

Evaluation in healthy volunteers
of the efficacy of a product that reduces
blood alcohol levels

An investigation without direct individual benefits



STUDY No. 97142

Product:
PIROFRUCTOL®

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QUALITY CONTROL CERTIFICATE

Clinical trial number: 97142
Starting date of test(s): May 20th, 1997
Ending date of test(s): June 9th, 1997

The aforementioned study has been performed in accordance with the regulations on Good Clinical Practices and the regulations established by the International Standards Organization (ISO), and to the standard operating procedures of the DERMSCAN laboratory.

The person responsible for quality control for this study certifies that it has respected all the aforementioned rules, regulations and procedures, as well as the control of the study and the data contained herein.

Introduction: Alcohol intake in moderate doses forms part of the pleasures of life, and does not present long-term risks in the following doses (<40g/day for women; <60g/day for men). There are circumstances such as periods of drug consumption, digestive problems or fatigue, where alcohol tolerance is reduced even if alcohol intake is limited to small doses.

This product allows increasing alcohol metabolism, reducing blood alcohol levels and thus reducing the undesirable effects of alcohol.

Product analyzed: This glucose-dominant product acts according to two main mechanisms:

- Fructose accelerates alcohol oxidation increasing pyruvicemia rates.
- Citric acid provides the mixture with sufficient acidity in order to obtain lasting pyloric fermentation. This stomach retention allows delaying alcohol absorption and causes a start of degradation, even before its assimilation by the body.

This food complement contains natural substances that are not toxic in the doses prescribed, these doses conforming to nutritional supplement legislation.

This product is only active in moderate alcohol doses.

Prior Trials: Sugars absorbed with drinks can reduce blood alcohol levels. Sugar function has been known since the work of Carpenter and Lee (1937), which has been confirmed by numerous works and especially by the work of Pletscher (1953).

J. LERBOULLET's (1) study of 1968 carried out on 75 individuals confirms the role of sugars in lowering blood alcohol levels:

- Firstly, the action of fructose on the blood alcohol level curve resulting from the subject taking alcohol at 0.5 g/kilo, i.e. 30 g for a person weighing 60 kg.

Blood alcohol levels are reduced by 50% for the entire duration of the test after absorption of 100g of fructose and only by 15% after absorption of 20g of fructose (Figure 1). This reduction has been the same for all curves performed during this first test.

- A second series of experiments has specified the role played by the time of absorption: fructose, always in a 100 g dose, was administered thirty minutes after alcohol intake. Under these conditions, the reduction in blood alcohol levels is much less significant and reaches 23% thirty minutes after fructose consumption and 20% one hour later.

Several sugars have been studied, always with the same dose of 100 g. Fructose, glucose, lactose and sucrose have an almost equal action, fructose seeming to be the most active and sucrose the least active.

Trial Justification: Effectiveness of the product developed by CA Recherches laboratory in blood alcohol level reduction after alcohol intake has never been tested in the framework of a clinical trial on humans, and the human model is the only one that can provide enough information.

Trial Aim: To evaluate the effect of the product developed by CA Recherches laboratory on blood alcohol levels after alcohol intake by blood alcohol level doses (pilot study).

Method:

Trial period:

The trial can be performed at any time of the year.

Ethical aspects:

The trial is subject to a "CCPPRB" protocol. It is a study with no direct individual benefits.

Experimental plan:

Intraindividual open study.

Evaluation Criteria:

Main Criteria

To evaluate product effectiveness upon blood alcohol levels due to blood alcohol rate dosage. It is equally performed with a control of blood glucose levels.

Secondary Criteria:

Tolerance is evaluated by glucose dosage, by measurements at T0, T15, T45, T30, T60, T90 and T120.

Standard and measurement apparatus

Blood alcohol and glucose level dosage. Ethanol (alcohol) is dosed by the enzymatic technique that uses alcohol-oxidase and peroxidase.

Glucose dosage is performed by the glucose-oxidase technique.

Organization

The DERMSCAN laboratory organizes and performs the entire trial. Samplings are performed at the DERMSCAN laboratory.

Trial Diagram

Before day 0

- Preinclusion visit after clinical exploration by the investigating doctor which requires having an empty stomach at day 0.
- Performance of a biological balance with blood ionogram, formula numbering and platelets, hepatic balance ((SGOT – SGPT) transaminases), Hepatitis B and C serology, VIH-1 and VIH-2 serology and BHCG dosage (for all women susceptible of being pregnant). Only volunteers with normal results are included.
- Volunteers sign consent form.

