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# Reduction in Triglycerides and Improvements in Platelet Levels Through Cupping Therapy in the Normal Population

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## ABSTRACT

The aim and objective of this study are to find the alleviation of triglycerides and platelet levels in human blood through cupping therapy. An interventional study was conducted to evaluate the efficacy of cupping therapy. In this therapy, cups are applied to the skin, and negative pressure is created with the help of a vacuum gun for five minutes. Now very popular in Pakistan for the last few years very simple and effective procedure. Cupping cups are applied to the skin, and negative pressure is created with the help of a vacuum gun. Then, remove the cups and applied scar is applied with the help of a surgical blade. The statistical analysis was performed using GraphPad Prism 6.0 (GraphPad Prism Software, San Diego, CA). One-way analysis of variance (ANOVA) with Tukey's multiple comparison tests was

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performed for biochemical and hematological viability assays. All p-values <0.05 were considered statistically significant. Subsequently, cups are removed and blood is collected for biochemical and hematological analysis. Our results indicate that before and after cupping, blood sample platelets show a significance value of .003. Check the significance of cupping, and after cupping, the value is .003 and in the last analysis, which was clinically important before and after cupping, the sample value is .003. before and after cupping blood sample Triglyceride showed a significance value of .000. Check the significance of cupping and after cupping the value is .000 and the last analysis, which was clinically important before and after cupping sample value is .006. This study concludes that cupping therapy is effective in the reduction of triglyceride levels and in increasing platelet count in normal populations needs to be evaluated in patients.

**Keywords:** Cupping therapy, Blood Parameters, Triglycerides, Platelets, Pakistan

## Introduction

Cupping or Hijamah (Arabic word), which means sucking. Cupping therapy is a type of traditional Chinese medicine treatment. Cupping treatment is extensively utilized all over the world due to its features of being simple to learn and administer, as well as the lack of negative effects (1). Cupping therapy is one of the oldest therapeutic methods with a great history. When there was no modern medicine and surgical method, cupping therapy played an important role in controlling different acute and chronic diseases (2). In the Modern era, different nations are trying to explore the science behind this great treatment method. Scientists come to some conclusions by using different research methods. Significant data available on cupping therapy has a positive effect on health, not only physical health, but also mental health (2). The origin of cupping is unidentified, but it has been documented of early Egyptian and Chinese medical practice. The Ebers Papyrus, written a book C, 1550 BC, and one of the ancient books in the Western world, describes the Egyptians' use of cupping therapy while mentioning similar practices employed by Saharan peoples(3). In Greece, Hippocrates (c. 400 BC) used cupping for internal illness and structural complications. Cupping treatment is known in Arabic as Al-Hijamah, and it has been a part of Middle Eastern culture for thousands of years, with citations reaching back to Hippocrates' time (400BC)(4).

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Cupping therapy is most popular in more than 60 countries. Cupping is a non-pharmacological procedure that affects different diseases and disorders as an evidence-based practice. Moreover, limited research is available on the therapeutic effect of cupping therapy, especially in musculoskeletal disorders (5), Hyperuricemia, Hyperlipidemia (4), Hypertension (6), Pain (7) and used as preventive therapy in different countries. (8) The goal of the study was to provide a visual review of the available information on cupping therapy for various illnesses, as well as a narrative to assist stakeholders in evaluating the current evidence for informed policy and clinical decision-making (9).

Wet cupping, also known as complete (bleeding) cupping, was the most popular and widely used cupping method by early physicians, particularly in Europe, who used the Bleeding cupping technique to remove toxic blood from the body, which was thought to be the genesis of sickness (10). It can be used in the treatment of a sudden increase in blood pressure, and in discharging pus from boils and furuncles, which represents excess, with blood heat and stagnation. Sterilize the selected points with alcohol and make a very small incision with a triangle-edged needle or, using a plum blossom needle, firmly tap the point for a short time to cause bleeding. Cupping is used for internal disease and structural problems (11).

In Asian and European cultures, this strategy was used in a variety of ways in medicine. Cupping developed in Europe and the Middle East from humoral medicine, a health system developed by the ancient Greeks to restore equilibrium in the body's four "senses of humor": blood, phlegm, yellow bile, and black bile (12), Sucking through a bone tube was another method for removing illness. Massage and 'cupping by sucking, with the mouth, or with a buffalo horn' were both used throughout the Babylon-Assyrian Empire (which stretched from Iraq to the Mediterranean) (13). The first graphic record of cupping has been discovered in a carved relief depicting Egyptian medical equipment from circa 1500 BC. In the lowest corner, contemporary-style cupping vessels may be seen (14). Hippocrates also mentioned two different types of cupping. Dry cupping and wet or moist cupping are two types of cupping. The local underlying tissue is pulled up into a cupping vessel in dry cupping, but in wet cupping, the skin (and occasionally deeper) is sliced to create a blood flow, and then a cup is attached (15).

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Scientists and physicians are trying to understand the exact mechanism behind cupping therapy. Some scientist says that it is pseudoscience due to limited research, whereas others believe that it is evidence-based therapy based on Random Control Trials (RCTs)(16) but recently scientists have conducted a different research study on it and found its good effects on health, especially reduction in biochemical parameters like cholesterol, uric acid (17), pain management (7), musculoskeletal disorder (5) and improve hematological parameters (18), reduces biochemical and metabolic toxins from the body (19) and reduces the burden from excretory organs like kidneys, liver, skin, etc. The cup's vigorous pulling motion increases the amount of blood drawn. Though Hippocrates used wet cupping, it appears that he preferred dry cupping since it was a softer and safer procedure (4).

