THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE
Volume 11, Number 2, 2005, pp. 299–304
© Mary Ann Liebert, Inc.

Bioelectrographic Testing of Mineral Samples: A Comparison of Techniques

ALEX VAINSHELBOIM, Ph.D., and KENNETH S. MOMOH, B.S.

ABSTRACT

Objectives: This study was initiated to determine the suitability of differing techniques to record optical properties of gemstones under electromagnetic stimulation. Such properties are of interest due to the historical use of gemstones in folkloric remedies, specifically as agents for concentrating, focusing, or otherwise conducting energy flows in the human body.

Design: The techniques researched produce a localized corona discharge around the tested material. The simplest technique, Tesla coil Kirlian photography (TCKP), uses a Tesla coil to introduce a strong electric current, and the circuit is completed by a glass electrode. The corona discharge is then photographed. The other technique used in the study is gas discharge visualization (GDV), which uses a pulsed current and a digital camera integral to the coil to produce digital images of the corona discharge.

Materials: Gemstones were tested both whole and in powdered form. The sample gemstones were amethyst, aquamarine, garnet, golden citrine, pink tourmaline, and yellow topaz. Powdered gemstones were ground to a particle size of 2–5 microns; whole gemstones were roundcut to a diameter of 5 mm.

Results: In our tests, TCKP showed divergent effects for differing types of gemstone. The most extreme effects were exhibited by tourmaline, both in powdered and whole form. In addition, TCKP appeared to indicate differing effects for gemstones of the identical type but mined from differing locations. The GDV technique showed differing data among the gemstones for the measured parameters, indicating that a high relative intensity did not correspond to the size of the corona discharge.

Conclusions: While both techniques showed promise in distinguishing differences in corona discharge behavior in gemstone samples, further work is necessary to determine the significance of differences in geographical sources or between gemstones of similar crystalline structure. The techniques explored show promise in characterizing the properties of gem materials under electromagnetic stimulation.

INTRODUCTION

Imaging techniques based on the Kirlian effect are normally used to record subtle characteristics of organic materials. These techniques share a common basis in that they use a strong electromagnetic field environment to elicit a corona discharge from a test object. Classic applications have included photographing leaves, human fingertips, and hands. The fact that a given object can exhibit divergent corona discharge behavior between tests in a controlled environment has led many to make claims for its ability to record subtle biologic phenomena that have escaped detection by other devices. While the Kirlian effect has been known for nearly a century, it is in the past three decades that the rising field of bioelectrography has honed and extended the technique for use in a variety of applications.

In the simplest version of the Kirlian technique, Tesla coil Kirlian photography (TCKP), a Tesla coil is used to

Aveda Corporation, Minneapolis, MN.

TABLE 1. PREPARATIONS AND CLAIMS FOR SELECTED GEMSTONES, BASED ON INTERVIEWS WITH INDIGENOUS AYURVEDIC PRACTITIONERS IN INDIA AND THE UNITED STATES

Stone	*Herbs used in preparation*	*Ayurvedic claims*
Quartz	Keora (*Pandanus odoratissimus*) Himalayan water	Universal conduit Amplifies, focuses, stores, transforms, energizes. Stimulates psychic perceptions Attunes to all chakras, all signs and all numbers
Topaz	Rice (*Oryza sative*) Horse gram (*Dolichos biflorus*) Himalayan water	Stone of the sun Assists with the elimination of toxins 3rd *chakra* and higher
Tourmaline	Rice (*Oryza sative*) Horse gram (*Dolichos biflorus*) Himalayan water	Brings healing power to the user Balances left and right brains Gives discernment and "sight" into a given situation Attunes to *chakras* of like color
Ruby	Lemon (*Citrus medica*) Himalayan water	"Queen" of all gemstones Stone of love Helps heal the heart and all blood impurities Detoxifies the body 4th *chakra*
Emerald (Grade I)	Himalayan water	Healing of eyesight and speech impediments Tranquilizing effect 4th *chakra* and higher

generate a high-voltage, low-amperage electrical charge, which is modulated to a pulsing current and passed through an electrode to a grounded test subject. This strong electromagnetic field (EMF) causes ionized gases to flow from the subject, and the resultant molecular collisions result in photons being emitted. The resulting glow forms a corona around the object. With a separate camera, a photograph is taken of the gas discharge, which can allow for qualitative analysis.