The trial is performed with presence of the doctor. In the event of discomfort, sugar will be administered by perlingual or intravenous route.

Day 0

Volunteers arrive at the laboratory with an empty stomach.

At t0

- Placing of a catheter by a GARIBALDI Medical Analysis Laboratory nurse.
- Blood extraction = (10 ml for blood alcohol level, and 5 ml for glucose).
- Intake of 43° whisky: the dose is calculated according to Lereboullet's study (1) so that it remains below 0.5 g/l (0.30g/kg for women and 0.35 g/kg for men), i.e. a man weighing 60 kg takes a 50 ml glass and a woman weighing 60 kg takes a 40 ml glass (lower dose in women due to greater absorption capabilities).

At T15min, t30min, t45min, 60min, t90min and t120min after ingesting the whisky:

- Blood extraction.
- Measurement of the alcohol and glucose level in the volunteers' bloodstream by the GARIBALDI Medical Analysis Laboratory.
- Volunteers will be given a meal at the end of the study.

Volunteers will only leave the laboratory once they have been examined by the doctor. Since the blood alcohol level always remains below 0.5 g/l, driving a vehicle will be authorized.

On day 7

At t-30min

- Distribution to the volunteers of the product to be tested in powder form, to be diluted in a glass of water and ingested.

At t0

- Placing of a catheter by a GARIBALDI Laboratory nurse.
- Blood extraction (blood alcohol level, glucose level).
- Ingestion of a certain amount of 43° whisky (0.30 g/kg for women and 0.35 g/kg for men).

At t15min, t30min, t45min, 60min, t90min and t120min after ingesting the whisky

- Blood extraction.
- Measurement of the alcohol and glucose level in the volunteers' bloodstream.
- Volunteers will be given a meal at the end of the study.

Volunteers shall only leave the laboratory once they have been examined by the doctor. Since blood alcohol levels always remain below 0.5 g/l, driving a vehicle will be authorized.

A quality control is performed in accordance with the regulations of Good Clinical Practices by the DERMSCAN laboratory investigator.

Number of subjects: Pilot study on 10 subjects (5 men and 5 women).

Manner and place of application

Oral administration under the monitoring of the study's head technician.

Study variable: Effectiveness of Pirofructol® product

$$D = (X_{P1tj} - X_{P1t0}) - (X_{P0tj} - X_{P0t0})$$

X represents blood alcohol measurements

P i with i=0 (without ingestion of product to be tested) or 1 (with ingestion of product to be tested)

X_{Pi_t0} corresponds to blood alcohol level after alcohol intake.

X_{Pi_tj} with j=30 min, 1 hour or 2 hours.

A negative value for D shows greater variation in blood alcohol levels in absence of ingestion of the product to be tested.

- Paired data: measurements in absence or presence of nutritional supplements performed on the same volunteers.
- Statistical method: the study variable is shown at different evaluation times (mean and 95% confidence interval). If 0 is not within the confidence interval, it can be concluded with a significant difference (D=5%) between the variation observed after product ingestion and that observed without product intake (D<>0)

Trial follow-up: The study was carried out from May 26th to June 4th, 1997.

The study was performed on 10 healthy volunteers, five men and five women, of ages comprised between 24 and 48 years of age (average age 35).

Results: Blood alcohol level dosage

Table 4 shows individual results for blood alcohol levels (g/l) measured in the same group of 10 volunteers, before absorption and 15 minutes, 30 minutes, 45 minutes, 60 minutes, 90 minutes and 120 minutes after ingesting whisky.

The statistical analysis is shown in the appendix (D significantly different from 0 at different evaluation times (D=0.05)).

The mean (n=9) and mean standard deviation (MSD) of these values are equally shown. The values for volunteer 3 appear in grey in the following table and have not been taken into account in mean value calculations.

