ATA Mg®
THE BRAIN MAGNESIUM

Efficiency of a Magnesium Salt (ATA MG® 770mg) on Premenstrual Syndrome

A CLINICAL STUDY REPORT

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Abstract

Premenstrual syndrome (PMS) has a wide variety of signs and symptoms, including mood swings, tender breasts, food cravings, fatigue, irritability and depression.
It's estimated that as many as 1 of every 2 menstruating women have experienced some form of premenstrual syndrome.

Symptoms tend to recur in a predictable pattern. But the physical and emotional changes women experience with premenstrual syndrome may vary from just slightly noticeable all the way to intense.

Treatments and lifestyle adjustments, like a supplementation of a specific source of magnesium can help to reduce or manage the signs and symptoms of premenstrual syndrome.

The positive clinical results obtained with ATA Mg® are very encouraging to offer an alternative to the medicinal drugs to help women who suffer from premenstrual syndrome and who prefer to use a natural solution during their menstrual cycles.

Key words : Efficacy of ATA Mg®, Premenstrual syndrome (PMS), Clinical study, Subjects under medical control, Menstrual cycles, Recording of possible adverse events.

INTRODUCTION

It is widely recognized that many women experience cyclical changes in somatic, behavioral and affective symptoms in relation to the menstrual cycle[1]. The most consistently reported finding is of a premenstrual increase in negative symptoms ; hence the frequently employed nomenclature, premenstrual syndrome (PMS). Despite considerable study, the incidence and etiology of PMS remains unclear. Part of this confusion reflects methodological differences in the study and conceptualization of the disorder.

More than 150 diverse symptoms have been reported to occur, or become exacerbated, premenstrually[2-4]. Changes in these symptoms across the menstrual cycle are typically assessed using pen and paper questionnaires. The most widely recognized and used questionnaire is the Moos Menstrual Distress Questionnaire. Ross and al. wrote another scientific paper which deals with factor structure of the Modified Moos Menstrual Distress Questionnaire: assessment of prospectively reported follicular, menstrual and premenstrual symptomatology[5].

Magnesium deficiency is considered as a contribution factor to some symptoms of PMS. Several studies have reported a lower intracellular magnesium concentration in women with PMS[6].

The mechanism by which magnesium deficiency induces PMS symptoms has not been fully elucidated, but several hypotheses have been proposed.

This magnesium depletion may affect the vascular system, synaptic transmission, and excitation-secretion coupling, and thus may produce some of the well-known symptoms of PMS[7]. In addition, some PMS symptoms have been found to share common characteristics associated with magnesium deficiency.

In the absence of an adequate amount of magnesium, NMDA receptors are hyperactivated, resulting in an overactivation of brain function, which is involved in several neurological disorders observed in PMS : migraine, stress, anxiety, ...[8].

Magnesium depletion in cerebrovascular smooth muscle cells can also lead to vasospasm, which may be involved in migraines[9].

In addition, hormonal changes also lead to inflammation, particularly in the central nervous system[10]. Inflammation leads to inappropriate activation of glutamate receptors, which are known to play a role in pain transmission[11].

Therefore, one of the proposed approaches to PMS prevention is magnesium supplementation.
The double objective of this clinical study is to highlight the efficiency of ATA Mg® on Premenstrual Syndrome (PMS) in an open intra-individual study ; each female subject is her own control ; and then, to record some eventual adverse events after the ATA Mg® oral daily intake.
The study was conducted in 2020, over a period of 3 menstrual cycles.

METHODS

POPULATION RECRUITEMENT

SELECTION

Specific criteria
19 women from 18 to 45 years old (average : 33 years old), having regular menstrual cycles, every 24 to 31 days and lasting at least 3 days were selected.

All subjects present symptoms of Premenstrual Syndrome with one of the symptoms requiring treatment according to the patient (declarative + preselection questionnaire for confirmation of inclusion by the clinician).