The cupping procedure is performed with proper SOPs like minor surgical procedures proper OT dressing face and head cover wearing gloves the cupping area being clean and a hygienic environment scrub your hand before starting the cupping procedure patient relax on a coach or cupping chair (20). Clean area with Pyodine and cup is applied with a manual or automatic machine or using a fire which pulls out the air and creates a vacuum where cups are applied local hyperemia under the area where the cup is applied all receptors are hyper-activated after 5 to 6 minutes remove the cup and apply superficial scar with the help of surgical blade no 11 (Feather ) once again apply cup on the same area the n blood ooze out apply EDTA on the surface of the cup so that blood do not clot after 2-3 minutes collect a blood sample for Hematological and biochemical analysis two types (21). Local scarification of the skin and capillary vessels may act as a nociceptive stimulus (21). Cupping therapy cures musculoskeletal disorders and pain management hypertension, and neck pain (5). The main objective of this therapy is to precipitate the circulation of blood and to remove blood-stasis and waste from the body (21). Physicians use cupping therapy for acute and chronic illness in evidence-based practices the exact mechanism is still debatable but in some of the latest research on mechanism cupping therapy Taibah's theory explains the mechanisms of cupping therapy (20). As we know skin performs an excretory function different metabolic wastes are excreted beneath the skin there is the capillary bed when we apply pressure filtration rate increases. Cupping is more likely to have a function in the

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excretion of aged RBCs (22). The aim and objective of this study are to find the alleviation of triglycerides and platelet levels in human blood through cupping therapy.

## Methods

### Study Setting and Participants

This interventional study was conducted in February 2020 among healthy volunteers male-only aged ranged in between 20 years to 60 years with no history of any chronic disease. This study has been conducted at the University of Haripur, Khyber Pakhtunkhwa, Pakistan. Based on a sample size calculation, fifty healthy volunteers aged 20 years to 60 years without any chronic disease were selected at the first aid center, The University of Haripur, Khyber Pakhtunkhwa, Pakistan.

### Sample Size Calculation

The recommended sample size will be 50. The sample size (n) is calculated according to the simple proportion formula: $n = \infty^2(z_{1-\infty} + z_{1-\beta})^2 / (\mu_0 - \mu_\alpha)^2$

Where: z =1.96 for a confidence level, Level of Significance ($\alpha$) = 5%, Power of the test (%) 1-$\beta$ = 90, Population standard deviation ($\infty$) = 15.98, Population Variance ($\infty^2$) = 255.36, Test value of population mean ($\mu_o$) = 33.01, Anticipated Population Mean ($\mu_\alpha$) = 40.37.

$n = 15.98^2(1.96_{(1-15.98)} + 1.96_{(90)})/ (33.01 - 40.37)^2$

n = 41 + 9 (20%), 20% = Drop out estimation

$n \approx 50$

The sample size is equal to 50.

### Cupping procedure and sample collection method

### Before Cupping Procedure

A questionnaire is filled out by a volunteer and records blood pressure heart rate and Oxygen saturation. Remove hair from the cupping area Between C7 to T2 and scrubbing with Pyodine solution. Apply primary suction for three minutes with the help of a vacuum gun and apply cups. Scarification with the help of a surgical blade 11 number. Secondary suction cups were applied and soaked with EDTA for three minutes. Apply gauze piece and stick to maintain the hygienic condition.

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**After Cupping Procedure**

By using above mentioned material and apparatus blood samples were taken from a healthy volunteer and collected into a CP tube and Gel tube before the cupping procedure and cupping sample was also taken from cups and third samples were taken within one week after cupping. Healthy volunteer men aged between 20 and 60 years were selected for cupping therapy. All samples were collected in July and August of 2018 between 9 to 3 o'clock temperatures is 25C. And there was no history of chronic disease. Before starting upping therapy 2ml intravenous blood samples were collected in a CP tube and 3 ml in a gel tube for cupping samples cups soaked with anticoagulant EDTA (Ethylene diamine tetra acetic acid) blood samples were collected for hematological and biochemical analysis after one-week same blood and biochemical analysis performed. Following the collection of venous blood, the cupping operation was performed as follows: At the back, between the two scapulae, a location was chosen (C7-T1, T2 vertebrates). The tip is then disinfected by putting Pyodine on it. Following step for cupping therapy (23).

**Primary Suction**

Cup placed on the selected area of the skin I am working on the Sunnah point (kahil) in between the head and trunk located cervical vertebra C7-T1, T2) Apply 2 cups to create a vacuum with the help of a cupping gun manually air pull out and create a vacuum inside. Skin uplifted on the affected area and left over for 5 minutes.

**Scarification**

In this technique minor superficial incision is with the help of surgical blade no 11 (feather) the incision is superficial with minimal pain and discomfort.

**Secondary Suction**

Once again cups were soaked with anticoagulant EDTA and applied on the same area blood oozed out of the area and collected in a cup to collect a sample for analysis.

**Biochemical Analysis**

Biochemical performed immediately separated by centrifuging (Centrifuge KUBOTA) the blood samples at 3500 rpm for 15 minutes; and the parameters including cholesterol, Triglyceride, and Uric Acid, LDL, HDL were analyzed by Biosystem-350 chemistry analyzer (Merck, Germany), using standard kits supplied by Merck (24).