Table 4. Without Pirofructol® (day 0)

Volunteer	t0	t15min	t30min	t45min	t60min	t90min	t120min
1	0.02	0.28	0.37	0.28	0.25	0.19	0.15
2	0.00	0.27	0.31	0.24	0.21	0.16	0.12
3	0.02	0.13	0.22	0.22	0.19	0.10	0.10
4	0.00	0.31	0.30	0.27	0.22	0.23	0.14
5	0.01	0.37	0.32	0.20	0.23	0.08	0.03
6	0.02	0.36	0.39	0.32	0.28	0.19	0.15
7	0.01	0.37	0.43	0.34	0.27	0.19	0.12
8	0.02	0.19	0.36	0.35	0.46	0.30	0.22
9	0.01	0.16	0.36	0.37	0.33	0.27	0.21
10	0.01	0.09	0.18	0.30	0.30	0.26	0.22
Mean (n=9)	0.01	0.27	0.34	0.30	0.28	0.21	0.15
MSD	0.00	0.01	0.01	0.01	0.01	0.01	0.01

Table 5 shows individual results for blood alcohol levels (g/l) measured 7 days later in the 10 volunteers before absorption and 15 minutes, 30 minutes, 45 minutes, 60 minutes and 120 minutes after ingesting whisky and the Pirofructol® product.

The mean (n=9 as a result of the exclusion of volunteer 3) and mean standard deviation (MSD) for these values are equally shown.

Table 5. With Pirofructol® (day 7)

Volunteer	t0	t15min	t30min	t45min	t60min	t90min	t120min
1	0.01	0.05	0.09	0.23	0.24	0.10	0.05
2	0.01	0.02	0.02	0.02	0.01	0.09	0.04
3	0.00	0.37	0.40	0.27	0.15	0.09	0.04
4	0.01	0.03	0.06	0.09	0.13	0.11	0.08
5	0.01	0.01	0.01	0.00	0.01	0.04	0.08
6	0.01	0.05	0.09	0.11	0.13	0.07	0.02
7	0.01	0.02	0.01	0.03	0.02	0.02	0.03
8	0.01	0.03	0.04	0.07	0.10	0.08	0.10
9	0.01	0.6	0.07	0.09	0.22	0.18	0.11
10	0.01	0.01	0.014	0.01	0.03	0.05	0.04
Mean (n=9)	0.01	0.03	0.04	0.07	0.10	0.08	0.06
MSD	0.00	0.00	0.00	0.01	0.01	0.01	0.00

Variations in blood alcohol levels are calculated from the following formula:

$$\% = \frac{(Z_{ti} - Z_{t0}) - (Z_{nti} - Z_{nt0})}{(Z_{nti} - Z_{nt0}) + Z_{t0}} \times 100$$

where:

Z_{ti}: value at t_i after product absorption,

Z_{t0}: value at t₀ after product absorption,

Z_{nti}: value at t_i without product absorption,

Z_{nt0}: value at t₀ without product absorption.

Pirofructol® is rapidly effective: in t15minutes whisky absorption reduction was 86%; this effect is maintained until t45minutes (84% reduction) after a peak at t30minutes (-87%).

Variations obtained at t15min, t30min, t45min, t60min, t90min and t120min with or without Pirofructol®, are significantly different. The statistical analysis is shown in appendix 9-3.

The use of the Pirofructol® product therefore reduces the increase in blood alcohol levels.

Conclusion: The study was carried out from May 36th to June 4th, 1997.

It had the aim of verifying the effect of the Pirofructol® product, developed by the CA Recherches Laboratory, on blood alcohol levels after ingestion of whisky (0.30g/kg for women and 0.35g/kg for men) by blood alcohol level dosages at t0, t15min, t30min, t45min, t60min, t90min and t120min.

The study was performed with one week intervals on 10 healthy volunteers of both sexes, with ages comprised between 24 and 48 years, their mean age being 35 ± 3 years old. On D0 the volunteers ingested the whisky on its own, and on D7 the volunteers ingested the whisky 30 minutes after taking one dose of Pirofructol®.

One volunteer had to abandon the trial due to consumption of a Zyrtec® tablet on the day before each study.

There has not been any discomfort during the study requiring glucose administration.

Under the conditions of this study, the Pirofructol® product is very effective and acts quickly, since an 85% reduction of whisky absorption is verified from t15minutes and is maintained until t45minutes.

This effectiveness persists from t60 until t120minutes with a reduction of approximately 63%.

In short, the Pirofructol® product significantly reduces alcohol absorption.

This study has been performed under the responsibility of DERMSCAN Laboratory members.

Literature

Alcohol and the gastrointestinal tract, INSERM colloquium, 1980.

Thèse médecine Paris, Hakim Jacques /245, 1968.

Alcoolémie et boissons alcoolisées, la Revue de l'alcoolisme, 17, 1971, n° 2.