

Comparison of "Nano ostrich oil" and "ostrich oil" on Human skin

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ABSTRACT: Nanotechnology as a branch of science which is related to nano materials helps in overcoming the limitations of size and can change the outlook of the world regarding science. In the recent years the number of slaughter ostriches has been increasing. Over the last decade there is a growing interest in Ratitae farming, mainly ostriches that provide dietetic meat, valuable skins as well as feathers and eggs and specially oil. Ostrich oils are used widely in the cosmetics and pharmaceutical industry. They are apparent to have exceptional moisturizing, penetrating and therapeutic qualities for humans and animals. Ostrich oil also contains variable levels of compounds including carotenoids, flavones, polyphenols, tocopherol and phospholipids in the no triglyceride fraction, which may present therapeutic benefits including antioxidant properties. We, in this paper, study the effect of nano ostrich oil on skin and compare it with natural ostrich oil. 60 participants are participated in this experiment. Results obviously show that the softening and transparency effect of nano ostrich oil is higher than other tested treatments. Considering the satisfaction forms given to participants, those who applied the nano ostrich oil were completely satisfied about softening and transparency quality of their skin.

Key words: Nano ostrich oil, Nanotechnology, Skin

INTRODUCTION

Nanotechnology is emerging as a rapidly growing field with its application in science and technology for the purpose of manufacturing new materials like cosmetics, ICT, food and feed, environmental health and agricultural productions at the nanoscale level (Wijnhoven et al, 2009). The term "Nano" is a Greek word synonymous to dwarf meaning extremely small (Rai et al, 2009). The term Nanotechnology was coined by Professor Norio Taniguchi in Tokyo Science University in the year 1974 to explain precision manufacturing of materials at the nanometer level. Nanotechnology as a branch of science which is related to nano materials helps in overcoming the limitations of size and can change the outlook of the world regarding science (Kim et al, 2007). Nanoparticles are clusters of atoms in the size range of 1–100 nm (Gavanji et al., 2012). Furthermore, nano materials can be changed for more efficient applications in different fields such as bioscience and medicine (Kim et al, 2007; Gavanji et al, 2013). Nanoparticles can be defined as objects ranging in size from 1-100 nm that due to their size may differ from the bulk material. The high surface to volume ratio increases their ability to penetrate cell membranes and possible biochemical activity. Nanoparticles are being used for diverse purposes, from medical treatments, using in various branches of industry production such as solar and oxide fuel batteries for energy storage, to wide incorporation into diverse materials of everyday use such as cosmetics or clothes (Gavanji et al, 2012). By manipulating materials at the atomic level, nanotechnology offers to achieve unique properties for various desired applications. It is noticeable that most of the nature's creations occur at the nanoscale regime too (Ghosh et al, 2010). Because of its widespread application, the commercial nanotechnology industry is predicted to increase significantly to \$3 trillion by 2015 (Ahamed et al, 2010; Gavanji et al, 2013). In the recent years the number of slaughter ostriches has been increasing. With growing demand for prime products such as dietetic meat and valuable skin, the ostrich industry started to make use of ostrich negligible products, especially fat. This includes the oil provided from fat and used in cosmetics (Sales et al, 1999). Moreover, food industry uses ostrich fat as an ingredient of value-added products for humans, as well as a supplement to pet food, mainly for dogs and cats. Fat in the Ratitae (ostrich, emu, and rhea) carcass is situated in specific depots in abdomen, on breast, and on back (Sales et al, 1999). Recently Horbańczuk and his coworkers reported on cholesterol content and fatty acids profile of breast fat obtained from ostrich females collected at the age of five years. Since our knowledge about the quality of ostrich fat (Gunstone and Russell, 1954) is still limited, an effort should be made at

obtaining information on the cholesterol and fatty acids content of ostriches. The aim of this study is to compare the effect of "Nano ostrich oil" and "ostrich oil" on softening and transparency of human skin.

MATERIALS AND METHODS

Preparing nano particles

Nano ostrich oil is prepared from Mobin Tolid Tasnim Company (Iran, Esfahan). The nano particles were between 80 to 300 nm in size. The particles were in the form of suspension for better application by participants. The size of nano ostrich oil was determined using Scanning Electron Microscope (SEM) machine.