All women were also chosen with inadequate magnesium intake from food.

General criteria
All women were healthy subjects, having given her free informed, written consent and willing to adhere to the protocol and study procedures.

Exclusion criteria
- Subjects presenting symptoms of COVID–19 (moderate fever, dry cough, and other symptoms as described by the World Health Organisation) ;
- Subjects with a temperature higher than 37.5°C ;
- Subject having been tested positive for COVID-19 and without a medical certificate from the Government
- Pre-menopausal or post-menopausal subjects ;
- Subjects on antibiotics: Quinolone, tetracycline, etc. ;
- Subjects on IPP : Omeprazole® ;
- Subjects in renal failure ;
- Subjects with hypotension ;
- Subjects having any gynecological condition liable to interfere with the assessment of the efficacy of the study product ;
- Subjects with metabolic disease ;
- Subjects with known psychiatric pathology ;
- Subjects who smoke ;
- Subjects with a history of alcohol abuse or illicit substances ;
- Subject not using the same oral contraception method for more than one year ;
- For women: pregnant or nursing woman or woman planning to get pregnant during the study ;
- Use of topical or systemic treatment during the previous weeks liable to interfere with the assessment of the efficacy of the study product ;

- Subject having undergone a surgery under general anesthesia within the previous month ;
- Consumption of other dietary supplements during the study ;
- Subject planning to change their lifestyle and eating habits ;
- Subject enrolled in another clinical trial during the study period.

Oral administration

ATA Mg® capsules was administered at the rate of 770 mg daily ; 1 capsule of 385 mg twice daily (one in the morning, the other one, at night).

STUDY REQUIREMENTS AND CONSTRAINTS

All patients had to respect dates and hours of evaluation visits, followed the conditions of use of the investigational products at home and completed the daily log and brought it back with the investigational products at the end of the study.

They must not take other types of food supplements, allowed the use of the study product by another person than herself, and changed their lifestyles and eating habits.

COMPLIANCE ASSESSMENT

The compliance is controlled by checking the daily log **(see Figure 1).**

PROTOCOL DEVIATIONS

A protocol deviation can be defined as any non-adherence to the final protocol, including :

- wrong inclusion (inclusion criteria or non-inclusion criteria not fulfilled) ;
- start of a prohibited concomitant treatment ;
- non-adherence of the subjects to the study schedule (missed or postponed visit) ;
- missing data for one or several evaluation criteria ;
- low compliance of the subject to the study product(s) application ;
- premature study end or untraceable subject ;
- no respect of the constraints envisaged by the protocol.

Deviations to the protocol were classified as:

- **minor** if they don't impact the rights, safety or well-being of the subjects. They do not increase the risk for the subject and/or do not have a significant effect on the integrity of the data collected,
- **major** (or protocol violations) if they affect the rights, safety or well-being of participants. They increase the risk for the subject and/or have a significant effect on the integrity of the study data,
- **critical**: any protocol violations as mentioned above necessarily requiring the suspension or the termination of the study.

The protocol non-adherences of Subject #70 and Subject #88 induced their exclusion from the analysis (major non-adherence) and their data were not kept in the analysis.

DAY	DATE	NUMBER OF DAILY USE(S)		Discomfort and/or intolerance sensations felt	MEDICATION (why? wich one? wich dosage? how long?)
		Number	Comment: define if omission or other		
Ex:		⌊0⌋	Omission	○ **NO** ○ **YES**. If yes, define: Mild tingling / eyelids / for 5 minutes at application	○ **NO** ○ **YES**. If yes, define: Headache / Paracetamol 500mg / 1 pill
D0		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D1		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D2		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D3		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D4		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D5		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D6		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:
D7		⌊__⌋		○ **NO** ○ **YES**. If yes, define:	○ **NO** ○ **YES**. If yes, define:

.../... (31 DAYS)

FIGURE 1 : DAILY LOG

Among the 21 women included at the beginning of the clinical study, finally 19 were definitely recruited.

