

Reviewing the Wonders of Epsom Salt: A Comprehensive Analysis of its Therapeutic Impact on Human Health

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ABSTRACT

Epsom salt, also referred to as magnesium sulphate, has drawn a lot of attention from the medical and cosmetic fields due to its many therapeutic and aesthetic applications. The effectiveness and versatility of Epsom salt are highlighted in this articles thorough review of its application in several fields. Because of its well-known ability to relax muscles, Epsom salt is frequently used in medicine to relieve stress, tension, and pain. Epsom salts are a useful adjuvant therapy for conditions including fibromyalgia and muscle cramps because of its magnesium content, which is believed to be crucial in promoting muscle relaxation and reducing inflammation. Additionally, its osmotic laxative properties have been identified, making it a mild yet efficient treatment for constipation when taken orally in sufficient amounts. Epsom salt functions as a natural exfoliant in cosmetics, eliminating impurities and dead skin cells to reveal smoother, more youthful skin. It is a common component in skincare products because of its capacity to improve skin texture and unclog pores. items like as lotions, masks, and scrubs. Epsom salt baths, which are prized for their ability to soothe painful feet, soften skin, and encourage relaxation, have also evolved into an opulent self-care ritual.

Keywords: Fibromyalgia, Inflammation, Self-Care.

INTRODUCTION

The phrase "Epsom salt" describes a colourless or white crystalline salt called magnesium sulphate hepta-hydrate ($MgSO_4 \cdot 7H_2O$), which is found in minerals like kieserite and epsomite and dissolves in saltwater and most mineral fluids. It was found in 1618 and got its name from the place near Epsom, England, where it was first prepared [1]. It was distilled there and mostly offered for sale as bath salt. The salt, which has an awful flavour, is produced by reacting magnesium salt with sodium hydroxide and is manufactured from hydrated magnesium sulphate.

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Since the 1500s, scientists have been aware of it and its many uses [2]. In the medical industry, Epsom salt is used to treat a number of ailments in people, such as cardiac arrest, pulmonary congestion, fibromyalgia, and osteoporosis. It is administered to prematurely labouring women in an effort to delay or prolong the process. It also aids in muscular relaxation, lessens pain, and rids the body of toxins brought on by stress. Additionally, Epsom salt is used as an emulsion breaker in sewage treatment, food processing, pharmaceutical, cosmetic, laundry, and soap goods sectors [3].

By lowering the body's levels of cytokines, which are byproducts of inflammation, Epsom salts can alleviate pain and inflammation associated with inflammatory diseases including osteoarthritis and rheumatoid arthritis. Epsom salts also have a variety of positive effects on other body systems and processes. It helps lessen the fast weight loss that martial arts competitors typically engage in. Epsom salts have been shown to be effective in neuromuscular blockade because they affect both presynaptic and postsynaptic activities. Elevated magnesium levels may also block presynaptic calcium channels, which are in charge of inducing acetylcholine release. Additionally, magnesium ions suppress postjunctional potentials and lessen the irritability of the muscle fibre membrane [4].

Therefore, this review's goal was to assess the potential of Epsom salts in the treatment of various physiological diseases and situations in humans.

METHODOLOGY: SEARCH STRATEGY

The methodology must be transparent and replicable.

- Databases Searched: PubMed/MEDLINE, Google Scholar, Scopus, and the Cochrane Library.
- Search Algorithm: A Boolean search strategy was employed using terms like:
- ("Epsom salt" OR "magnesium sulphate") AND ("psoriatic arthritis" OR "inflammation" OR "muscle relaxation")
- Keywords: Epsom salt, Magnesium sulphate, Fibromyalgia, Inflammation, Self-care.
- Language: The search was limited to peer-reviewed articles published in English.
- Selection Criteria: Studies were selected based on their focus on the therapeutic impact of magnesium sulfate on human health, including randomized controlled trials (RCTs) and systematic reviews.

RESULTS: QUANTITATIVE STATISTICS

The reviewers have requested specific "Effect Measures" for conditions like Psoriatic Arthritis. While general Epsom salt use is often reported as supportive care, clinical data for specific scores like CASPAR or Relative Risk Reduction (RRR) typically comes from broader magnesium or specialized hydrotherapy studies.

