A Darkfield Microscopic Evaluation of the Live Blood Effects Caused by Moringa Oleifera (Smart Mix proprietary formula)

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ABSTRACT

Live blood cell analysis using darkfield microscopy is a well documented investigative technique that can demonstrate subtle effects that may be caused by nutritional deficiencies, digestive irregularities, physical or psychosomatic stress, or environmental factors such as toxicity and electromagnetic radiation.[1] [2] [3] These factors specifically including the presence of undigested fat, saturated fat, abnormal protein, stress and electromagnetic radiation can cause erythrocyte aggregation and rouleau.[4] The adequate visualization of transparent living materials or thin unstained sample specimens is not possible with a brightfield microscope.[5] Darkfield microscopy can be used to document the changes to live blood such as erythrocyte aggregation and rouleau as well as the formation of fibrin, and aggregation of platelets caused by the combination of factors germane to a diversity of environmental and physiological conditions.[6] [7]

In optimal blood cell formations, the spatial orientation of the erythrocytes is singular, free moving and often colliding with one another but repelling due to the negative charge. The erythrocytes are generally consistently uniform in shape, size and colour. Blood is responsible for the distribution and transport of oxygen from the lungs to the cells of the body and the removal of carbon dioxide from the cells and transport back to the lungs.[8] [9] Blood is also responsible for the transportation of

[1] Coyle M. Advanced Applied Microscopy for Nutritional Evaluation and Correction. Petaluma, CA. Elbow Room Publishing. 2000.
[2] Aloisio T. Blood Never Lies. Llumina Press. Tamarac FL. 2004;p.6
[3] Omoto C K, Folwell J A. Darkfield microscopy: A simple and inexpensive way to enhance light microscopy. The American Biology Teacher. 1999;61:p.621-624.
[4] Coyle M. Advanced Applied Microscopy for Nutritional Evaluation and Correction. Petaluma, CA. Elbow Room Publishing. 2000;p.170.
[5] Ibid.
[6] Coyle M. Advanced Applied Microscopy for Nutritional Evaluation and Correction. Petaluma, CA. Elbow Room Publishing. 2000;p.170, 197.
[7] Rubik B. Pilot Research Study: Live Blood Analysis of Adults Comparing the Weston A. Price Foundation Diet and the Conventional Modern Diet. *Wise Traditions in Food, Farming, and the Healing Arts.* 2009; Vol 10(4): 35-43.
[8] McGeown J G. Master Medicine Physiology*:* A Clinical Core Text of Human *Physiology* With Self-assessment . Churchill Livingstone. Spain. 2004. p.29-30.

nutrients, hormones and wastes, temperature control, pH, electrolyte balance and the immune system function of the white blood cell components.[10]

The ability of blood to carry out these functions is dependent upon a plethora of factors, however abnormal spatial orientations, rouleau and erythrocyte aggregation (EA), are two related anomalies that may significantly inhibit these functions.[11] [12] [13] [14] [15] Erythrocyte aggregation is the tendency of erythrocytes to form aggregates whose shapes change according to normal variations or pathological conditions.[16] Consequently, regardless of cause, these anomalies effect changes to flow dynamics and predispose the inability to carry out transportation activities and decrease functional capillary density (FCD) or decrease erythrocyte surface area, also decreasing functional efficiency.[17] Functional capillary density is the determination of the number of capillaries in an area that have erythrocyte flow and relates to the subsequent ability of the blood to deliver nutrients, fluid and solute exchange, and waste product excretion.[18] Red blood cell aggregation has a significant impact on functional capillary density.[19] [20]

Moringa Oleifera may be the most phytonutrient dense plant in the world. .[21] [22] [23] .[24] [25] [26] [27] [28] [29] [30] [31] [32] [33] The US National Institutes of Health, the nation's