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### Hematological Analysis

Hematological parameters were analyzed using an automatic Huma count plus, Hematology analyzer (Midray, Japan). Hematological parameters that were tested include RBC, WBC, hemoglobin, HCT, MCV, MCH, platelets, and, in blood samples obtained from veins through the standard procedure, and in blood samples obtained through the technique of cupping and cup socked with EDTA. Values of biochemical, and hematological parameters in cupping and venous blood samples and after cupping of each volunteer were analyzed using parametric (12).

### Statistical Analysis

The statistical analysis was performed using GraphPad Prism 6.0 (GraphPad Prism Software, San Diego, CA). One-way analysis of variance (ANOVA) with Tukey's multiple comparison tests was performed for biochemical and hematological viability assay. All p-values $<0.05$ were considered statistically significant.

## Results

### Effect of Cupping Therapy on Serum Cholesterol Level

Cholesterol is a wax-like substance found in the blood**.** Cholesterol plays an important role in our body's formation of healthy cells, but high levels of cholesterol can increase your risk of heart disease. High cholesterol causes, non-communicable diseases and increases the chance of the formation of plaque (Blockage inside the blood vessels) and it may cause IHD (ischemic heart disease). The effect of cupping on healthy volunteers is an increase in cupping blood samples and a decrease after cupping samples. On GraphPad Prism 6.0 analysis before and after cupping blood sample cholesterol shows a significance value of .000 check the significance of cupping and after cupping the values is 0.000 and the last analysis which was clinically important before and after cupping sample value is 0.000.

### Effect of Cupping Therapy on Serum Triglyceride Level

Triglycerides are a type of fat (lipid) found in our blood. Triglycerides are stored in fat cells and later on converted into energy with the help of specific hormones triglyceride store energy if they increase up to 150 to 199 mg/dL (1.8 to 2.2 mmol/L) causing metabolic syndrome diabetes type two hypertension and cupping effect triglyceride is increase in cupping blood sample and decrease after cupping sample. On GraphPad Prism 6.0 analysis before and after cupping the blood sample

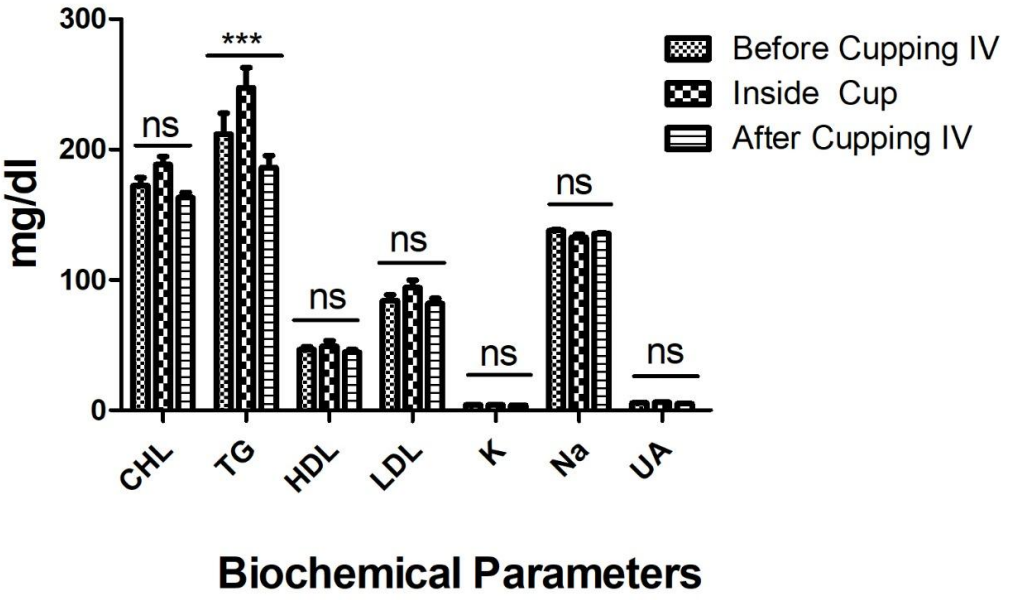
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Triglyceride showed a significance value of .000 check the significance of cupping and after cupping the values is .000 and the last analysis which was clinically important before and after cupping sample value is .006. Significant effects of cupping on the alleviation of triglycerides are shown in Figure 1.

**Figure 1.** In biochemical parameters before, inside, and after cupping the TG Triglycerides showed significant changes but other Parameters showed non-significance changes. *$p<0.05$ & ***$p<0.001$, ns= non-significance.




**Effect of Cupping Therapy on High-Density Lipids**

High-density lipids (HDL) are known as good because they remove cholesterol from the bloodstream. The normal parameter HDL is 40 to 59 mg/dL. The mean value of HDL remains the same before and after cupping therapy which indicates that there is no effect of cupping on HDL.

**Effect of Cupping Therapy on Serum Low-Density Lipids Level**

Cupping therapy decreases low-density lipids (LDL) known as bad cholesterol which initiate the process of atherosclerosis which may be a primary cause of serious diseases like myocardial infarction if their level is elevated for certain periods. The normal value of LDL is <100. There is no significant decrease in LDL level after cupping

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**Effect of Cupping on Uric Acid**

It is a type of nitrogenous waste found in the blood it has no specific function by-product excreted out through urine the normal value of uric acid in levels are 2.4-6.0 mg/dL (female) and 3.4-7.0 mg/dL (male) cupping show a significant increase in Cupping blood sample and decrease after cupping sample. On GraphPad Prism 6.0 analysis before and after cupping the blood sample uric acid shows a significance value of .000 check the significance of cupping and after cupping the values is 0.000 and the last analysis which was not clinically important before and after cupping sample value is 0.000.

