SCIENTIFIC LITERATURE REVIEW OF APEX GPA’S EFFECTS

Composed of natural ingredients and certified by Health Canada, Apex GPA:

- Helps to enhance cognitive function and memory in adults.
- Promotes endurance, helps reduce fatigue and improve physical performance.
- Promotes alertness and wakefulness, and helps improve intellectual performance.
- Helps the body to metabolize carbohydrates, proteins and lipids.
- Helps in the formation of red blood cells and tissues.
- Helps to prevent vitamin B6 and B12 deficiency.

The above claims can be reviewed by searching NPN:80066540 on Health Canada’s Database.

The effects of the ingredients (Caffeine, Panax ginseng, and Ginkgo Biloba) used in Apex are supported by scientific literature, to substantiate the claims of Health Canada. Positive effects have been attributed to individual ingredients, and the synergistic effects between Caffeine/Panax Ginseng and Ginkgo Biloba/Panax Ginseng.

All studies examining the effects of Apex GPA were placebo controlled and double-blinded. Double-blind studies ensure that researchers and participants are unaware of the distribution of the placebo and the treatment condition. This is essential for avoiding biased results based on the initial response and outcome of the research participants.
**PANAX GINSENG**

Each subject received a treatment of 200 mg and a placebo for 8 days and were tested based on the baseline level of central nervous system arousal (calmness).[iii]

“Calmness - steadiness of mind under stress”

“At each time period of observation, on day 1 and day 8, results revealed that a 200 mg dose significantly improved self-reported ratings of calmness.[iii]

Participants taking *Panax Ginseng* showed improved calmness after 2.5 hours of use with an increased score of *4.2%* and after 4 hours of use showed an increase of **7.4%** in calmness on day 1 of treatment.

On day 8 of treatment, improved calmness continued at the 1 hour mark, with the score increasing to †3.64% and after the 4 hour mark, the score increasing to ‡4.26%.

*Day 1: p<0.012, **p<0.0001
†Day 8: p<0.029, ‡p<0.015

*Panax Ginseng* has been studied based on the hypothesis that it may improve working memory in healthy young individuals. Doses ranged from 100, 200, 400 mg and/or matching placebo. Baseline test followed by testing at times 1, 3 and 6 hours. Evidence suggests that *Panax Ginseng* can increase working memory in middle-aged adults. This was observed at the 3 hour mark of testing with Panax Ginseng vs. Placebo. Results:[iv]

Spatial WM**
Time: 3 hour - *93.4% improvement

Working Memory**
Time: 3 hour- *86.6% improvement
*Both tests scoring p<0.0001

**The ability to process, hold and manipulate information. Particularly important in processing short-term memory. This may help people focus and stay on task. Spatial WM (Spatial working Memory) is the part of memory responsible for recording information about the environment and spatial perception (sense of navigation).
CAFFEINE

Evidence suggests that caffeine consumption helps to improve alertness and concentration. A dose of 75 mg of caffeine (about one cup of coffee or one shot of espresso) can increase attention and alertness. “According to a recent opinion by the European Food Safety Authority (EFSA) on the basis of the data presented, a cause and effect relationship has been established between the consumption of caffeine and increased attention”. [v]

The current study tested the effectiveness of repeated 200 mg doses of caffeine on cognitive function. 200 mg and/or a placebo were administered late evening and early morning after 4h of sleep. Based on the scores obtained during the study, caffeine use was found to be effective to help maintain cognitive function when optimal sleep periods were not available. Testing showed a 56 percentage point improvement for PVT/FVT and 76% faster time for LRT. [vi]

PVT (Psychomotor Vigilance Test)* and FVT (Field Vigilance Test)¹: Caffeine condition vs. caffeine control condition
“There was a significant effect observed (reaction-time measuring speed where a point scheme was implemented) based on the time of consumption* and a significant group-time interaction* for PVT, but the caffeine group scored significantly more points * than those receiving placebo throughout the three nights of restricted sleep (10.8±1.4 versus 6.1±0.8 points for caffeine and placebo, respectively)” This can be seen through hours 01h00 to 06h15 for days 3, 4 and 5.[vi]
*PVT based on consumption (p<0.001) and (p<0.02)
** PVT based on caffeine group (P<0.001)

LRT (Logical Reasoning Test) caffeine vs. placebo in correct response time (sec¹): “There was a main effect of group condition* indicating that overall the caffeine group correctly responded more rapidly (1.9±0.07 s) than placebo (2.5±0.07 s)”[vi]
*Main group effect (P<0.001)

Overall Vigilance monitor
“Overall, there was a main effect of the caffeine condition* where the number of correct stimuli responses for participants receiving caffeine (7.6±0.4) was significantly greater than those receiving a placebo (4.8±0.3)” [vi]
*Overall vigilance monitor caffeine effect (p<0.001)

Reactive-time based test used to measure speed pertaining to visual stimulation. The test presents a visual cue that appears in the middle of a screen. The subject’s task is to press a designated key in response to the visual cue. Points are awarded based on reaction time.

"Evaluating logical reasoning based on non-verbal skills (shape coordination/arrangement, numbering schemes etc.) This test is an adaptation of a pencil and paper linguistic task requiring knowledge of English grammar and syntax and the ability to determine whether various simple sentences correctly describe the relational order of two symbols.

---

**GINKGO BILOBA**

different doses 120 mg, 240 mg, and 360 mg were tested for the acute effects of Ginkgo Biloba. Volunteers were tested on speed of attention, speed of accuracy, quality of memory and speed of memory.