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[9] Pallister C. Physiology and Pathophysiology. Butterworth Heinemann. London. 1994.
[10] McGeown J G. Master Medicine Physiology*:* A Clinical Core Text of Human *Physiology* With Self-assessment . Churchill Livingstone. Spain. 2004. p.29-30.
[11] Aloisio T. Blood Never Lies. Llumina Press. Tamarac FL. 2004;p.37
[12]Coyle M. Advanced Applied Microscopy for Nutritional Evaluation and Correction. Petaluma, CA. Elbow Room Publishing. 2000;p.197
[13] Bishop J J, Nance P R, Popel A S, Intaglietta M, Johnson P C. Effect of erythrocyte aggregation on velocity profiles in venules. *Am J Physiol Heart CircPhysiol*. 2001;Jan;280(1):p.222-236.
[14] Das B, Bishop J J, Kim S, Meiselman H J, Johnson P C, Popel A S. Red blood cell velocity profiles in skeletal muscle venules at low flow rates are described by the Casson model. *Clinical hemorheology and microcirculation*. 2007;36(3):p.217-33
[15] Baskurt O K, Meiselman H J. Blood rheology and hemodynamics. *Semin Thromb Hemost.* 2003;29:p.435–450.
[16] Rampling M R, Martin *G*. A comparison of the. techniques for estimating erythrocyte aggregation*. Clin. Hemorh.* 1989; 9:p.41-46.
[17] Kim S, Popel A S, Intaglietta M, Johnson P C. Effect of erythrocyte aggregation at normal human levels on functional capillary density in rat spinotrapezius muscle. *Am J Physiol Heart Circ*. 2006;290:p.941-947.
[18] Ibid.
[19] Durussell J J, Berthault M F, Guiffant G, Dufaux J. Effects of red blood cell hyperaggregation on the rat microcirculation blood flow. *Acta Physiol Scanda*. 1998;163:p.25-32.
[20] Kim S, Popel A S, Intaglietta M, Johnson P C. Effect of erythrocyte aggregation at normal human levels on functional capillary density in rat spinotrapezius muscle. *Am J Physiol Heart Circ*. 2006;290:p.941-947.
[21] Babu S C. Rural nutrition interventions with indigenous plant foods: a case study of vitamin deficiency in Malawi. International Food Policy Research Institute, Washington, DC. *Biotechnology, Agronomy Soc. Environ*. 2000 ;4(3):p.169-179.
[22] Delisle H, Bakari S, et al. Provitamin A content of traditional green leaves from Niger. *Cahiers Agricultures* 1997;6(6):p,553-560.
[23] Fahey J W. *Moringa oleifera*: a review of the medical evidence for its nutritional, therapeutic, and prophylactic properties. *Trees for Life Journal*. 2005;1(5) p. 1-13.
[24] Ganguly R, Guha D. Protective role of an Indian herb, Moringa oleifera in memory impairment by high altitude hypoxic exposure: Possible role of monoamines. *Biogenic Amines*. 2006;20:p.121-33.
[25] Holst S. *Moringa: Nature's Medicine Cabinet*. Sierra Sunrise Publishing, Sherman Oaks, CA. 2000.128 pp.

medical research agency whose mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability, has affirmed *Moringa oleifera* can "arrest, reverse, and cure, over 300 different diseases and disorders."[34] Regular use of *Moringa oleifera* has been shown to have a multitude of health benefits.[35] [36] In addition to this, *Moringa oleifera* provides all of the essential amino acids, vital vitamins, contains several important minerals, is an incredibly powerful antioxidant, is high in fiber, stimulates the immune system to fight cancerous cells, tumors, ulcers, epileptic seizures and cleanses and detoxifies the entire body.[37]

An American scientist and product formulator Russ Bianchi has created a proprietary formula of raw organic Moringa oleifera incorporating the leaves, seed cake and fruit that has empirically demonstrated subjective beneficial changes in patients who have supplemented with this formula and live blood microscopic evaluation indicates positive changes in the shape and spatial orientation of the erythrocytes and decreased incidence of aggregation and rouleaux indicating improved functional capillary density.