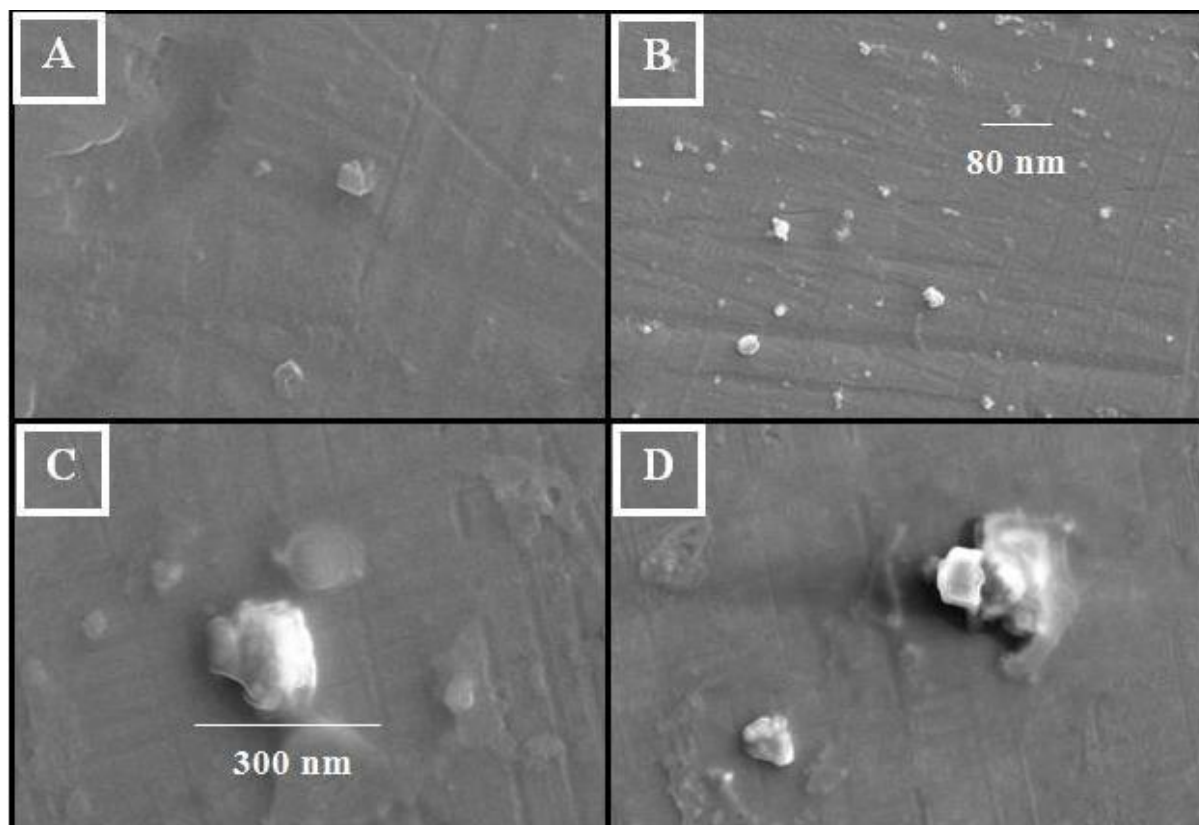


Figure 1. Scanning Electron Microscope of nano-sized ostrich oil particles (80 to 300nm)

Participants

Ninety adult people were participated in this experiment (between 18 to 65 years old). Thirty of them received natural ostrich oil, thirty received nano-sized form of the oil and the rest received olive oil (control group). Thirty percent of participants were male and the rest were female. The experiment was done using double-blinded method.

Application on skin

The effect of nano ostrich oil and natural ostrich oil had been determined between May and September time interval (2013). The oils were prepared in some completely similar tubes and the participant did not know about the ingredient of the tubes. All female participants were checked for pregnancy before using the oil. All participants were asked to sign consent form and they all were checked for possible sensitivity to the oil. For 3 month, they received the oil and used it on their skin 3 times per day. Every participant had an individual form in which some information were recorded. Also there was another form for participant satisfaction during the experiment. In order to evaluate the degree of satisfaction and the effect of oil on softening and transparency of skin, the forms were arranged by digits 1 to 4 which 4 indicates the high satisfaction of participants. Based on some similar studies and by using means comparison method, data were analyzed using SPSS software (Version 17) and analysis of variance were done with repeated calculation.

RESULTS AND DISCUSSION

Results shown in figure 2 obviously show that the softening and transparency effect of nano ostrich oil is higher than other tested treatments. Considering the satisfaction forms given to participants, those who applied the nano ostrich oil were completely satisfied about softening and transparency quality of their skin. As it is shown, the highest effect is referred to A2 and then to B2. Nano ostrich oil is shown to have a better transparency effect compared to its softening effect which it was effective too. Considering the percentage given in figure 1, C1 and C2, in contrast to other treatments, are extremely different in their effect.