**Effect of Cupping Therapy on Hemoglobin**

Hemoglobin is the type of protein found in red blood cells blood carrying oxygen to all tissue and carbon dioxide towards the lungs. The normal value of hemoglobin is for men, from 13.5g/dl to 17.5g/dl. For women, 12.0g/dl to 15.5g/dl grams when they increase up to normal parameter called polycythemia Vera. Cupping effect hemoglobin level increase in cupping blood sample and after increasing hemoglobin level. On GraphPad Prism 6.0 analysis before and after cupping blood sample hemoglobin shows a significance value of 0.003 check the significance of cupping and after cupping the values is .164 and the last analysis which was not clinically important before and after cupping sample value is 0.000.

**Effect of Cupping on RBCs**

The normal RBC range for men is 4.7 to 6.1 million cells per microliter (mcL). The normal RBC range for women who aren't pregnant is 4.2 to 5.4 million mcL. In cupping blood samples there is no significant increase in RBCs after cupping therapy.

**Effect of Cupping on Platelets**

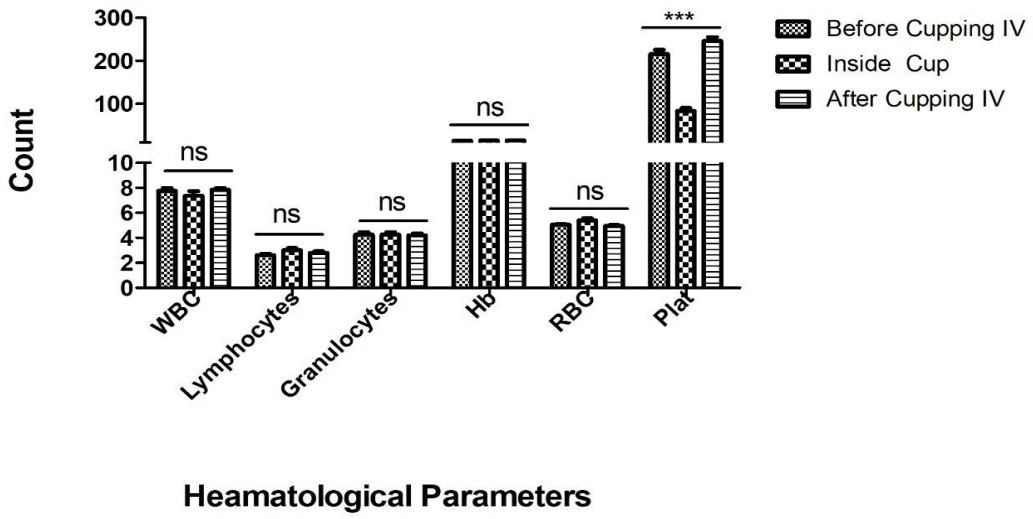
Platelets are disc-like blood cells that play an important function in our body the normal value of platelets is 150000 to 450000. Cupping affects platelets and decreases in cupping blood samples and increases after cupping samples. On GraphPad Prism 6.0 analysis before and after cupping blood sample platelets show a significance value of .003 and check the significance of cupping and after cupping the values is .003 and the last analysis which was clinically important before and after cupping sample value is .003. The effects of cupping on platelets are shown in Figure 2.

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**Figure 2.** In hematological parameters before, inside, and after cupping the Platelets showed significant changes but other Parameters showed non-significance changes. *$p<0.05$ & ***$p<0.001$, ns= non-significance.




## Discussion

According to my research study, there is a significant result in triglyceride and platelet counts. High triglycerides are frequently a symptom of other conditions that increase the risk of heart disease and stroke, such as obesity and metabolic syndrome — a group of symptoms that includes excess fat around the waist, high blood pressure, high triglycerides, high blood sugar, and abnormal cholesterol levels. Triglycerides are a type of fat (lipid) found in our blood. Triglyceride is stored in fat cells and later on converted into energy with the help of specific hormones triglyceride store energy if they increase up to 150 to 199 mg/dL (1.8 to 2.2 mmol/L) causing metabolic syndrome diabetes type two hypertension and cupping effect triglyceride is an increase in cupping blood sample and decrease after cupping sample. Our study result matches with L. A. Mustafa's Study Cupping significantly reduces total cholesterol, LDL cholesterol, and the LDL/HDL ratio in hyperlipidemic patients compared to before cupping, but there are no significant differences in serum HDL Concentrations of cholesterol and triglycerides (25). On GraphPad Prism 6.0 analysis before and after cupping blood sample Triglyceride showed a significance value of .000 check the significance of cupping and after

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cupping the values is .000 and the last analysis which was clinically important before and after cupping sample value is .006. Platelets also increase after cupping therapy On GraphPad Prism 6.0 analysis before and after cupping blood sample platelets show a significance value of .003 and check the significance of cupping and after cupping the values is .000 and last analysis which was clinically important before and after cupping sample value is .000. our study results match with that study before wet cupping, the mean was 8.82 (1.18) fl. After one week of wet cupping, this number increased to 9.94 (1.75) fl. After two weeks of wet cupping, the mean dropped to 8.74 (1.18) fl. The MPV level increased after one week of wet cupping and decreased after two weeks of wet cupping, according to the results (26).

Results of the systematic review (27) suggest that cupping therapy appears to be effective for various diseases/conditions, in particular herpes zoster, acne, facial paralysis, and cervical spondylosis. However, the main limitation of our analysis was that nearly all included trials were evaluated as high risk of bias. As such, it is necessary to conduct further RCTs that are of high quality and larger sample sizes to draw a definitive conclusion.