INTRODUCTION

Blood is the most unique organ in the body and virtually all physiological functions are totally dependent on the capability of this diverse fluid to carry out a number of functions. The primary function of blood involves the distribution and transportation of oxygen from the lungs to the cells of the body and the removal of carbon dioxide from the cells for transportation back to the lungs and subsequent

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[26] Kumar N A, Pari I. Antioxidant action of Moringa oleifera Lam (drumstick) against antitubercular drug induced lipid peroxidation in rats. *J Medicinal Foods*. 2003;6(3):p.255-259.

[27] Bharali R, Tabassum J, Azad M R H. Chemomodulatory effect of *Moringa oleifera*, Lam, on hepatic carcinogen metabolizing enzymes, antioxidant parameters and skin papillomagenesis in mice. *Asian Pacific Journal of Cancer Prevention* 2003;4:p.131-139.

[28] Njoku O U, Adikwu M U. Investigation on some physico-chemical antioxidant and toxicological properties of *Moringa oleifera* seed oil. *Acta Pharmaceutica Zagreb.* 1997;47(4): p.87-290.

[29] Siddhuraju P, Becker K. Antioxidant properties of various solvent extracts of total phenolic constituents from three different agroclimatic origins of drumstick tree (*Moringa oleifera* Lam.) leaves. *Journal of Agricultural and Food Chemistry.* 2003;51:p.2144-2155.

[30] Fahey J W, Dinkova-Kostova A T, Talalay P. *The "Prochaska" microtiter plate bioassay for inducers of NQO1*. Chapter 14 in Methods in Enzymology, Vol. 382, Part B, 2004;p. 243-258 (Eds.) H. Sies & L. Packer, Elsevier Science, San Diego, CA. 2004.

[31] Faizi S, Siddiqui B S, Saleem R, Aftab K, Shaheen F, Gilani A H. Bioactive Compounds from the leaves and pods of *Moringa oleifera*. *New Trends in Natural Products Chemistry* 1998;p.175-183.

[32] Rao K N V, Gopalakrishnan V, Loganathan V, Shanmuganathan S. Antiinflammatory activity of *Moringa oleifera* Lam. *Ancient Science of Life* 1999;18(3-4):p.195-198.

[33] Ashok K, Pari, L. Antioxidant action of Moringa oleifera Lam. (drumstick) against antitubercular drugs induced lipid peroxidation in rats. J Med Food. 2003; Fall; 6 (3):p.255-9.

[34] NIH Record. NIH Celebrates Earth Day 2008. Vol LX. No.6. March 21, 2008. http://nihrecord.od.nih.gov/newsletters/2008/03_21_2008/story4.htm

[35] Fuglie L J. *The Miracle Tree: Moringa oleifera: Natural Nutrition for the Tropics*. Church World Service, Dakar. 1999;68 pp.

[36] Fisher, H. Moringa Oleifera: Magic, Myth or Miracle. Britannia Press. Toronto. 2011.

[37] Paliwal R, Sharma V, Pracheta V. A review on Horse Radiah Tree (Moringa oleifera): A Multipurpose Tree with High Economic and Commercial Importance. *Asian Journal of Biotechnology*. 2011;3(4):p.317-328.

exhalation.[38] Blood is also responsible for the transportation of nutrients, hormones, wastes, temperature control, pH, electrolyte balance and the immune system function of the white blood cell components.[39]

Moringa oleifera, containing more than ninety verified bio-available phyto-nutrients, has been considered to be one of the most phyto-nutrient dense botanical on the planet. Evidence has shown that it may improve immune system function, digestive function, mental clarity, restful sleep, sexual desire and performance, healthier and younger looking skin, overall blood circulation, visual acuity and overall general physical well being. It also assists in maintaining healthy heart function, normalizing blood pressure, lowering and regulating cholesterol levels, alleviating diabetes and stabilizing normal blood sugar levels. It protects the liver from damage, shows immense anti-inflammatory qualities, inhibits the activation of lymphoma cells and helps the recovery of patients suffering from leukemia and dengue fever.[40] In addition to all of this, *Moringa oleifera* provides all of the essential amino acids and vital vitamins. It contains several important minerals, is an incredibly powerful antioxidant, is high in fiber, fights cancerous cells, tumors, ulcers, epileptic seizures and cleanses and detoxifies the entire body.[41] Moringa has been called, the most powerful natural antioxidant on earth (with over 46 naturally occurring antioxidants found in the plant itself), the most effective natural medicine to combat chronic disease and also the most nutritional plant ever discovered.