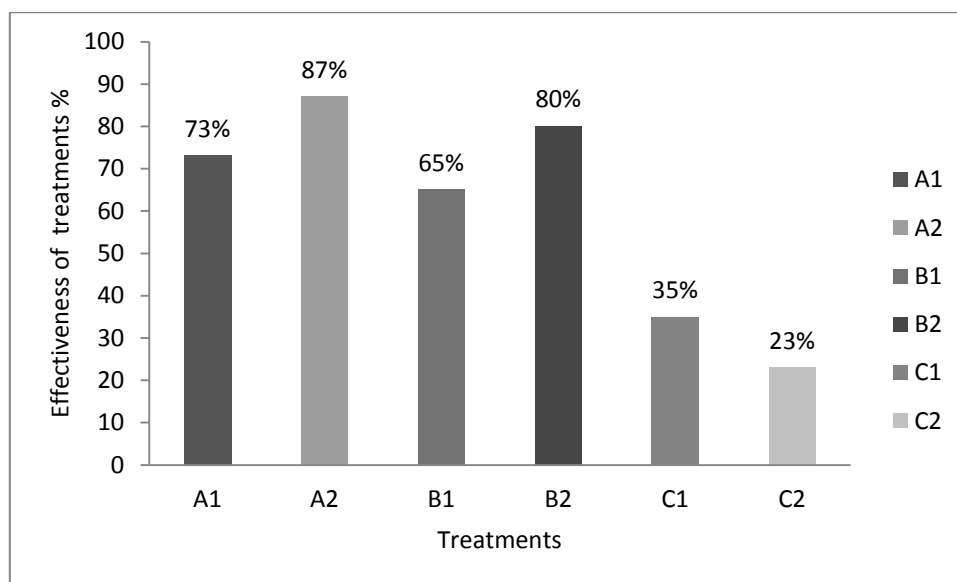


Figure2. Effect of all treatments applied on participant's skin

A1: Softening effect of nano ostrich oil on skin; A2: Transparency effect of nano ostrich oil on skin; B1: Softening effect of ostrich oil on skin; B2: Transparency effect of ostrich oil on skin; C1: Softening effect of olive oil on skin; C2: Transparency effect of olive oil on skin

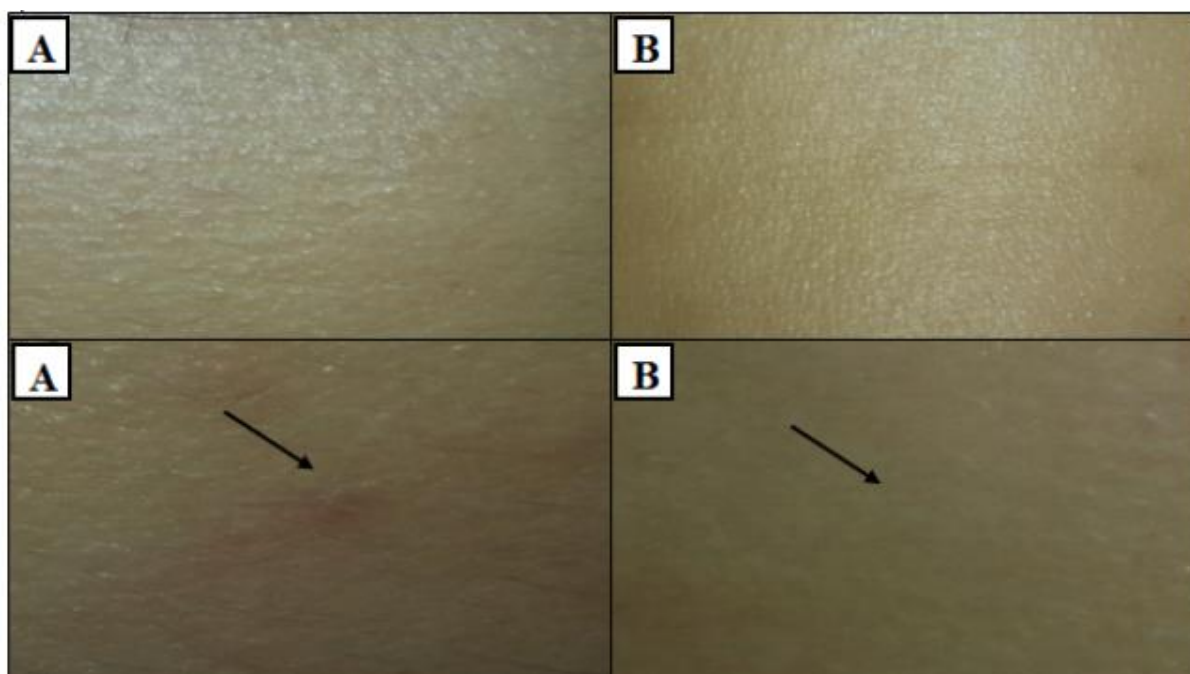


Figure 3. The quality of skin using nano ostrich oil before and after treatment
A: Before experiment; B: After experiment

