

Separation of Selected Pathogenic Bacteria from Herbal Products

Anum Khan¹, Atifa Kazmi¹

¹Department of Microbiology, Jinnah University for Women

ABSTRACT

In present era, there is the growing demand of herbal cosmetics because of the irritability and side effects of synthetic products. The study primarily comprised on the consideration of the presence of microorganisms in locally marketed cosmetic products. Unfortunately, these cosmetic products are not suitable for the human usage due to its exceeding microbial limit. The products mainly possess inconsistent quantity of natural material, that supports the microbial growth. Bacteria such as *Staphylococcus*, *E.coli*, and *Aspergillus* were the main contaminants of the herbal products. In this study mehendi (Hina), hand and body lotion, facial cleanser and liquid soaps were analyzed. Mostly bacteria were isolated while one fungal species was isolated from these marketed cosmetics. In this study also found out that *Staphylococcus* species is one common contaminant in these lotion and creams. While *Pseudomonas aeruginosa* was also isolated from two of the samples of herbal face wash and shampoo that is alarming. Herbal cosmetics are more likely samples get contaminated due to the usage of polluted water in these products. Herbal cosmetic products such level of contamination occurred in shampoo. Hence, the study proved that the herbal cosmetics are not suitable for the human usage due to the presence of higher load of microorganisms. Therefore, it is a must that such product to be properly manufactured, packaged and stored.

Keywords: Cosmetics, herbal products, microbial contamination

INTRODUCTION

Herbal Cosmetics, here in after alluded as,utilizing different safe herbal ingredients to frame the base in which one or more are utilized to give characterized restorative advantages just, should be called as “Herbal Cosmetics” (Shivanand *et al.*, 2010). The historical backdrop of natural beauty care products in the 1940s shows how the style or pattern regarding lipstick color was altered yearly. A portion of the pure herbs are separated from the territories of Himalayas where various herbs are yet to be recognized (Srikanths *et al.*, 2007)

Herbs are thought to be sustenance as opposed to prescription since the contamination is removed and make it pure, as nature expected. At the point when herbs are taken, the body begins to eliminate, it gets decontaminating itself unlike synthetically manufactured and exceedingly focused medications that may

deliver numerous reactions, herbs can effectively alert the body's barriers. Herbs don't create moment cures, but instead offer an approach to put the body in proper tune with nature. Herbs are for the most part characterized as non-woody plants, which bite the dust in the wake of development. This definition has been extended to any of the plants of which part or entire can be utilized as a part of therapeutic medications, culinary arrangements (as seasonings), nourishing supplementation, or utilized as a shading or restorative agent. They are presently being progressively cosmetics, food and teas, and additionally elective solutions. The developing interest in herbs is a part of the development towards change in ways of life. This development depends on the conviction that the plants have a vast potential for their utilization as a healing medication. There are a few herbs that are promptly utilized for the beauty care products purposes such

Amla, Neem and Sikhakai. Amla is very prized both for its high vitamin C content and for the valuable oil, which is extricated from its seeds and mash and utilized as a treatment for hair and scalp issues. It is utilized as a part of eye disorders, male pattern baldness, and youngsters sicknesses etc. Sikhakai is viewed as a prevalent chemical for “brilliant long hair” and has been accounted for as “maintaining hair growth and neglecting dandruff. It likewise helps in expelling dandruff and lice and extremely compelling in expelling oil and earth from hair (Saklani *et al.*, 2012)

Neem gives the benefits of health assurance and helpful in skin diseases, rashes & inflammation, Immunity booster, Anti obesity, Blood purifier for beautiful & healthy skin, Anti diabetic, Anti viral, Disperses intestinal worms and parasites, Malaria, Piles, Hair disorder & Oral disorders. Additional important oils which are used in cosmetics include anise oil, coriander oil, grapefruit oil, jasmine oil, palma rose oil, sandalwood oil (Shweta and Gediya *et al.*, 2011)

These procedures are not focused to aseptic environment amid assembling, packaging and transport and so on, as required for pharmaceutical measures (Baird 1992; Beveridge 1992). Furthermore, numerous plant materials alongside them transmit microbes and growths rising in soil. The animal fertilizers and slurries for the most part have pathogenic living beings, subsequently bringing on bring up in infectivity and microbial growth. Though a tremendous measure of microorganisms from abundantly present herbs, oxygen consuming sporulation microscopic organisms ordinarily exceed, an assortment of measures of reaping, taking care of and generation may bring on additional poisons and microbial vegetation, in this way compounding the cosmetic measures (Bensky *et al.*, 1993; Marcus and Grollman, 2002). Using these restorative arrangements which are polluted with various microorganisms has been connected with a

few sicknesses. This causes the considerable weakness in quality endorsement of items. Absence of standardization, low quality control, under reporting and so on is chief obstacles in assessing natural beauty care products (Barnes *et al.*, 1998; Schulze *et al.*, 2003). The time has come to apply investigative way to deal with this issue.

Contaminants in naturally made cosmetics are grouped into physicochemical contaminants and organic contaminants. An assortment of agrochemical agents and some natural solvents might be critical deposits in herbal medicines. Contamination must be reduced and controlled through quality assurance practices, for example, good agricultural and controlled practices (GACP) for therapeutic plants, and good manufacturing practices (GMP) for natural medications. Compound and microbiological contaminants can be obtained because of the utilization of human excreta, animal's wastes and sewage as fertilizers. Dangerous components and other synthetic contaminants, including solvents starting from items planned for use in family units and mechanical chemicals can be moved in treated the soil sewage. In this way, care must be practiced with sewage administration in farming regions. Foreign matter must be controlled. By a wide margin the greater part of conceivably hazardous contaminants and deposits are found in the herbs and natural materials. This results in their presence in the items, for example, herbal remedies and medications (WHO, 2007)

While trying to make the natural item more secure to be utilize, serious excellence in handling these procedures should be taken. The primary goal of the research is to determine the bioload of herbal cosmetics care products advertised locally and push the necessity to take after the remedial measures to provide cosmetics absolutely safe to human utilization.