Live blood cell analysis acts as screening format for haematological physiological status which is representative of nutritional and environmental effects on the health of an individual. [42] [43] The procedure, using a darkfield microscope, is significantly different from standard microscopy. With this technique, light does not travel directly through the specimen, but comes in from the sides and only the light which is reflected by the specimen is viewed against a dark background creating a highly contrasted image.[44]

Through the use of darkfield microscopic imaging, the visible haematological effects of pre-existing physiological and environmental status were profiled. The introduction of the spring water mixed with a Moringa oleifera formulation (from the contents of a Smart Mix sachet formulated by Russ Bianchi manufactured by Zija International) yielded visual evidence of the occurrence of a physiological change pertaining to the subsequent reduction and/or elimination of physiological and environmental haematological effects.

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[38] McGeown J G. Master Medicine Physiology*:* A Clinical Core Text of Human *Physiology* With Self-assessment . Churchill Livingstone. Spain. 2004. p.29-30.

[39] McGeown J G. Master Medicine Physiology*:* A Clinical Core Text of Human *Physiology* With Self-assessment . Churchill Livingstone. Spain. 2004. p.29-30.

[40] Fuglie L J. *The Miracle Tree: Moringa oleifera: Natural Nutrition for the Tropics*. Church World Service, Dakar. 1999;68 pp.

[41] Paliwal R, Sharma V, Pracheta V. A review on Horse Radiah Tree (Moringa oleifera): A Multipurpose Tree with High Economic and Commercial Importance. *Asian Journal of Biotechnology*. 2011;3(4):p.317-328.

[42] Coyle M. Advanced Applied Microscopy for Nutritional Evaluation and Correction. Petaluma, CA. Elbow Room Publishing. 2000.

[43] Aloisio T. Blood Never Lies. Llumina Press. Tamarac FL. 2004;p.6

[44] Hayden J E. Adventures on the Dark Side: An Introduction to Darkfield Microscopy. *BioTechniques*. 2002; 32(4): p.756-761.

METHOD

The selection criteria used for subjects was designed to reflect a normal cross-section of the existing population. The only subjects who had not eaten within the two hour period preceding the experiment were used.

A Meiji microscope using darkfield oil immersion technique with a 50X objective microscope, was used to examine all live blood samples. Subjects were selected at random and were not allowed to ingest food or liquid for three hours preceding the study.

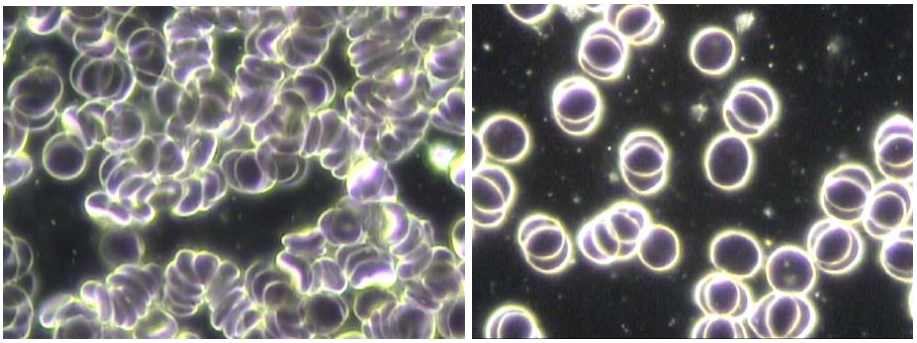
Three samples consisting of one drop of blood each were drawn from each of the subjects in the following manner: The subject's finger was punctured using a sterile blood lancet. An initial drop of blood was expressed and discarded. A second drop of blood was drawn from the finger tip of the subject and placed on the specimen slide. A cover slip was placed over the sample. The slide was examined under a microscope and designated to be the control sample. When a control status sample was achieved, the investigator proceeded to the next step. A digital camera was attached to record results.