The mechanism of cupping therapy is poorly understood but some theory explains mechanism of cupping therapy including the "Pain-Gate Theory," "Diffuse Noxious Inhibitory Controls," and "Reflex Zone Theory" which might all explain pain reduction and changes in skin biomechanical features(28). The "Nitric Oxide idea" might explain muscle relaxation, changes in local tissue architecture, and an increase in blood circulation. The "Activation of Immune System Theory" may be responsible for immunological and hormonal changes. The "Blood Detoxification Theory" might explain the release of toxins and the elimination of wastes and heavy metals. These ideas may interact or overlap to provide different treatment results for different maladies and diseases(Mehta et al., 2014.). There appears to be no single explanation that can explain all of the consequences of cupping. In the future, further study is needed to confirm or contradict the aforementioned hypotheses, as well as to propose creative conceptualizations of (CT) (20).

Physiological mechanism and progress of clinical research about the application of cupping therapy to cardiovascular diseases, chronic musculoskeletal pain, migraine, and other painful symptoms, as well as arthritis whose effects involve

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the above-mentioned blood-circulation promotion, tension-increase, gate theory, and inflammation-immune reaction, respectively(30). We believe that the mechanisms of cupping therapy are not independent and should be explored further from different perspectives (31).

**Conclusion**

There is a significant decrease in triglyceride levels and increased platelet count after cupping. There is no significant improvement in hematological factors including hemoglobin level RBCs and other hematological parameters. People who participated in the cupping process found it satisfactory and better with no side effects. This study will be extended to a wider range of participants to get better findings. Many biochemical and haematological parameters would be considered for the evaluation of blood in different groups. Control and female groups will also be under consideration in future studies. The biological effects of cupping therapy with their mechanism of action may need an extended study to clarify its significance and contribution to curing diseases.

**Data Availability**

The data used to support the findings of this study will be available from the corresponding author upon request.

**Consent**

Written informed consent was obtained from all participants who agreed to participate.

**Conflicts of Interest**

The authors declare that there is no conflict of interest related to the publication of this study.

**Financial Statement**

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**Supplementary Data**

**Figure Legend:**

**Figure: S1**

PCA: Coloring based on Before cupping (B), After cupping (A) and cupping (C) blood)

**Figure: S2**

PCA: Dendogram, colored based on Before cupping (1), After cupping (3) and cupping (2) blood)

**Figure: S3**

PLS-DA: Grouping based on Before cupping (B), After cupping (A) and cupping (C) blood)

**Figure: S4**

PLS-DA: Dendogram, grouping based on Before cupping (1), After cupping (3) and cupping (2) blood)

**Figure: S5**

PCA: Coloring based on Before cupping (B), After cupping (A)

**Figure: S6**

PCA: Dendogram, colored based on Before cupping (1), After cupping (2)

**Figure: S7**

PLS-DA: Grouping based on Before cupping (B), After cupping (A)

**Figure: S8**

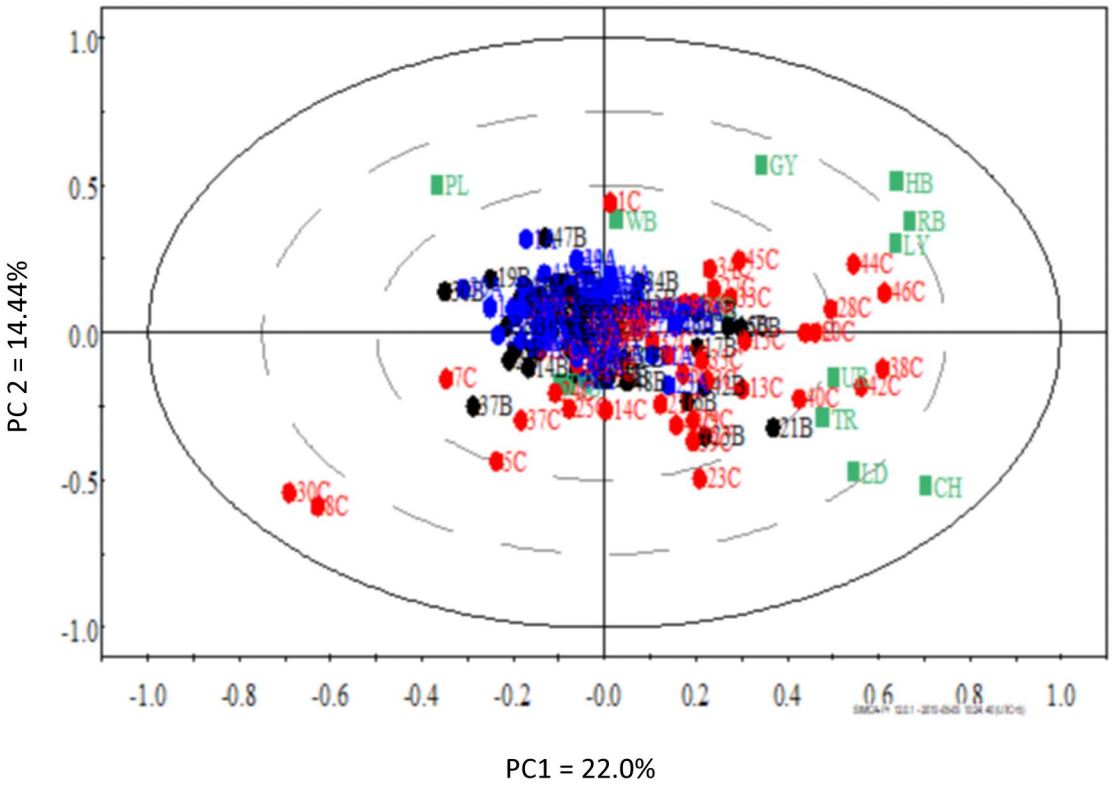
PLS-DA: Dendogram, grouping based on Before cupping (1, After cupping (2)