MATERIALS AND METHODS

Total aerobic bacterial plate count: Serial dilution was attained until 10⁻⁷ dilutions, then 0.1 ml from 10⁻⁷ was inoculated onto the Nutrient Agar plate by pour plate method and incubated at 37°C for 48 hours.

Isolation and identification of *Staphylococcus aureus*: To isolate the *Staphylococcus aureus*, the culture was transferred from the pre enriched plate into Mannitol Salt Agar plate (MSA) and incubated at 37°C for 24 hours.

Isolation and identification of *Escherichia coli*: To isolate the *E.coli*, the culture was transferred from the pre enriched plate into Eosin Methylene Blue Agar (EMB) and incubated at 37°C for 24 hours.

Isolation and identification of *Aspergillus* species growing on SDA: To isolate the culture of fungus, the pre attained serial dilution of 10⁻⁷ was inoculated to SDA agar at 37°C for a week.

RESULTS

10 samples of herbal products were observed for bacterial and fungal contamination. Out of 10 samples, 6 samples gave bacterial and fungal growth while 4 samples were sterile. In those 6 samples, Mehandi (Hina), Sikakai, Amla and Neem based herbal products gave the growth of *Staphylococcus aureus*, Cleansing cream showed the growth of *Escherichia coli* and Face wash exhibited the growth of *Aspergillus*.

Table I: Growth obtained from the herbal products

S.No	Products	Colonies	Grams Reaction	Organism
1	Mehandi (Powder)	Colonies appear	Gram positive	<i>Staphylococcus aureus</i>
2	Shikakai (Powder)	Colonies appear	Gram positive	<i>Staphylococcus aureus</i>
3	Amla (Powder)	Colonies appear	Gram positive	<i>Staphylococcus aureus</i>
4	Neem (Soap)	Colonies appear	Gram positive	<i>Staphylococcus aureus</i>
5	Cleansing (Cream)	Colonies appear	Gram negative	<i>E.coli</i>
6	Face Wash	Colonies appear	Fungus	<i>Aspergillus</i>
7	Scarb (Cream)	No colonies	No reaction	No organism
8	Face Mask	No colonies	No reaction	No organism
9	Exfoliating Scrub	No colonies	No reaction	No organism
10	Spa Massage Cream	No colonies	No reaction	No organism

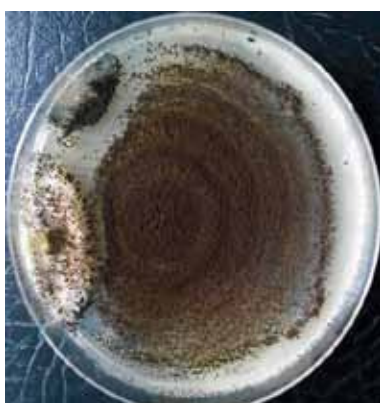


Figure 1. Growth of *Aspergillus*



Figure 2. Growth of *S. aureus*



Figure 3. Growth of *E. coli*

DISCUSSION

Use of herbal products is the delightful way to prevent from chemically made substances and their side effects but these substances are becoming contaminated because of some negative aspects. The study was carried out to explore the ways of contamination and the kind of contamination. Herbal products usually resist the growth of microorganisms due to their medicinal properties. But some herbal products like herbal shampoos are less susceptible to contamination than other products presumably because they contain surfactants only. Viable bacterial count was not recovered from herbal shower bath soaps, herbal facial cleanser, hand, herbal body lotion and herbal shampoos, respectively. Only 2% of herbal Neem soap were heavily contaminated by aerobic spore forming bacteria (bacilli), while none of the others contaminated with such a huge number of bacteria. Related to the average contamination levels, 5% of herbal Mehendi showed bacteria, compared to 2% of hand and herbal body lotion which were contaminated to the same extent were recovered from one sample of herbal shampoos; *Staphylococcus aureus* was recovered from 4 samples. One isolate of *Aspergillus* was also detected in a sample of herbal face wash. One isolate of *E. coli* was also detected in a sample of herbal cleanser. The pH of all the tested samples was alkaline (6.5-7). Bacterial contamination in new herbal cosmetic products is common because of the surrounding in which the products are manufactured and packed. Herbal ornamental ingredients are affluent in nutrients and these supply natural substrates in the variety of sugar, starch, protein, amino acid, organic acid lipid etc. for microbial growth. Organisms such as *Pseudomonas putidissima* possess a mixed function oxidase enzyme that enable them to utilize substrates that many other organisms are unable to use. The ability of microorganisms to utilize substrates depends upon their survival

strategies. The nutrients needed by organisms include nitrogen, sulphur, phosphorus and mineral. The materials are required for enzyme function and cellular osmoregulation are furnished as components or raw material or in water. Water is a major medium in many cosmetic products and it has been the source of finished product contamination. Generally, microorganisms of interest in raw materials or herbal cosmetic products grow best around neutral pH 7.0 and many yeasts are able to tolerate acidic conditions. Natural herbal cosmetic ingredients supply nutrients for microbial growth. Therefore, herbal cosmetics should be produced in a perfectly clean hygienic environment.

CONCLUSIONS

Cosmetic item tainting is an exceptionally regular happening to spread disease. Shockingly, most clients are essentially unaware about the security risks connected with items that they utilize each day. The important points should be taken under the consideration found in this study and expanded use of natural cosmetic agents in the general public, alongside low value procedures taken by the producers and sellers leave an incredible question mark on the security of these products' safety.

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