The same subject then consumed 0.480 ml of spring water mixed with the contents of Zija International's Smart Mix Moringa oleifera formulation. Approximately one hour and ten minutes (70) minutes, a drop of blood was taken from the finger tip and observed under the microscope using the same procedure as listed previously. This was designated to be the *active* sample. The results were recorded on a digital camera. All results were analyzed and compared.

RESULTS

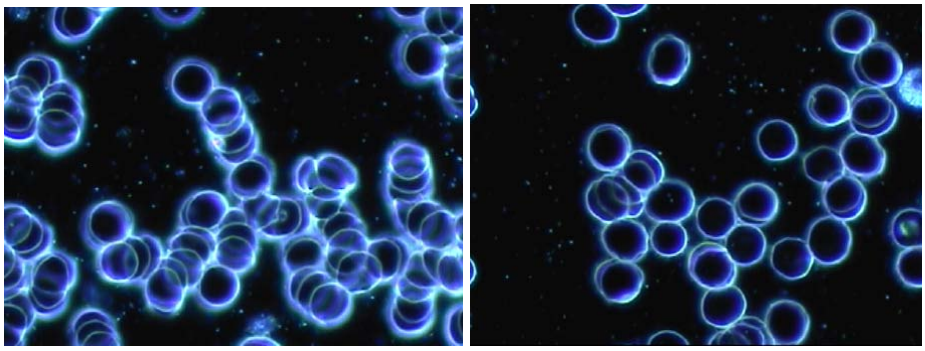
All images were recorded on a digital camera that was affixed to the microscope eyepiece. The microscopic images from the control and active blood samples are displayed.

SUBJECT 1



CONTROL **70 MINUTES AFTER INGESTING**

SUBJECT 2



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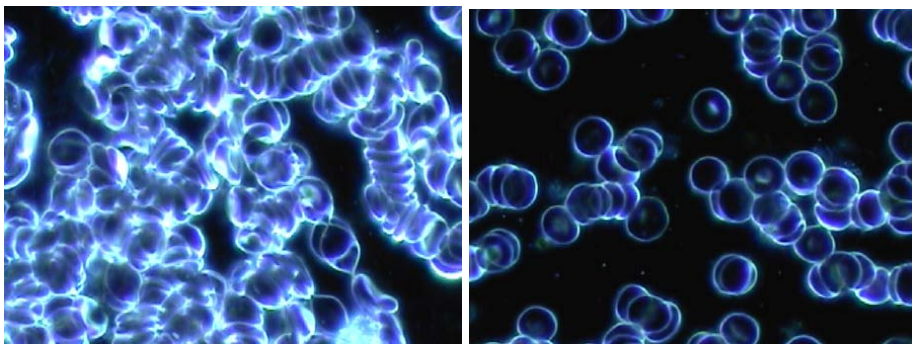