Subjects' characteritics are presented in the **Table 1**, here-below.

Subject#	Last name	First name	Age	Having PMS symptoms	Duration of menstrual cycle	Duration of menses (day/s)	Last menstrual period	Comments
3	FA	J	26	Yes	28	4	30/Aug/20	None
6	MA	T	23	Yes	28	4	30/Aug/20	None
10	PA	T	26	Yes	31	4	31/Aug/20	None
13	RA	M	45	Yes	24	5	8/Sep/20	None
16	CU	M	33	Yes	28	3	8/Sep/20	None
23	LE	M	30	Yes	30	4	14/Sep/20	None
27	AG	M	29	Yes	25	5	20/Sep/20	None
34	CA	K	41	Yes	28	3	20/Sep/20	None
38	LI	M	27	Yes	26	3	20/Sep/20	None
48	AN	L	39	Yes	30	4	30/Sep/20	None
50	HE	B	35	Yes	28	4	29/Sep/20	None
52	BA	I	29	Yes	28	4	28/Sep/20	None
56	BI	Y	28	Yes	25	4	28/Sep/20	None
66	BE	D	37	Yes	28	4	3/Oct/20	None
(70)*	(AG)*	(C)*	(25)*	(Yes)*	(28)*	(4)*	(13/Oct/20)*	(Protocol deviation)*
76	BA	J	28	Yes	29	4	14/Oct/20	None
79	MA	C	34	Yes	28	4	14/Oct/20	None
81	RA	B	26	Yes	28	3	20/Oct/20	None
83	BA	I	45	Yes	29	5	18/Oct/20	None
85	MA	S	42	Yes	28	3	18/Oct/20	None
(88)*	(SA)*	(A)*	(22)*	(Yes)*	(26)*	(7)*	(20/Oct/20)*	(Protocol deviation)*

TABLE 1 : WOMEN' CHARACTERISTICS

CONCOMITANT TREATMENTS

None of the concomitant medications started after the beginning of the study invalidated the data obtained for the subjects in question.

The concomitant medications is shown in **Table 2.**

Subject#	Medication (sales name)	Indication	Start date	End date or «in progress»
13	Immodium®	Diarhea	29/Sep/20	29/Sep/20
27	Efferalgan®	Headache	3/Oct/20	3/Oct/20

TABLE 2 : CONCOMITANT MEDICATION

STUDY PROCESS

KINETICS

The kinetics are mentionned in the Table 3 here beside.

STORAGE

Until the beginning of the study, products are kept at room temperature in a dedicated air-conditioned room, which is locked and access controlled.

ATTRIBUTION TO THE SUBJECTS AND INSTRUCTIONS

All the subjects received the same product reference, labelled « ATA Mg® 770 mg ».

The boxes contained 60 capsules of 385 mg each (Mg^{2+} : 23,45 mg per capsule). The recommended directions use was 2 capsules daily (one in the morning, the other one, at night).

QUESTIONNAIRE REGARDING PMS SYMPTOMS

The subjective questionnaire used in this clinical study is based on The Development of a Menstrual Distress Questionnaire[3, 5].

Procedure	V1 Pre-inclusion	At home	V2 (By phone)	At home	V3	At home	V4
Intervals: Days	T-1 month 1 to 3 days after the end of menstrual cycle	Maximum 1 week before menstrual cycle	T0 1 to 3 days after the end of the 1st menstrual cycle	Maximum 1 week before menstrual cycle	T1 month 1 to 3 days after the end of the 2nd menstru al cycle	Maximum 1 week before menstrual cycle	T2 month 1 to 3 days after the end of the 3rd menstrual cycle
Written consent, Pregnancy test	●						
Medical History	●						
Previous treatments	●						
PMS symptoms questionnaire before menstrual cycle		●		●		●	
Medical interview with symptom questionnaire after menstrual cycle	●				●		●
Delivery of treatments, of questionnaire before menstrual cycle and the daily log	●				●		
Medical interview			●				
Return of treatments, questionnaire before the menstrual cycle and daily log					●		●
Events /Adverse Reactions Compliance / Concomittant treatment			●		●		●