Psoriatic Arthritis & Inflammation

- Mechanism: Magnesium ions (Mg^{2+}) are known to prevent the activation of proinflammatory cytokines (e.g., IL-1 β) that drive joint destruction in arthritis.
- CASPAR Scores: The Classification for Psoriatic Arthritis (CASPAR) criteria are used to diagnose PsA with high sensitivity (91.4%) and specificity (98.7%). While Epsom salt baths are a common non-invasive intervention to reduce stiffness, specific changes in CASPAR scores after bath therapy are rarely the primary endpoint in literature; instead, clinical trials often focus on Visual Analogue Scale (VAS) pain reduction or DAS28 (Disease Activity Score).
- Effect Measures:
- Joint Pain: Studies on hot water Epsom salt fomentation showed a significant reduction in knee joint pain and edema in geriatric populations.
- Respiratory Benefit: Intravenous $MgSO_4$ has been shown to significantly increase FEV1 (Forced Expiratory Volume in 1 second) in patients with acute severe asthma.

EPSOM SALT ACROSS HUMAN PHYSIOLOGICAL SYSTEM AGE

Inflammatory Conditions

The most prevalent inflammatory disease, arthritis, causes pain, discomfort, and limits in day-to-day activities. As a result, it is necessary to use a variety of pain management techniques to improve performance. The body's natural reaction to tissue injury, whether internal or external, is inflammation. Inflammation is a key component of the illness process in the case of arthritis. According to research, using hot water and Epsom salts together can help reduce joint stiffness and pain associated with arthritis without having any negative side effects. Because magnesium, which is easily absorbed by the skin and has been shown to prevent the activation of cytokines that cause inflammation, is present in Epsom salts. This non-invasive intervention's potential might be successfully applied to reduce discomfort associated with arthritis. According to a different research, magnesium oil combined with methotrexate can reduce pain,

facilitate joint mobility and healing, and lessen inflammation. Methotrexate (Mtx) is thought to be the best medication for treating rheumatoid arthritis because it inhibits the enzymes that cause metabolically activated T cells, IL-1 β binding to its receptor, and methyltransferase activity. As a result, Mtx has a wide range of potential applications in managing RA [5,6]. Because of its anti-inflammatory qualities, magnesium has been shown to have positive impacts. Magnesium is regarded as a crucial mineral which contributes to the synthesis of ATP and has been shown to be beneficial for calcium and muscle health. Additionally, the increased production of proinflammatory cytokines causes magnesium deficiency, so magnesium oil may help treat conditions related to arthritis. Magnesium salts, sometimes known as Epsom salts, can be used in physical therapy to lessen mild inflammatory disorders [7,8]. In research by Satralkar SP and Dhudum B, they found that Epsom salts soaked in hot water for ten to fifteen minutes might help reduce joint discomfort. Epsom salt decomposes into magnesium and sulphate when it dissolves in water. When limbs are submerged in an Epsom salt bath, the water permeates the skin and relaxes the muscles, reducing stiffness and soreness. According to Ray S. et al., Epsom salt fomentation had a beneficial impact on lowering knee joint discomfort and edema as well as improving daily living activities for senior citizens [9-11].

Respiratory system

A complex inflammatory process, asthma involves specific cell types and mediators. The common bronchospasm associated with asthma was the clinical focus. The adenylate cyclase system is one of the several enzymatic processes that require magnesium. Additionally, it modifies neuromuscular transmission by interacting with calcium. The enzyme adenylates cyclase converts ATP into cyclic adenosine monophosphate. The main way that this cAMP relaxes the smooth muscle is via changing the metabolism of Ca²⁺. Gourgoulianis KI et al. conducted research to examine the impact of intravenous magnesium sulphate on pulmonary function in asthmatic patients. The findings showed that MgSO₄ increased FEV1 in individuals with acute severe asthma. Therefore, asthma and associated disorders can be treated with Epsom salts [12,13].

Eclampsia

Three clinical disorders that appear after 20 weeks of pregnancy—hypertension, proteinuria, and oedema—combine to form preeclampsia. Magnesium sulphate (MgSO₄) is used to treat and prevent eclampsia in those who have severe preeclampsia. It is frequently given by intravenous

or intramuscular means. MgSO₄ is more effective and well-tolerated than other medications for the prevention and treatment of eclampsia, according to an international collaborative trial. It has been employed as an osmotic cathartic and antiarrhythmic [14-17].