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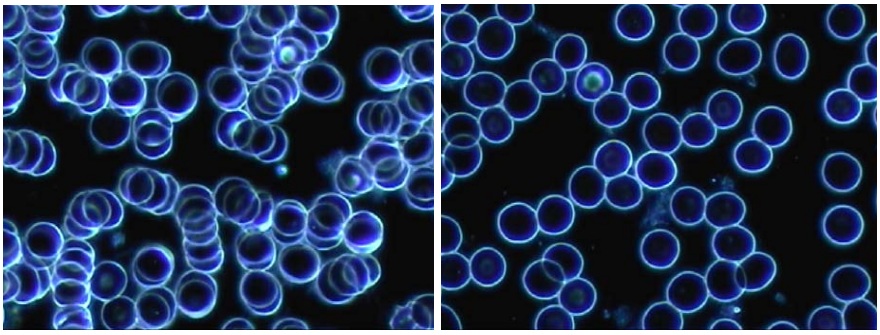
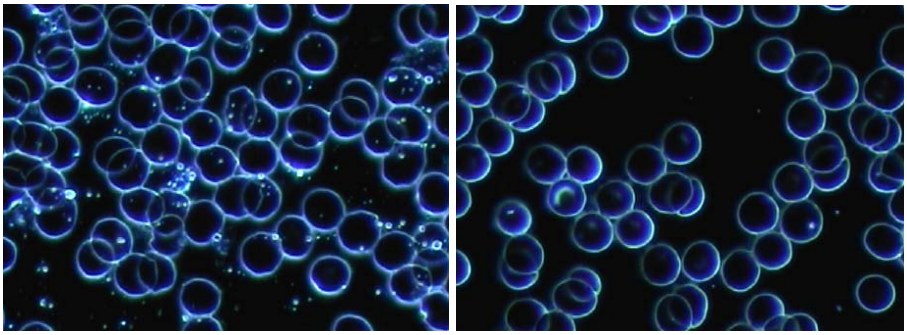


