Identification of volatile biomarkers of Giardia duodenalis infection in children with persistent diarrhoea

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Currently, chronic diarrhoea syndrome in children is a very common pathology whose aetiology is sometimes difficult to identify. Methodologies for the diagnosis of infections have diversified, and gas chromatography/mass spectrometry (GC/MS) is a very useful tool. The aim of this study was to identify volatile biomarkers of the presence of Giardia duodenalis in the faeces of patients with chronic diarrhoea (with and without giardiasis) using static headspace extraction followed by GC/MS. The analysis of the volatiles extracted from the headspace had enough sensitivity to detect differences in the volatile profiles in the faeces of the patients with and without Giardia duodenalis infection and discriminate between them. Dimethyl disulphide and trisulphide were found in the faeces of patients without giardiasis but not in the faeces of patients with G. duodenalis. Finally, three possible biomarkers, acetic acid, 1,4-dimethoxy-2,3-butanediol and 1,3-dimethoxy-2-propanol, were proposed to identify patients with giardiasis; these compounds were not present in the patients without the parasite. Multivariate analysis revealed that principal component 1 separated the stool samples according to the presence of infection by G. duodenalis despite the inter-individual variability in biological specimens such as faeces.

Biomarkers

Chronic diarrhoea

Gas chromatography

Giardia duodenalis

Persistent diarrhoea

Volatile compounds

1,3 dimethoxy 2 propanol

1,4 dimethoxy 2,3 butanediol

acetic acid

aldehyde

amide

biological marker

butanoate

butyric acid ethyl ester

hexanoic acid

isobutanol

methyl heptanoate

para cymene

pentanoate

pentanol

propyl butanoate

sulfur

terpene

unclassified drug

volatile agent

biological marker

Article

child

chronic diarrhea

clinical article

diarrhea

feces

female

giardiasis

headspace extraction

host

human

intestine flora

male

mass fragmentography

principal component analysis

priority journal

animal

Giardia intestinalis

giardiasis

multivariate analysis

parasitology

preschool child

Animals

Biomarkers

Child

Child, Preschool

Diarrhea

Feces

Female

Gas Chromatography-Mass Spectrometry

Giardia lamblia

Giardiasis

Humans

Male

Multivariate Analysis