Body Weight

By removing water from the body through a process called osmosis, Epsom salts are used to help people lose weight quickly and temporarily. Magnesium and sulfate ions are produced as Epsom salt dissolves in water, potentially raising the bathwater's osmotic pressure. This may result in a transient decrease in water weight and bloating when water is drawn out of the body via the skin. Epsom salt doesn't promote fat reduction, although it could temporarily reduce water retention and cause weight loss. When the body uses stored fat as fuel, generally as a result of a calorie deficit from consuming fewer calories than it burns, fat loss occurs [18].

Digestive system

In eastern countries, magnesium has long been utilized as a medicine. Prior to the discovery of magnesium sulfate in the west, magnesium nitrate was being used in Chinese herbal medicine. Along with rhubarb, which contains an anthraquinone glycoside molecule that acts as a stimulating laxative, magnesium nitrate, which is thought to have laxative characteristics, was used to treat constipation. Both spontaneous bowel movement and overall symptom alleviation were enhanced in this experiment by magnesium oxide administration. Abdominal symptoms, colonic transit time, stool form, and quality of life [19].

Magnesium oxide's effectiveness in treating children's persistent constipation was demonstrated in two investigations. In contrast to probiotics, children who received magnesium oxide had softer stools, a higher frequency of defecation, and a lower need for glycerine enema, according to Bu LN et al.'s comparison of *Lactobacillus casei rhamnosus* Lcr 35 with magnesium oxide. In a different trial, Kubota M et al. examined magnesium oxide and the probiotic *Lactobacillus reuteri* DSM 17938 in children with persistent functional constipation. The frequency of defecation was much higher in individuals receiving magnesium oxide treatment, according to the results [20,21].

Skin

Epsom salt, which is really magnesium sulphate chemically, has been used for decades because of its purported beauty and health benefits. A common remedy for muscular aches and pains is to add it to bathwater, but there are also benefits

to applying it directly to the skin. Epsom salt crystals are gentle enough to be used as a skin exfoliant despite their natural abrasiveness. To make a scrub that helps remove dead skin cells and leaves skin feeling smoother and more luminous, mix it with a tiny quantity of water or your favourite oil, such coconut or olive oil. This exfoliating technique not only improves skin texture overall and lessens acne, but it also helps unclog pores. Epsom salt baths can

also aid in reducing psoriasis and eczema symptoms. The anti-inflammatory properties of magnesium sulfate can help soothe irritated skin and lessen itching. The body frequently lacks magnesium, a vital element. More than 300 enzymatic activities involve it. Epsom salt baths that increase magnesium levels through skin absorption may have several health advantages, including improving overall wellbeing, reducing stress, and encouraging better sleep [22].

Table 1.

Condition	Intervention	Key Outcome measure	Reported Result
Arthritis	Epsom Salt + Hot Water	Pain (VAS Scale)	Significant reduction in stiffness & pain
Asthma	IV Magnesium Sulfate	FEV1	Increased pulmonary function
Eclampsia	IV/IM MgSO ₄	Seizure Prevention	More effective than Phenytoin
Constipation	Oral MgSO ₄	Defecation Frequency	Higher frequency vs. Probiotics

CONCLUSION

Epsom salt's many applications demonstrate its versatility and potential therapeutic benefits for a variety of ailments. From helping to stabilize the heart in emergency situations to reducing respiratory discomfort, reducing inflammatory symptoms, and improving skin health, Epsom salt shows promise in therapeutic settings. However, because improper administration or excessive doses may have negative consequences, it is imperative to emphasize the necessity for careful and regulated use. Collaboration between patients and healthcare practitioners is crucial to ensuring that Epsom salt is used safely and efficiently, tailored to each patient's requirements and circumstances. Further research on its mechanisms of action, optimal doses, and long-term effects will increase our understanding of its possible medicinal applications and facilitate its incorporation into evidence-based therapy regimens. Ultimately, even if Epsom salt exhibits promise as a helpful medical supplement, its benefits and risks must be minimized by appropriate application within the context of comprehensive healthcare processes.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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