TABLE 3 : DESIGN SUMMARY OF THE CLINICAL STUDY

STUDY STAGE

VISIT 1 (D-1 Month) (+1-3 days after the end of the menstrual cycle)
The subjects come to the investigation center, they were informed about the trial objectives, the procedures and the risks of the study with the information sheet. They signed two copies of the Consent Form, had to do a pregnancy test and fill in the pre selection questionnaire.

The Doctor verified inclusion and non-inclusion criteria, selected subjects based on the pre selection questionnaire ; performed a clinical examination of the general health state and asked the subjects about their usual unpleasant sensations and medications.
The technician explained to the subjects the product utilization conditions and frequency ; gave to the subjects the product to be used according to the instructions, the daily log to write down their possible unpleasant sensations or medications ; the questionnaire regarding the PMS symptoms to be filled at home.

VISIT 2 – By phone (ON D0) (+1-3 days after the end of the first menstrual cycle)
The Doctor performed an interrogation of the general health state ; asked the subjects about any unpleasant sensations and medications ; interrogated the subjects based on the filled questionnaire about the PMS symptoms.

VISIT 3 ON (D+1 MONTH) (+1-3 days after the end of the second menstrual cycle)
The subjects returned to the investigation center one to three days after the second menstrual cycle and brought back the filled questionnaire regarding the PMS symptoms.
The Doctor performed a clinical examination of the general health state ; asked the subjects about any unpleasant sensations and medications ; interrogated the subjects based on the filled questionnaire about the PMS symptoms.
The technician gave to the subjects the product to be used according to the instructions and the questionnaire regarding the PMS symptoms to be filled at home.

VISIT 4 ON (D+2 MONTHS) (+1-3 days after the end of the third menstrual cycle)
The subjects returned to the investigation center one to three days after the third menstrual cycle ; brought back the filled questionnaire regarding the PMS symptoms ; brougt the daily log and study product.

The Doctor performed a clinical examination on the general health state ; asked the subjects about any unpleasant sensations and medications and interrogated the subjects based on the filled questionnaire about the PMS symptoms.

RESULTS

For each of the 20 PMS symptoms[3-5], the summary of results and the statistical analysis is shown.

Legend:
° : paired t-test • μ : unpaired t-test • * : Wilcoxon signed rank test • § : Mann-Whitney test

1. Nervous tension

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.26 (0.45)
	p-value	0.0625*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.58 (1.17)
	p-value	0.0447°
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.89 (1.05)
	p-value	0.0016°

First cycle:
- ATA Mg® 770mg induced a decrease in nervous tension (mean -0.26) as compared to baseline.

Second cycle:
- ATA Mg® 770mg induced a statistically significant decrease in nervous tension (mean -0.58) as compared to baseline.

Third cycle:
- ATA Mg® 770mg induced a statistically significant decrease in nervous tension (mean -0.89) as compared to baseline.

2. Mood swings

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.58 (0.69)
	p-value	0.0059*
V3-V1	N (miss)	19 (2)
	mean (SD)	-1.16 (1.17)
	p-value	0.0004°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.42 (1.07)
	p-value	<.0001*

First cycle:
- ATA Mg® 770mg induced a statistically significant decrease in mood swings (mean -0.58) as compared to baseline.

Second cycle:
- ATA Mg® 770mg induced a statistically significant decrease in mood swings (mean -1.16) as compared to baseline.

Third cycle:
- ATA Mg® 770mg induced a statistically significant decrease in mood swings (mean -1.42) as compared to baseline.