Testing hours: 1, 2.5, 4 and 6 [vii]

Results used for 120 mg:

**Speed of attention (milliseconds) placebo vs. ginkgo change from baseline**

2.5 hour score: 1048.29/1099.95 = *4.92%
4 hour score: 1048.29/1079.85 = *3.01% faster

Speed of attention: *p <0.0001, p <0.0026.

**Quality of memory**

2.5 hour score: 370.72/396.52 = **6.95%
4 hour score: 347.60/357.42 =** 2.83% increase

Quality of memory: **p <0.0001, p<0.0047

**Speed of memory (Msecs)**

1 hour score: 2432.37/2480.58 = ***1.98% faster
6 hour score: 2352.75/2441.88 = ***3.79% faster

Speed of memory: ***p <0.05, p <0.0002
CAFFEINE AND PANAX GINSENG (SYNERGY)

Further research showed that *Panax ginseng* and caffeine can not only aid cognitive functions, but physical performance as well. This placebo controlled double-blind study involved testing the physical restraint of runners (VO2, skin temperature, heart rate, and core body temperature) and has shown to help increase physical endurance in runners (P < 0.05)[i]

Placebo (PL) vs. caffeine and panax ginseng (CPG)
- “Running time to exhaustion was significantly different (p<0.05) between CPG and Pl trials (107.3±33.2 min and 83.6±21.4 min, respectively)”

Heart rate time
  - 60 min mark: 170/175 = 5 beats per minute faster ***2.9% increase
  - VO2 max (ml.kg⁻¹.min⁻¹)
    - 10 min mark: 7.7/33.95 = ***340% in VO2
    - 50 min mark: 35.21/35.65 = ***1.24% increase
  - **Core body temp(°C)
    - 60 min mark: 38.56/38.57 = ***0.03% increase
  ** Skin temperature(°C)
    - 60 min mark: 33.56/33.69 = ***0.4% increase

*When compared to the pre-exercise condition at time 0 min, data shows an overall of p<0.001 in the same trial.
** With longer running skin temperature and core body temperature are maintained
***p<0.0037, p<0.0001, p<0.215, p<0.9761, p<0.689
**GINKGO BILOBA AND PANAX GINSENG (SYNERGY)**

Both *Ginkgo Biloba* and *ginseng* have been combined in many treatments to test their effects on cognition when mixed together. In this placebo controlled, double-blind study, *Ginkgo Biloba* and *Panax Ginseng* were tested separately as well as together (totalling 3 studies). Many dosages were administered: 0, 200, 400 and 600 mg (6:10 *Ginkgo biloba-Panax ginseng*). The outcomes of the study were as predicted, resulting in heightened level and speed of attention when ginkgo and ginseng are combined. When *Panax Ginseng* was administered alone, study participants showed an improvement in accuracy ( # of subtractions completed vs. # of errors made), but showed slower performance.[ii]

Serial 3 test **Testing hours 0, 1, 2.5, 4 and 6 (320 mg combination, 120 mg *Ginkgo*: 200 mg *Ginseng* vs. placebo)**

Hour 4 showed the highest
Number of Responses: 7.5/3.75 = *87.5% increase*
*Serial 3 test 4 hour mark P < 0.000*

Serial 7 test **Testing hours 0, 1, 2.5, 6 and 6 (320 mg combination 6:10 vs placebo)**
Hour 2.5 and 6 showed the highest data

Number of Responses
- 5/1 = **400% increase**
- 5/2 = **150% increase**

Number of Errors:
- 0.5/2 = **25% fewer errors**
- 0.5/2 = **25% fewer errors**

** serial 7 test 2.5 and at 6 hour mark respectively P < 0.0001**
** Testing completed by serial subtraction task, beginning from 100 subjects subtract 3 or 7 from the previous number.
Apex GPA maximum daily dosage should not exceed 2 capsules per 24 hour period.

- Doses higher than 600 mg per day of caffeine may cause anxiety, tachycardia (rapid heart rhythm), palpitations, insomnia, nervousness, tremors, digestive problems, and headaches
- It is not recommended to take this product with other products containing caffeine (medications, coffee, cola, guarana).
- It is not recommended to consume this product with natural health products (e.g. bitter orange extract, synephrine, octopamine, or medications (e.g. ephedrine) that increase blood pressure
- Do not use if you are taking health products that affect blood clotting (anticoagulants e.g., a substitution therapy with coagulation factors, acetylsalicylic acid, ibuprofen, fish oil, vitamin E); this may increase the risk of spontaneous bleeding.

**APEX GPA**

*Ginkgo biloba* (50:1, 24% Flavoglycosides, 6% terpenoids).................80mg (160mg/day)

*Asian ginseng* (*Panax ginseng*, root)...............................100mg (200mg/day)

*Bacopa monnier* (*Bacopa monnieri*, herb)..............................100mg (200mg/day)

*Caffeine* (1,3,7 trimethylxanthine).........................................100mg (200mg/day)

*Vitamin B6* (pyridoxine hydrochloride)........................................4.5mg (9.0mg/day)

*Vitamin B12* (methylcobalamin)................................................0.5mg (1.0mg/day)

---


[vi] Gary H Kaminmori et al. 2014, Caffeine improves reaction time, vigilance and logical reasoning during extended periods with restricted opportunities for sleep

[vii] Kennedy et al. 2000 The dose-dependent cognitive effects of acute administration of Ginkgo biloba to healthy young volunteers