More recently, a technique called gas discharge visualization (GDV) was developed to provide quantitative data on the phenomenon (Bell et al., 2003; Korotkov, 2004). Although the physics behind the phenomenon remain the same, the electrode is coupled with a camera and software to analyze brightness and area of the corona discharge effect. In the basic application of this technique, still images are used. We will refer to this technique as static GDV. It has been most commonly used to analyze bioelectric effects. Development of the technique has been spearheaded by Dr. Konstantin Korotkov and associates in Russia. Their primary focus is on the use of the GDV technology to record what is termed the "human energy field," a subtle energy permeating the organism and figuring largely in homeopathy. It is this field that gemstones have been believed to influence.

In these experiments, we sought to explore the electromagnetic behavior of several gemstones traditionally used in Ayurvedic practice. We intended to test analytically certain folkloristic claims regarding the inner energies of gemstones. Electrically, gemstones are generally insulators, although some gemstones, such as tourmaline, exhibit some piezoelectric and/or pyroelectric behavior. However, the gemstones' ability to align and shape certain electromagnetic radiation, such as visible light, is well known. Gemstones were subjected to both of the bioelectrographic techniques described—TCKP and GDV. Comparison of the results yields insight into the nature of these gemstones and of proper methods of analysis.

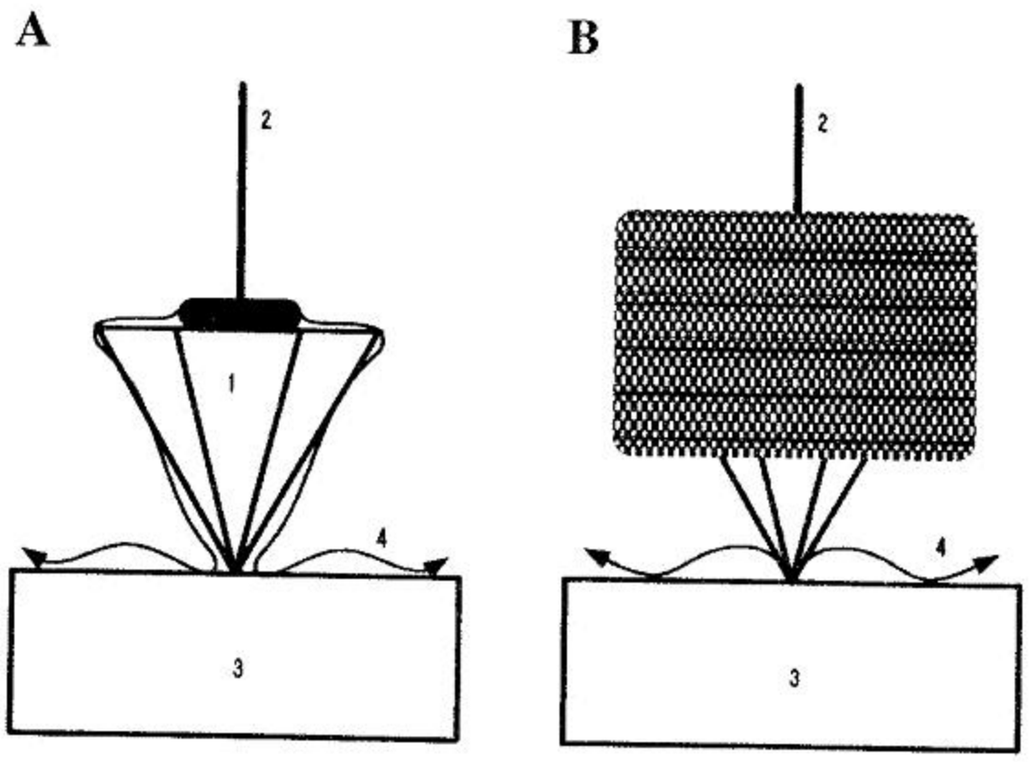


FIG. 1. **A.** Initial design of gas discharge visualization study (GDV) of gemstones. **B.** Final design of study. 1, gemstone; 2, electrode; 3 GDV camera; 4, path of electrical current.