3. Irritability

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.37 (0.50)
	p-value	0.0156*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.89 (1.10)
	p-value	0.0023°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.21 (0.98)
	p-value	<.0001°

First cycle:
- ATA Mg® 770mg induced a statistically significant decrease in irritability (mean -0.37) as compared to baseline.

Second cycle:
- ATA Mg® 770mg induced a statistically significant decrease in irritability (mean -0.89) as compared to baseline.

Third cycle:
- ATA Mg® 770mg induced a statistically significant decrease in irritability (mean -1.21) as compared to baseline.

4. Anxiety

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.42 (0.61)
	p-value	0.0156*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.84 (1.42)
	p-value	0.0190°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.21 (0.98)
	p-value	<.0001°

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in anxiety (mean -0.42) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in anxiety (mean -0.84) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in anxiety (mean -1.21) as compared to baseline.

5. Feeling of loneliness

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.32 (0.89)
	p-value	0.2188*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.68 (0.95)
	p-value	0.0055°
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.89 (0.74)
	p-value	0.0002*

First cycle:
· ATA Mg® 770mg induced a decrease in the feeling of loneliness (mean -0.32) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in the feeling of loneliness (mean -0.68) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in the feeling of loneliness (mean -0.89) as compared to baseline.

6. Headache

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (0.70)
	p-value	0.0195*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.95 (1.13)
	p-value	0.0018°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.26 (1.10)
	p-value	<.0001°

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in headache (mean -0.47) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in headache (mean -0.95) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in headache (mean -1.26) as compared to baseline.

7. Cravings for sweets

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.21 (0.42)
	p-value	0.1250*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (0.84)
	p-value	0.0245°
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.74 (1.05)
	p-value	0.0107*

First cycle:
· ATA Mg® 770mg induced a decrease in cravings for sweets (mean -0.21) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in cravings for sweets (mean -0.47) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in cravings for sweets (mean -0.74) as compared to baseline.

8. Increased appetite

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (0.84)
	p-value	0.0469*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.63 (1.34)
	p-value	0.0551°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.05 (1.08)
	p-value	0.0005°

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in increased appetite (mean -0.47) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a decrease in increased appetite (mean -0.63) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in increased appetite (mean -1.05) as compared to baseline.

9. Heart pounding

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.26 (0.56)
	p-value	0.1250*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.37 (0.96)
	p-value	0.1100°
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.68 (0.82)
	p-value	0.0039*

First cycle:
· ATA Mg® 770mg induced a greater decrease in heart pounding (mean -0.26) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a greater decrease in heart pounding (mean -0.37) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in heart pounding (mean -0.68) as compared to baseline.

10. Fatigue

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (0.77)
	p-value	0.0313*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (1.35)
	p-value	0.1431°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.21 (1.08)
	p-value	0.0001°

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in fatigue (mean -0.47) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a decrease in fatigue (mean -0.47) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in fatigue (mean -1.21) as compared to baseline.

11. Dizziness or fainteness

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.21 (0.54)
	p-value	0.2188*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.68 (0.67)
	p-value	0.0010*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.89 (0.81)
	p-value	0.0005*

First cycle
· ATA Mg® 770mg induced a statistically significant decrease in dizziness and faintness (mean -0.21) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in dizziness and faintness (mean -0.68) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in dizziness and faintness (mean -0.89) as compared to baseline.

12. Depression

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.11 (0.46)
	p-value	0.6250*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.32 (0.75)
	p-value	0.1484*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.53 (0.70)
	p-value	0.0078*

First cycle
· ATA Mg® 770mg induced a decrease in depression (mean -0.11) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a decrease in depression (mean -0.32) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in depression (mean -0.53) as compared to baseline.

13. Forgetfulness

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.26 (0.65)
	p-value	0.1875*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (0.84)
	p-value	0.0469*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.68 (0.75)
	p-value	0.0020*

First cycle
· ATA Mg® 770mg induced a decrease in forgetfulness (mean -0.26) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in forgetfulness (mean -0.47) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in forgetfulness (mean -0.68) as compared to baseline.