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**Figure: S1**

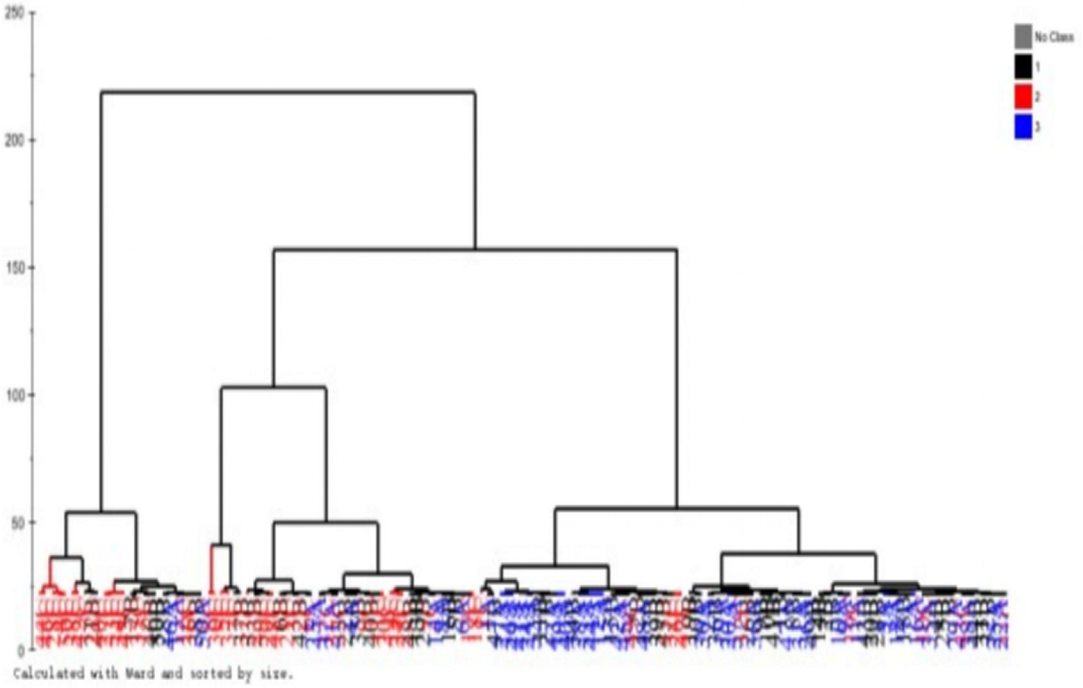


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**Figure: S2**

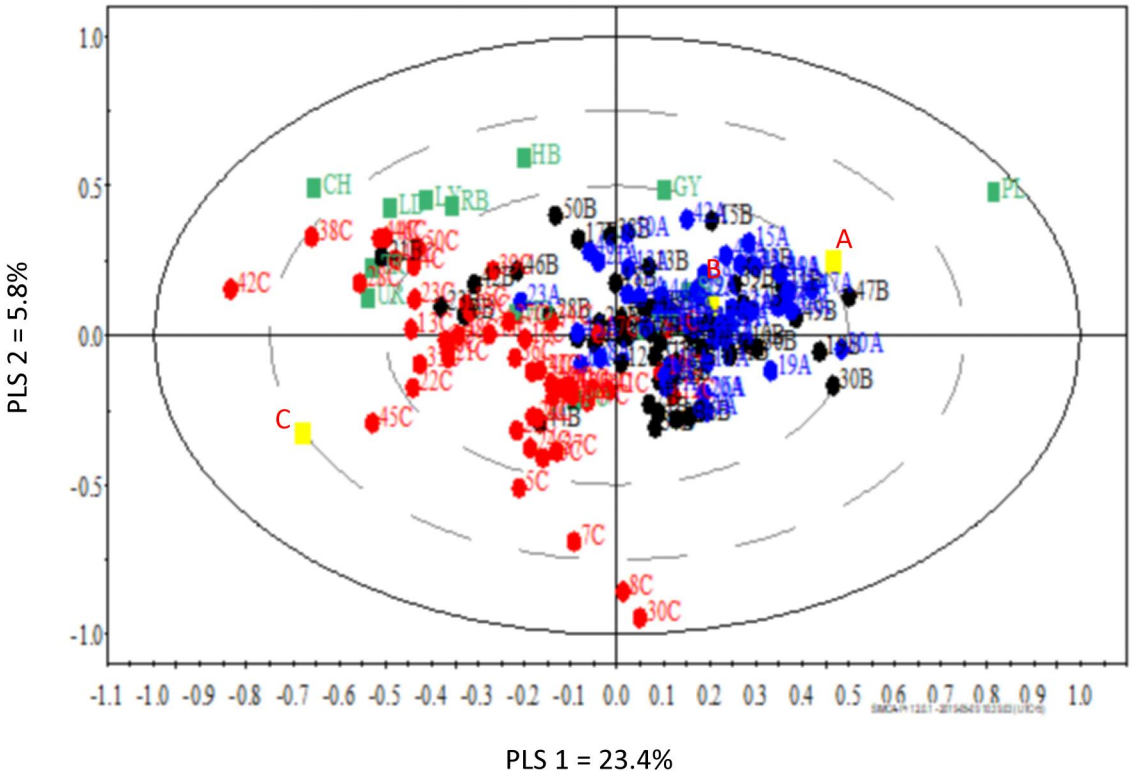


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**Figure: S3**