FIG. 2. **A.** Tesla coil Kirlian photograph (TCKP) of 5 mm diameter amethyst from Orissa, India. **B.** TCKP of 5 mm diameter amethyst from Nigeria.

HISTORICAL ORIGINS

Gemstones have a long history of use in healing. Although they are mineral in composition, their highly ordered structure, visual appeal, and unique effects on visible light have led many to experiment with their effects on the human body.

In the language of bioelectrography, the gemstones' highly ordered composition allows them to conduct and align subtle electromagnetic fields. This has had two important holistic applications: structuring homeopathic liquid materials and aligning bodily fields by direct contact with the skin.

The latter technique is quite old. Gemstones found one of their earliest uses in the Ayurvedic system of India. Ayurvedic texts describe the use of gemstones to balance chakra points on the body, correcting energy imbalances believed to cause disease and discomfort. Tourmaline has been held in Ayurvedic tradition to act upon all three *doshas*, or personality types, which is a rare trait.

Study and consultation with Ayurvedic healers led to a selection of different gemstones for testing. Gemstones have been used in the tradition of Ayurvedic medicine for centuries. Ayurveda was already a mature system by the time it was discussed at the councils held after the Buddha Gautama's death c. 540 BC. Indian systems of medicine were later recorded and called *tikiccha* by Sri Lankan scribes who recounted the council. Despite the different name, this is clearly the same system, with 11 of the 12 branches considered to be the defining applications of Ayurveda preserved intact (Jyotirmitra, 1974).

The first detailed discussions of the use of gems in Indian healing appear to have taken place in the 6th century. The cornerstone text, *Brhatsamhita*, by Varahamihira, was composed c. 530–580. A second text, more directly focused on the use of gems, was the *Ratnapariksa* by Buddhabhatta.

In the early 1300s, Candesvara wrote the *Ratnadipika*, the most focused and authoritative discussion of the use of gems to that point. While it builds from the material found in the *Brhatsamhita*, it expands it and represents the basis of gem selection to the present day (Bhagwan, 1986; Muelenbeld, 2002; Shashtri, 1969).

MATERIALS AND METHODS

According to Ayurvedic belief, gemstones act to balance or tune specific chakras. Gemstones were selected and prepared according to Ayurvedic tradition. We consulted with Ayurvedic practitioners in the Himalayan region, observing many of these preparations firsthand.

Because Ayurvedic claims were the basis for the selection of the gemstones, gems were obtained from the Himalayan region, and Ayurvedic doctrines dictating the preparation of the gemstones were followed closely. These processes have been developed to cleanse and prepare them for healing use. These preparations involve washing, boiling with herbs, and rinsing. In all stages, water, herbs, and materials required for the process were obtained from sources in the Himalayan region from which the gemstones were sourced. All of the gemstones used in these experiments were prepared in this way (Table 1).

TCKP protocol

The gemstones selected for the TCKP experiments included amethyst, aquamarine, garnet, golden citrine, pink