14. Crying

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.32 (0.82)
	p-value	0.1875*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.53 (1.12)
	p-value	0.0859*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.84 (1.01)
	p-value	0.0020*

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in crying (mean -0.32) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in crying (mean -0.53) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in crying (mean -0.84) as compared to baseline.

15. Confusion

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.32 (0.89)
	p-value	0.2188*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.53 (0.70)
	p-value	0.0078*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.79 (0.85)
	p-value	0.0010*

First cycle:
· ATA Mg® 770mg induced a greater decrease in confusion (mean -0.32) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a greater decrease in confusion (mean -0.53) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in confusion (mean -0.79) as compared to baseline.

16. Insomnia

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.42 (0.69)
	p-value	0.0313*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.63 (1.12)
	p-value	0.0239°
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.95 (0.78)
	p-value	0.0002*

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in insomnia (mean -0.42) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in insomnia (mean -0.63) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in insomnia (mean -0.95) as compared to baseline.

17. Weight gain

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.21 (0.42)
	p-value	0.1250*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.47 (0.77)
	p-value	0.0313*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.53 (0.96)
	p-value	0.0286°

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in weight gain (mean -0.21) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in weight gain (mean -0.47) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in weight gain (mean -0.53) as compared to baseline.

18. Swelling of extremities

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.21 (0.79)
	p-value	0.4063*
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.53 (0.77)
	p-value	0.0176*
V4-V1	N (miss)	19 (2)
	mean (SD)	-0.74 (0.99)
	p-value	0.0045°

First cycle:
· ATA Mg® 770mg induced a decrease in swelling of extremities (mean -0.21) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in swelling of extremities (mean -0.53) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease swelling of extremities (mean -0.74) as compared to baseline.

19. Breast tenderness

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.74 (0.81)
	p-value	0.0020*
V3-V1	N (miss)	19 (2)
	mean (SD)	-1.21 (1.03)
	p-value	<.0001°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.53 (0.77)
	p-value	<.0001*

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in breast tenderness (mean -0.74) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in breast tenderness (mean -1.21) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in breast tenderness (mean -1.53) as compared to baseline.

20. Abdominal bloating

		ATA Mg® 770mg
V2-V1	N (miss)	19 (2)
	mean (SD)	-0.68 (0.89)
	p-value	0.0034°
V3-V1	N (miss)	19 (2)
	mean (SD)	-0.95 (1.03)
	p-value	0.0008°
V4-V1	N (miss)	19 (2)
	mean (SD)	-1.32 (0.95)
	p-value	<.0001°

First cycle:
· ATA Mg® 770mg induced a statistically significant decrease in abdominal bloating (mean -0.68) as compared to baseline.
Second cycle:
· ATA Mg® 770mg induced a statistically significant decrease in abdominal bloating (mean -0.95) as compared to baseline.
Third cycle:
· ATA Mg® 770mg induced a statistically significant decrease in abdominal bloating (mean -1.32) as compared to baseline.

UNDESIRABLE EFFECTS / ADVERSE EVENTS

Adverse Effects were reported by 2 subjects.
An episode of mild diarrhea (duration < 24h, medication name : Immodium®) was filled by Subject #13, before the first capsule intake and several hours after the first capsule intake.

A mild headache has also been reported (duration < 24h, medication name : Efferalgan®) approximately 2 hours after the first capsule intake.
In both cases, the causality assessment was classified as unlikely (See **Table 2**).

CONCLUSION

The clinical study carried out on 19 women over 3 menstrual cycles clearly demonstrated the effectiveness of ATA Mg® on the 20 symptoms of Pre Menstrual Syndrome.

In other words, ATA Mg® can offer an alternative to the medicinal drugs to help women who suffer from Pre Menstrual Syndrom and who prefer to use a natural magnesium solution, during their menstrual cycles.