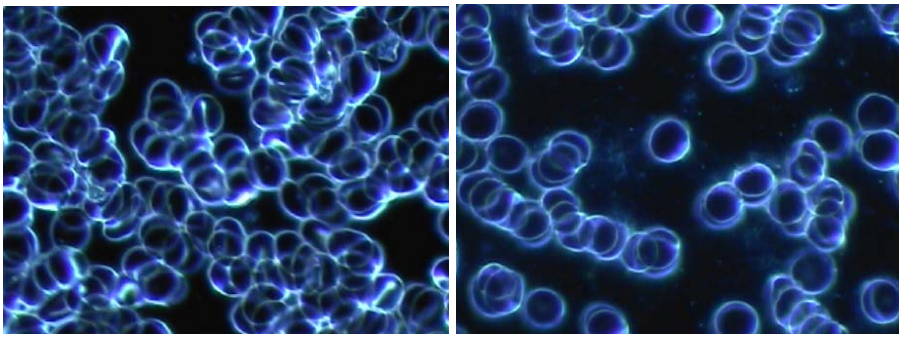
CONTROL **70 MINUTES AFTER INGESTING**

SUBJECT 5



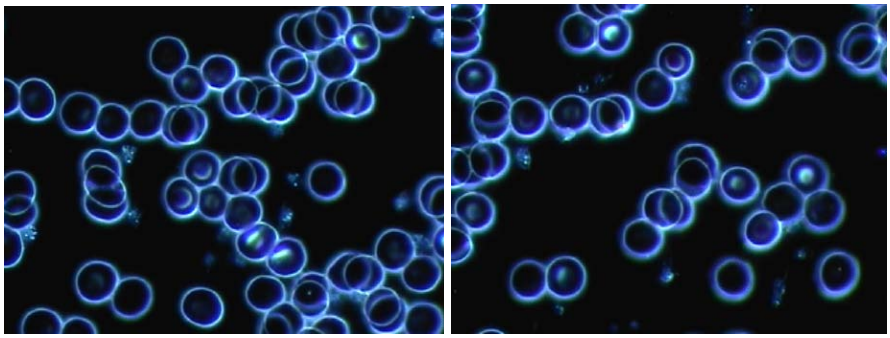
CONTROL **70 MINUTES AFTER INGESTING**

SUBJECT 6



CONTROL **70 MINUTES AFTER INGESTING**

SUBJECT 7



CONTROL **70 MINUTES AFTER INGESTING**

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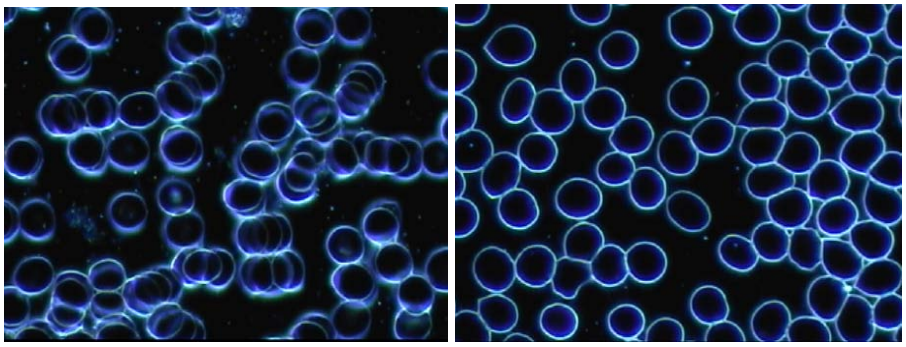
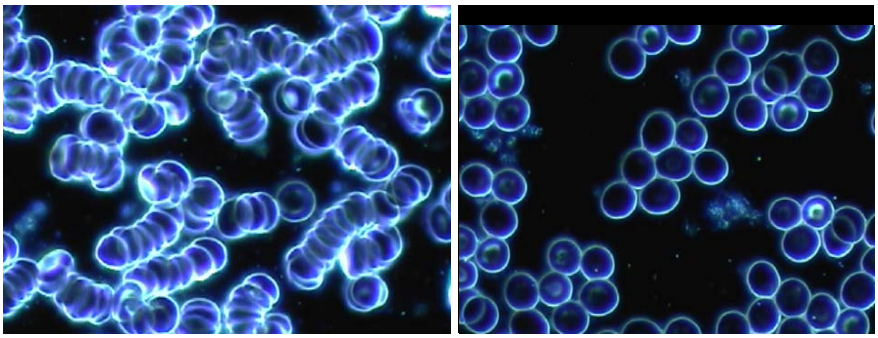


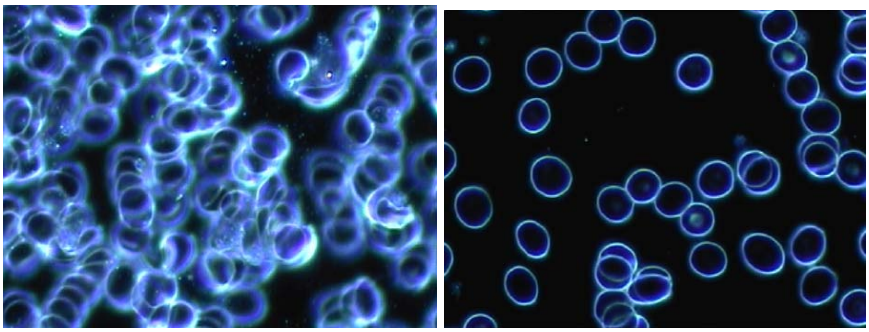
CONTROL **70 MINUTES AFTER INGESTING**

SUBJECT 9



CONTROL **70 MINUTES AFTER INGESTING**

SUBJECT 10



CONTROL **70 MINUTES AFTER INGESTING**

DISCUSSION

There are several issues that merit discussion in this investigation since the experimental design was intended to examine the effects, if any, of *Moringa oleifera* on live blood regarding the potential intervention of nutritional and environmental effects using erythrocyte spatial orientation as evidence. The control appearance of all subjects in this investigation indicated the status of the physiological effects of their overall health, environment, and nutritional factors that consistently led to documented findings of rouleau, clumping and erythrocyte aggregation creating an

abnormal haematological appearance. The ingestion of the Smart Mix reliably led to a change, and in many cases, the elimination of these effects, and a haematological appearance that was more optimal than the control.

