belaiche, 1979) Kivanc and Akgul, 1986). Orally administered oil of oregano ingestion was found to eradicate common fowl parasites in infected chickens and pheasants (Ninkov, 1996). Therefore, the present study was designed to examine the effects of oil of oregano in symptomatic patients with enteric parasites.

## MATERIALS AND METHODS

Thirty-three adult patients with chronic gastrointestinal complaints and fatigue submitted two purged faecal specimens, which were analysed by a clinical laboratory (Diagnostic and Educational Laboratory—Institute of Parasitic Diseases, Phoenix, Arizona). Parasites per high power field (400X) were counted. The scores were based on the means of four to six fields (nil for no parasites detected; +1 for 1–5 parasites; +2 for 6–10; +3 for 11–15; and +4 for >15). In addition, the patients completed a symptom and risk assessment questionnaire. After obtaining informed consent for the protocol, approved by a Review Board, patients with enteric parasites were supplemented with a preparation of emulsified oil of oregano (A.D.P. from Biotics Research Corporation, Rosenberg, Texas 77471). Fourteen patients (four men,

10 women, ages 24–56) with parasites were administered four tablets providing 200 mg of emulsified oil t.i.d. with meals. No other dietary changes or therapeutic interventions were employed. After 6 weeks of supplementation, patients submitted a second set of purged stool specimens for parasite analysis, and they completed a follow-up questionnaire. Statistical analysis of parasite scores employed the sign test.

## RESULTS

Thirty-three patients with gastrointestinal complaints who reported one or more of the following factors which could increase the risk of parasitic infections: recent foreign travel, exposure to small children in daycare, out-of-doors lifestyles and camping, lowered immunity, ownership of household pets, use of untreated well water, and consumption of uncooked salad greens, were selected for this study. Parasites were detected in stool specimens from 14 of these patients. As summarized by Table 1, eight patients initially tested positive for *Blastocystis hominis*; *Entamoeba hartmanni* was detected in another four patients; and one patient had *Endolimax nana*.

Thirteen of the 14 patients with parasites completed the supplementation protocol and submitted follow-up stool specimens. Parasites could no longer be detected in 10 patients (77%), including those who initially tested positive for *Entamoeba hartmanni*, *Endolimax nana* and *Blastocystis hominis* with scores <2+ (Table 1). In addition, parasite scores decreased for another three subjects (23%) with *Blastocystis hominis*, though the parasite was still detectable by the end of the study. The likelihood of obtaining decreased parasite scores for 13 of 14 individuals by chance was highly improbable ( $p < 0.0006$ ). Commensurate with the reduction in parasite scores after supplementation with oil of oregano,

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**Table I. Summary of faecal parasite scores, pre- and post-treatment with emulsified oil of oregano**

Parasite detected	Number of patients	Parasite score	
		Before	Post-treatment
<i>Blastocystis hominis</i>	5	1	nil
	2	2	1
	1	4	2
<i>Entamoeba hartmanni</i>	4	1	nil
<i>Endomalix nana</i>	1	2	nil
Total	13	10	3 $p < 0.0006$

seven of the patients who initially tested positive for *Blastocystis hominis* reported amelioration of symptoms, including bloating, GI cramping, alternating diarrhoea and constipation and fatigue.

## DISCUSSION

To the best of our knowledge, this is the first report of antiparasitic effects of oil of oregano in humans. Whether the improvement of symptoms in response to oregano oil was due to the inhibition of undetected microorganisms or to the elimination of parasites cannot be differentiated by this study. A variety of studies and case reports have reported *Blastocystis hominis* in faecal specimens of patients with gastrointestinal symptoms (Carbajal *et al.*, 1997; Shlim *et al.*, 1995). However, this observation may

reflect an association, rather than a causative agent. It should be noted that the prevalence of this parasite can be high, ranging from 9.5% to 18% among clinic stool specimens (Zuckerman *et al.*, 1990).

In considering the oral use of oil of oregano, an effective delivery is an important consideration. Exposure of gastrointestinal mucosa to concentrated (non-emulsified) essential oils can cause localized irritation, especially with prolonged usage. Emulsification of oil of oregano yielded stable particles with an average diameter of 0.5  $\mu\text{m}$ .

This process increases the surface area by about six orders of magnitude, thus the total surface area of an emulsion generated from 200 mg (four drops of oil) would theoretically equal the total luminal surface of the small intestine (an estimated 200  $\text{m}^2$ ). The clinical significance of *Blastocystis hominis* remains controversial. Case reports of the amelioration of gastrointestinal symptoms and systemic complaints upon eradication of *Blastocystis hominis*, *Endolimax nana* and *Entamoeba hartmanni* suggested these organisms may act as weak pathogens in susceptible individuals (Burnstein and Liakos, 1983; Schirmer *et al.*, 1998). The effect of emulsified oil of oregano on well-established enteric pathogens, such as *Entamoeba histolytica* and *Giardia lamblia*, warrants further study.

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## REFERENCES

- Belaiche, P. (1979). *Traite de Phytotherapie et D'Aromatherapie Tome I, L'Aromatogramme*, Maloine S. A, Paris.
- Burnstein, S. L., and Liakos, S. (1983). Parasitic rheumatism presenting as rheumatoid arthritis. *J. Rheumatol.* **10**, 514–515.
- Carbajal, J. A., Villar, J., Lanuza, M. D., Esteban, J. G., and Munoz, R. B. (1997). Signification clinica de la infeccion por *Blastocystis hominis*: estudio epidemiologico. *Med. Clin.* **108**, 608–612.
- Kivanc, M., and Akgul, A. (1986). Antibacterial activities of essential oils from Turkish spices and citrus. *Flavour Frag. J.* **1**, 175–179.
- Ninkov, D. (1996). *Pharmacological compositions based on enteric oils obtained from plants for their use in the human and veterinary field*. PCT W096/3721.
- Schirmer, M., Fischer, M., Rosboth, D. W., Mur, E., Dierich, M. P., and Frischhut, B. (1998). *Entamoeba hartmanni*; a new causative agent in the pathogenesis of reactive arthritis? *Rheumatol. Int.* **18**, 37–38.
- Shlim, D. R., Hoge, C. W., Rajah, R., Rabold, J. G., and Echeverria, P. (1995). Is *Blastocystis hominis* a cause of diarrhea in travelers? A prospective controlled study in Nepal. *Clin. Infect. Dis.* **21**, 97–101.
- Zuckerman, M. J., Ho, H., Hooper L., Andersen, B., and Polly, S. M. (1990). Frequency of recovery of *Blastocystis hominis* in clinical practice. *J. Clin. Gastroenterol.* **12**, 525–532.