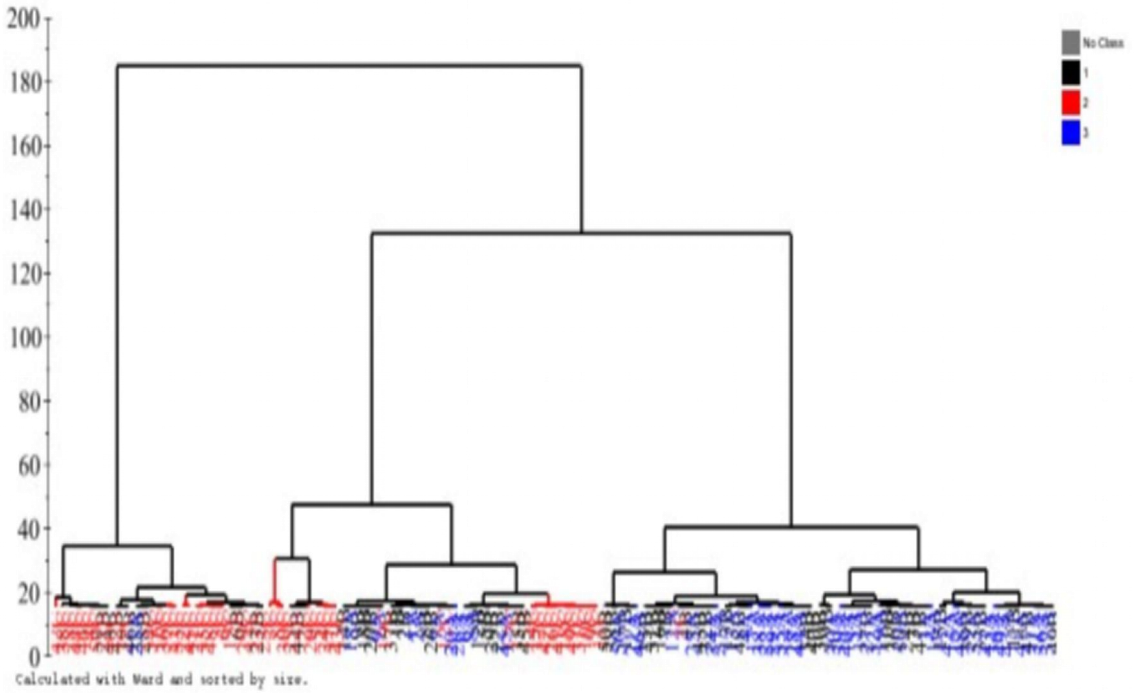


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**Figure: S4**

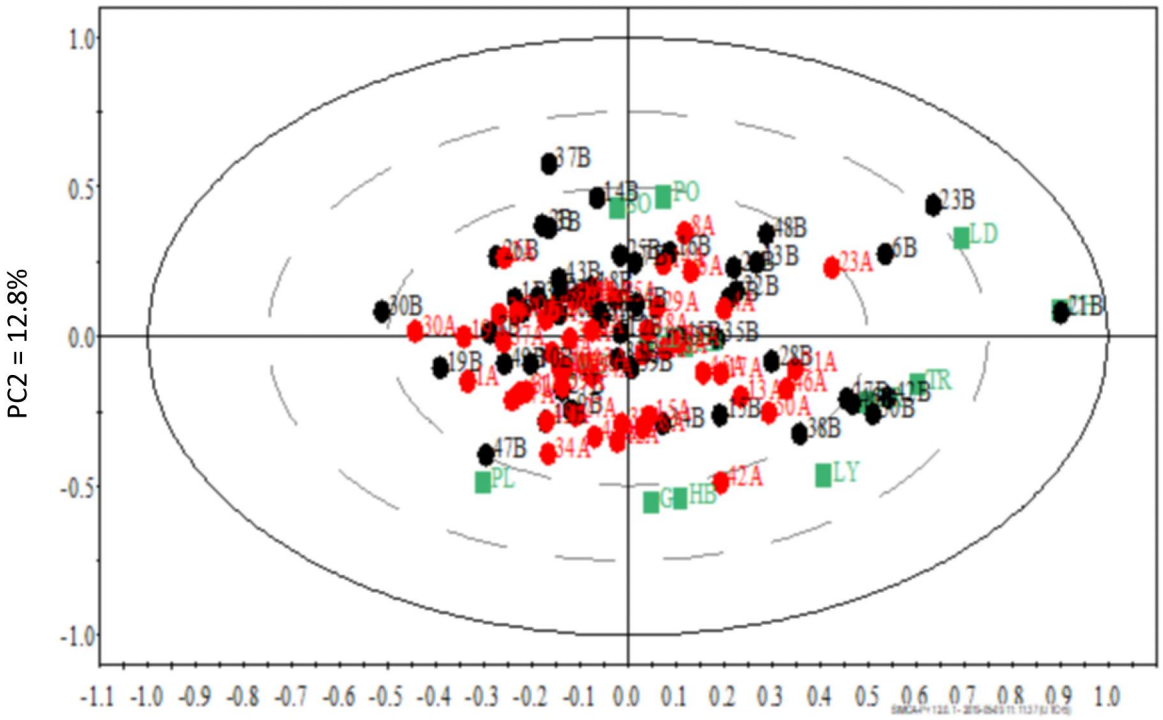


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**Figure: S5**

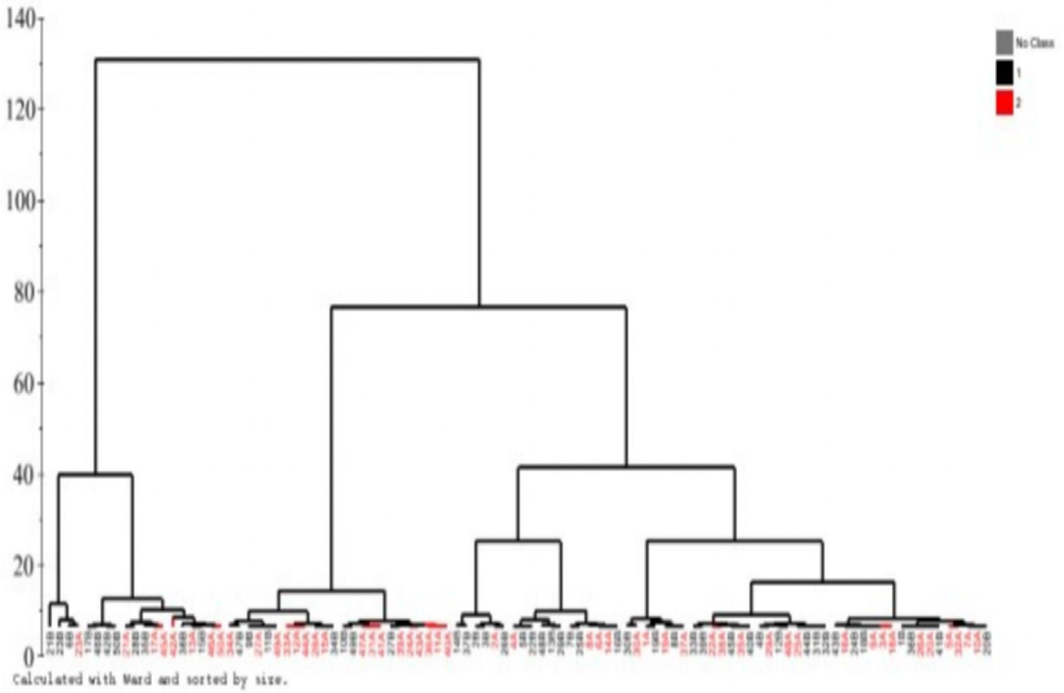