According to the formulator Adept Solutions, Smart Mix is a proprietary blend of enzymatically alive, fully bioavailable *Moringa oleifera* leaf, leaf puree, fruit, fruit puree and cellulose fibre seed cake capable of delivering significant levels of all essential vitamins and minerals, copious amounts of naturally created omega fatty acids 3, 6, and 9, dozens of bioavailable antioxidants, large amounts of anti-inflammatories, a significant number of anti-carcinogens, and not only all eight essential amino acids including histadine and nine others but available in proper sequencing and percentages found nowhere else in any other supplementation on the planet except for this specific varietal. A U.S. government organization, the National Institutes of Health, named it the plant of the year in 2008 and found to it arrest, reverse or mitigate in more than three hundred and twenty-one diseases. These natural phyto-nutrient components certainly add to the plausibility of the Smart Mix formulation bringing about the beneficial changes found in the live blood examination and in fact these enzymatically alive nutrients may no longer be available in the current food chain and most likely have been missing for at least seventy-five years.[45]

The relationship between function capillary density and erythrocyte aggregation has been established.[46] Therefore one must consider the potential decrease in efficiency of blood to carry out the normal functions when under the influence of factors causing erythrocyte aggregation. Conversely the subsequent optimization of function or return to homeostasis after the *Moringa oleifera* formulation was ingested must be considered. One must assume that not only have there been changes mediated by the phyto-nutrient rich plant to the live blood constituents' spatial orientation, but other concomitant physiological implications and health benefits that were not evaluated in the realm of this study may have also occurred.[47] The significance of the change in any demonstrable parameter of an investigation yields a physiological indicator which can then be used merely to interpret the validity of whether or not a change has occurred. The subsequent interpretation of the nature of this change, based on reproducibility will give us insights into the value of the phenomena.

There has been much controversy over the use of phase contrast or darkfield microscopy and according to the FDA of the United States, and in keeping with their current position, these techniques must not be used for diagnostic purposes. Always drawn into question is the consistency and ability of the investigating practitioner and for the purposes of this study, Colombe Gauvin, a naturopath and live blood cell microscopist with many years experience was responsible for the drawing of all samples and the preparation of all slides. All slides were examined in the central areas and no analyses were made on the edges or peripheral portions of the slide. All cover glasses were dropped onto the samples to eliminate or minimize any distortions or artefacts in the sample.

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[45] Beach, R. Modern Miracle Men. US Senate Document 264. 1936.

[46] Kim S, Popel A S, Intaglietta M, Johnson P C. Effect of erythrocyte aggregation at normal human levels on functional capillary density in rat spinotrapezius muscle. *Am J Physiol Heart Circ*. 2006;290:p.941-947.

[47] Fisher H W. Moringa oleifera: Magic, Myth or Miracle. Britannia Press. Toronto. 2011.

There are other methods to determine erythrocyte aggregation. Erythrocyte aggregation can be quantified using a photometric rheoscope (Myrenne Aggregometer; Myrenne GmbH, Rötgen, Germany) and based on the findings of this investigation further investigation using this technique may be of some value.[48]

There were other individual findings and inclusions in some of the samples that may have been indicative of health related issues that were present and although the appearance of some of them were ameliorated to varying degrees through the ingestion of the *Moringa oleifera* formulation, all findings are beyond the scope of this paper. Bearing in mind that researchers have not been able to determine many of the actual physiological mechanisms or incubation periods involved in the disease process for many cancers[49] and other nutritionally or environmentally related diseases, one must consider that the strategic functions of blood may play a probable cause in this relationship especially if a dynamic change has occurred.

CONCLUSION

The interpretation of the darkfield microscopic evaluation imaging results verified the presence of erythrocyte aggregation and rouleau effects in the blood samples of all subjects in this investigation. The intervention of the ingestion of the *Moringa oleifera*, either initiated or was responsible for a highly significant, if not total reduction, of the abnormal erythrocyte effects caused by the combination of environmental or health related physiological factors.

[48] Bauersachs R M, Wenby R B, Meiselman H J. Determination of specific red blood cell aggregation indices via an automated system. *Clin Hemorheol.* 1989;9:p.1–25.

[49] Morgan L L. Interphone Brain Tumors Studies To Date: An Examination of Poor Study Design Resulting in an UNDER-ESTIMATION of the Risk of Brain Tumors. *BEMS, San Diego, 12 June 2008.*