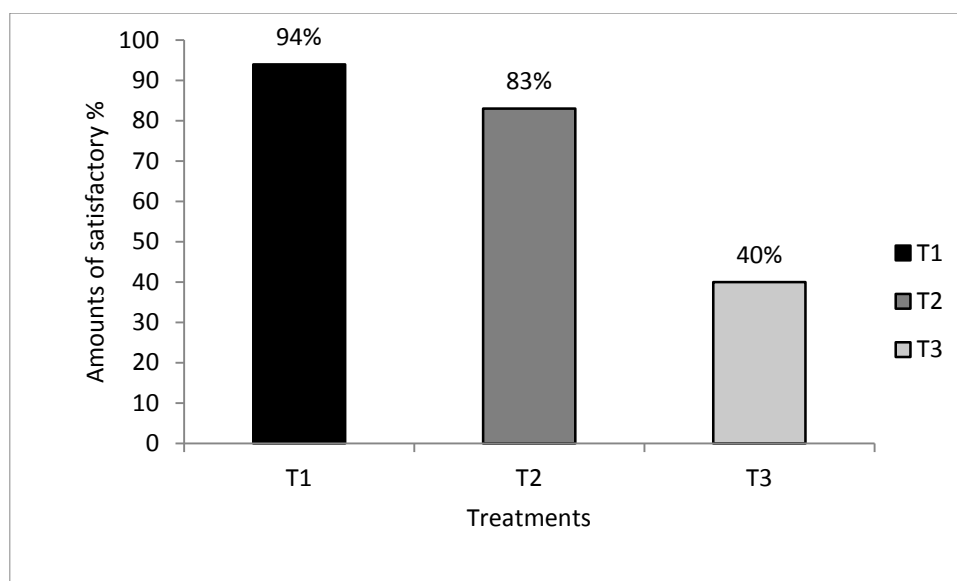


Figure 4. Measurement of participant's satisfactory using all treatments

T1: Amount of satisfactory using nano ostrich oil

T2: Amount of satisfactory using natural ostrich oil

T3: Amount of satisfactory using olive oil

As it is shown in figure 4, those participants who have used nano ostrich oil on their skin are meaningfully satisfied about the softening and transparency quality of their skins. Regarding the fact that T1 and T2 are not significantly different, natural ostrich oil is somehow acceptable, but not as much as nano-sized form. Olive oil, which was used for control group was meaningfully different in its effect. In the past decade or so, scientists have recognized the importance of omega-3 long chain polyunsaturated fatty acids (n-3 LCFA) during pregnancy and early developmental life of the newborn child. Research shows that sufficient amounts of omega-3 fatty acids enhance development of the fetal and infant brain and may improve cognitive development, visual acuity, hand eye coordination and attention span. In addition, recent research indicates that maternal omega-3 fatty acid intake lowers the infant's risk of developing allergies and asthma later in life. Omega-3 fatty acids are also very important for maternal wellbeing. Not only do they protect from cardiovascular disease (Kris-Etherton et al, 2003), lower triglyceride levels (Schacky and Harris, 2007) and may prevent inflammatory diseases like rheumatoid arthritis, they also have a specific effect on maternal health and the outcome of pregnancy. Oil from the emu and rhea is used in cosmetics (skin creams, lotions, lip balm, shampoo and massage oil) and first-aid products (burn creams, arthritis rubs, sports rubs). The reason for the effectiveness and uniqueness of emu and ostrich oil in these products is unknown and is under investigation. The Australian and British ostrich industries claim that ostrich oil is superior in cosmetics products (Sales and Franken, 1996). Nanotechnology deals with structures sized of 1 to 100 nanometer. Nanoparticles can be ingested directly via water, food, cosmetics, drugs, drug delivery devices, etc (Oberdo, 1990). Ostrich oil also contains variable levels of compounds including carotenoids, flavones, polyphenols, tocopherol and phospholipids in the nontriglyceride fraction, which may present therapeutic benefits including antioxidant properties Nano-sized ostrich oil particles are one of the manufactured products and are now going to be industrially produced in Iran. Nano-sized ostrich oil is shown to be more capable in absorbance and effect on human skin. The product is able to deeply penetrate into the layers of skin and also it can be used as an agent to deliver other beneficial materials to skin without blocking the pores.

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