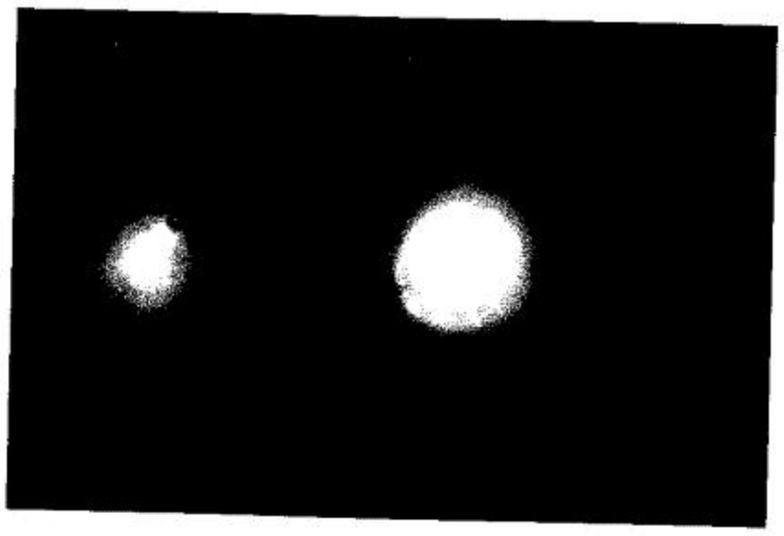


FIG. 3. Tesla coil Kirlian photograph of french talc (left) and pink tourmaline (right). Particle sizes for both were 2–5 microns.

tourmaline, and yellow topaz. The size of the round cut gemstones was a uniform 5 mm in diameter.

The gemstone samples were placed on a glass electrode. A Tesla coil apparatus, manufactured by Greg Bratcher (Kirlianlab.com, Wheatfield, IN), was used to introduce a current into the subject. After calibration, the current was set at 50KV and 20mA. The resulting effect was captured by a digital camera, and the images compared. Each gemstone was photographed 5 times.

As stated above, TCKP is a qualitative analysis tool. With solid gemstones, we sought to answer two questions: Do gemstones of the same size but different types (i.e., topaz versus ruby) produce an equally strong corona discharge under TCKP? Can TCKP distinguish between gemstones of the same size and type?

The first question has important implications for the use of gemstones in any products and applications in which their transmission of electromagnetic radiation, either visible or subtle, is to be used. The second question is important because of statements within the healing literature claiming different effects from gemstones of the same type mined in different locations. Based on what we know of crystalline structure, there should be no difference between two such gemstones, given their identically ordered structure.

In a subsequent experiment, the gemstones were ground into powder consisting of particles of 2–5 microns. They were subsequently heated to 260°C for sterilization. They were tested alongside a control of powdered talc, matched for particle size and sample size.

GDV technique

For the static GDV study, six gemstones were studied: amethyst, aquamarine, garnet, golden citrine, pink tourmaline, and yellow topaz. Each sample round cut gemstone measured 5.0 mm in diameter.

The principal device used in the test was a camera manufactured by Kirlionics Technologies International (St. Petersburg, Russia). Each sample was placed on the electrode, suspended over the image plate of the camera device (Fig. 1A). Initially, due to the small size of the test gemstones and their relative nonconductivity, the current passed directly from the electrode. To eliminate this problem, a plastic shield was constructed to sheath the electrode and part of the top of the gemstone. This allowed the corona discharge to develop from the stone itself (Fig. 1B).

Successive static GDV images for each gemstone were taken at a rate of 10 frames/second. During each image, the sample was subjected to 10 çs impulses of 15 kV with a steep rate of 106 V/s and a frequency of 103 Hz. Each sample was tested 10 times and the results averaged.

For each image, editing consisted of cleaning up stray pixels distant from the central image of the corona discharge image. The GDV software utilized for these experiments uses mathematical algorithms to measure image parameters (Korotkov, Korotkin, 2001). The quantitative values for the physical extent of the GDV images derived through processing the images with this software were area (size of the corona phenomenon, measured in pixels), and intensity (brightness of the phenomenon, units based on digital measures of brightness measured on a scale of 1–255).

RESULTS

TCKP

In researching the activity of stones of different types but identical cut and size, it was found that the tourmaline crystals produced an effect more brilliant than any other gemstone tested. Tourmaline is an unusual gemstone in that it is piezoelectric and pyroelectric: under heat or physical stress the gemstone will produce a charge, and the converse also applies: when subjected to an electromagnetic field, the gemstone will flex and produce heat. These effects, either not present or less prevalent in the other samples, may account for some of the difference seen in tourmaline's behavior.