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**Figure: S6**

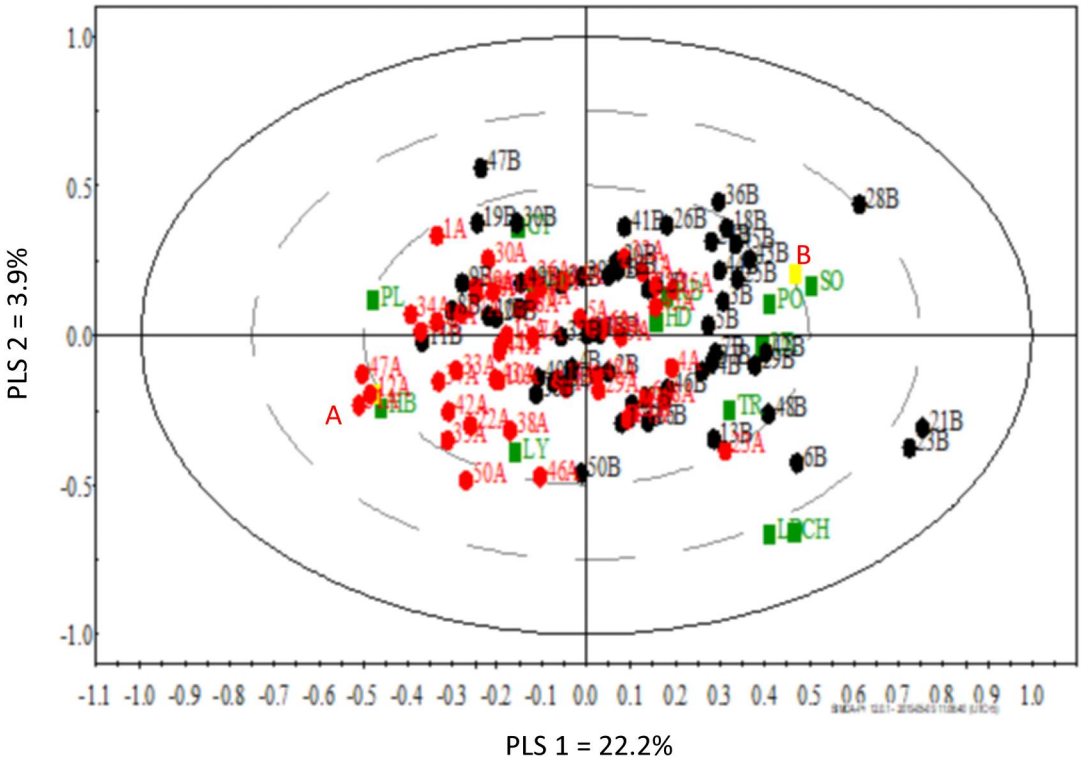


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**Figure: S7**



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**Figure: S8**