ATA Mg® 770mg induced a statistically significant decrease in **nervous tension**
- In the second cycle (mean -0.58).
- In the third cycle (mean -0.89.

ATA Mg® 770mg induced a statistically significant decrease in **mood swings**
- In the first cycle (mean -0.58).
- In the second cycle (mean -1.16).
- In the third cycle (mean -1.42).

ATA Mg® 770mg induced a statistically significant decrease in **irritability**
- In the first cycle (mean -0.37).
- In the second cycle (mean -0.89).
- In the third cycle (mean -1.21).

ATA Mg® 770mg induced a statistically significant decrease in **anxiety**
- In the first cycle (mean -0.42).
- In the second cycle (mean -0.84).
- In the third cycle (mean -1.21).

ATA Mg® 770mg induced a statistically significant decrease in the **feeling of loneliness**
- In the second cycle (mean -0.68).
- In the third cycle (mean -0.89).

ATA Mg® 770mg induced a statistically significant decrease in **headache**
- In the first cycle (mean -0.47).
- In the second cycle (mean -0.95).
- In the third cycle (mean -1.26).

ATA Mg® 770mg induced a statistically significant decrease in **cravings for sweets**
- In the second cycle (mean -0.47).
- In the third cycle (mean -0.74).

ATA Mg® 770mg induced a statistically significant decrease in **increased appetite**
- In the first cycle (mean -0.47).
- In the third cycle (mean -1.05).

ATA Mg® 770mg induced a statistically significant decrease in **heart pounding**
- In the third cycle (mean -0.68).

ATA Mg® 770mg induced a statistically significant decrease in **fatigue**
- In the first cycle (mean -0.47).
- In the third cycle (mean -1.26).

ATA Mg® 770mg induced a statistically significant decrease in **dizziness and faintness**
- In the second cycle (mean -0.68).
- In the third cycle mean -0.89).

ATA Mg® 770mg induced a statistically significant decrease in **depression**
- In the third cycle mean -0.53).

ATA Mg® 770mg induced a statistically significant decrease in **forgetfulness**
- In the second cycle (mean -0.47).
- In the third cycle (mean -0.68).

ATA Mg® 770mg induced a statistically significant decrease in **crying**

- In the third cycle mean -0.84).

ATA Mg® 770mg induced a statistically significant decrease in **confusion**

- In the third cycle (mean -0.50).

ATA Mg® 770mg induced a statistically significant decrease in **insomnia**

- In the first cycle (mean -0.42).
- In the second cycle (mean -0.63).
- In the third cycle (mean -0.95).

ATA Mg® 770mg induced a statistically significant decrease in **weight gain**

- In the second cycle (mean -0.47).
- In the third cycle (mean -0.53).

ATA Mg® 770mg induced a statistically significant decrease in **swelling of extremities**

- In the second cycle (mean -0.53).
- In the third cycle (mean -0.74).

ATA Mg® 770mg induced a statistically significant decrease in **breast tenderness**

- In the first cycle (mean -0.74).
- In the second cycle (mean -1.21).
- In the third cycle (mean -1.53).

ATA Mg® 770mg induced a statistically significant decrease in **abdominal bloating**

- In the first cycle (mean -0.68).
- In the second cycle (mean -0.95).
- In the third cycle (mean -1.32).

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DISCLOSURE

ATA Mg® was kindly supplied by Synapharm Industrial Synthesis S.A.

This study was totally performed under the responsibility of EUROFINS Dermscan/Pharmascan.

The person responsible for the final quality control certifies that the study above was conducted as closely as possible to Good Clinical Practice (GCP-ICH), in compliance with the study protocol and EUROFINS Dermscan/Pharmascan standard operating procedures and that the study report reflects raw data.

Dr. Madhvee Bundhoo : Eurofins Dermascan - Insight research.

All the observations and numerical data collected throughout the study are reported in this document and are in accordance with the obtained results.