For the question of whether stones differing only by source mine could be distinguished, we found that gemstones from different mines indeed produced differing effects. In general, the gemstones appeared to give off a discharge primarily from corners common to several facets. The number of corners from which the discharges emanated and the strength of such discharges differed between gemstones mined from different locations, while remaining the same for gemstones with identical sources (Figs. 2A and B).

In the case of tourmaline powders, the area of the corona discharge was more than 200% that of the talc control, showing a high response to electrical stimulation (Fig. 3).

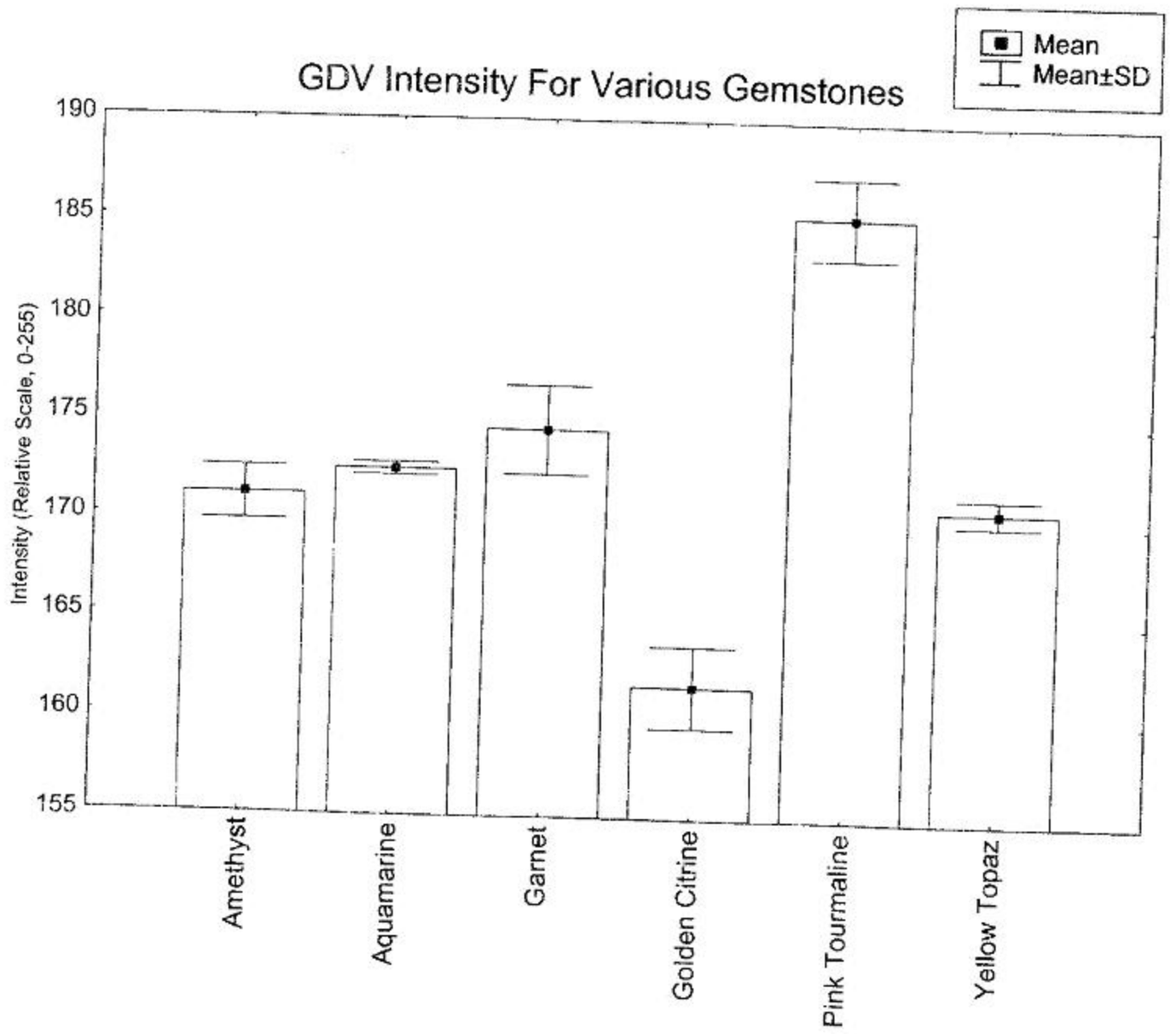
GDV results

Pink tourmaline showed a relatively high average intensity. The highest area readings, by far, were shown by yellow topaz. Curiously, the tourmaline showed an average area reading that was similar to all samples except yellow topaz (high extreme) and golden citrine (low extreme), and the yellow topaz, despite a high area of discharge, showed an intensity that was at similar levels with all samples except golden citrine (low) and pink tourmaline (high) (Figs. 4A, B).

DISCUSSION

The results from bioelectrographic imaging of the gemstones show that the technique is sensitive enough to detect subtle differences between stones that have been held in folklore to make a difference in treatment outcomes. The ef-

A



B

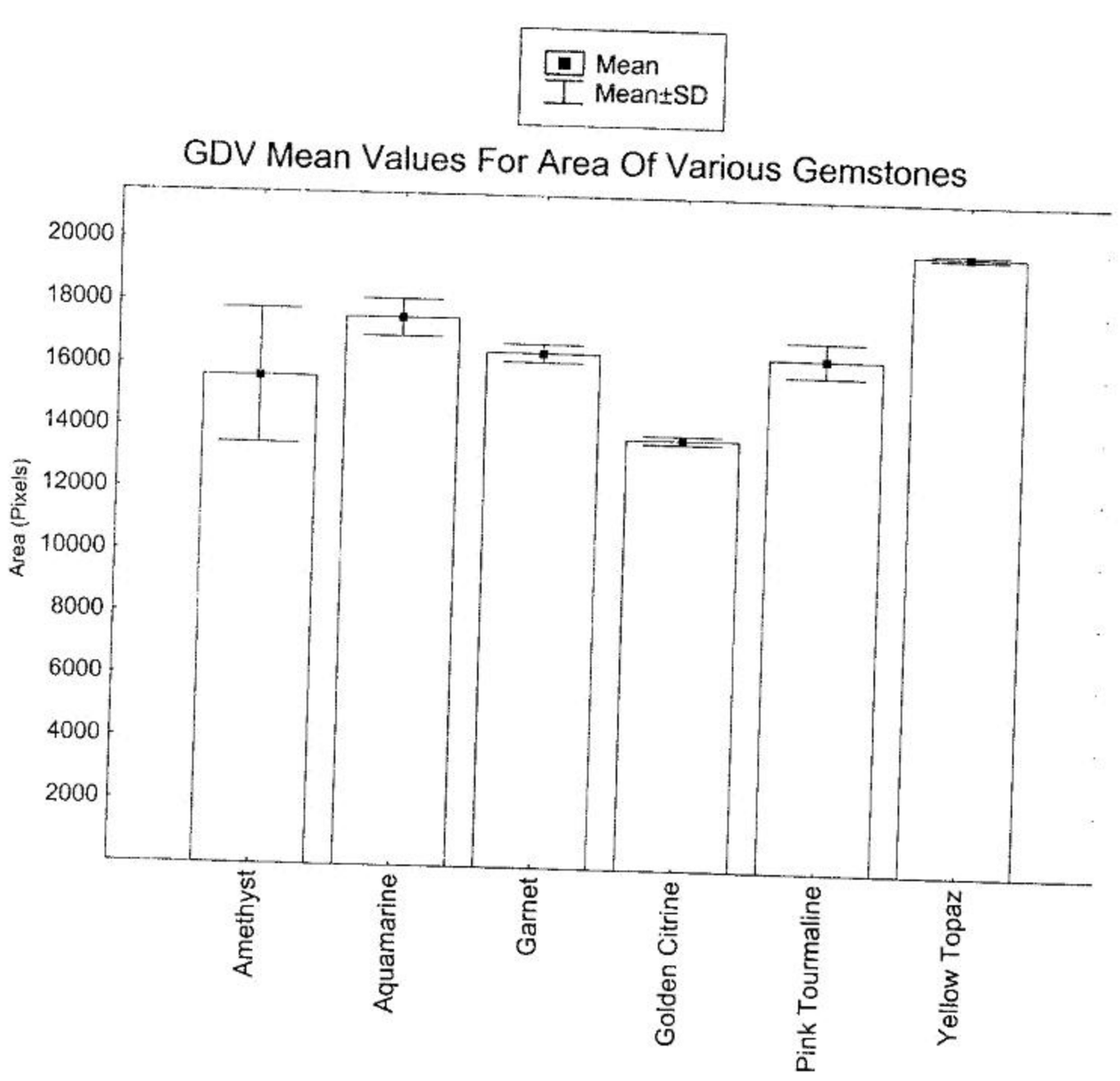


FIG. 4. Static gas discharge visualization (GDV) data for gemstones in test. (**A**) GDV intensity parameters (relative scale, 0–255). (**B**) GDV area (in pixels).

fect of such differences, such as mining source, might be minimized or ignored by other testing techniques.

The results from the TCKP experiments show that the technique is more than a scientific curiosity: it shows the ability to distinguish between extremely similar mineral samples. This sensitivity to subtle differences in nonorganic materials confirms its usefulness in applications other than those in the diagnostic or healing disciplines.

Bioelectrography can detect subtle electromagnetic properties of gems even where these differences are minimal. Even a seemingly blunt technique such as TCKP can detect these differences and provide vivid evidence of their existence. These differences can also be detected after stones have gone through severe stresses or physical change, such as being ground into powder.

The tests show that the GDV technique shows promise for analyzing inorganic material such as gemstones. Any effect that the EMF has on the gemstones, even piezoelectric samples such as tourmaline, seems to occur almost instantaneously, and does not subsequently change over the 30-second GDV tests. The steady readings from these gemstones echo their value in technologies relying on the electromagnetic behavior of the gemstones, such as quartz's applications in electronics and timekeeping. In practical and research applications, the GDV technique would be generally preferred over TCKP due to the ability of the researcher to quantify the corona discharge phenomenon.

While the tests may be used to identify that differences between the gemstones exist, further work must be done to develop a protocol for directly distinguishing and identifying the physical basis of any energetic or biologic effects the gemstones may have. As holistic practitioners hold, it is not possible to completely define or characterize a treatment in isolation; it must be considered and tested as part of the system it comprises along with the patient.

ACKNOWLEDGMENTS

Gemco International and the Aveka Corporation assisted with materials processing. Shivnath Tandon and Vinod Upadhyay assisted with obtaining Ayurvedic sources and information.

REFERENCES

Bell I, Lewis DA, Brooks AJ, Lewis SE, Schwartz GE. Gas discharge visualisation evaluation of ultramolecular doses of homeopathic medicines under blinded, controlled conditions. J Altern Complement Med 2003;9:25–37.

Bhagwan DV. Alchemy and Metallic Medicines in Ayurveda. New Delhi: Concept Publishing Company, 1986:14–19.

Jyotirmitra. History of Indian Medicine from Pre-Mauryan to Kuòsåaòna Period. Varanasi, India: Jyotiråalok Prakashan, 1974:4–6.

Korotkov KG, Korotkin DA. Concentration dependence of gas discharge around drops of inorganic electrolytes. J Appl Physics 2001; 89:4732–4736.

Korotkov KG. Human Energy Fields: State of the Science. New York, Backbone Publishing, 2004:129–142.

Meulenbeld GJ. A History of Indian Medical Literature. Groningen, Netherlands: E. Forsten, 2002:743,779–781.

Shastri AM. India as Seen in the Brhatsamhitaā of Varaāhamihira. Delhi: Motilal Banarsidass, 1969:22–29.

Address reprint requests to:
Alex Vainshelboim, Ph.D.
Aveda Corporation
400 Pheasant Ridge Drive
Minneapolis, MN 55449

E-mail: avainshe@aveda.com