



AUREA
BIOLABS



**Innovative Solution
for Joint Health**



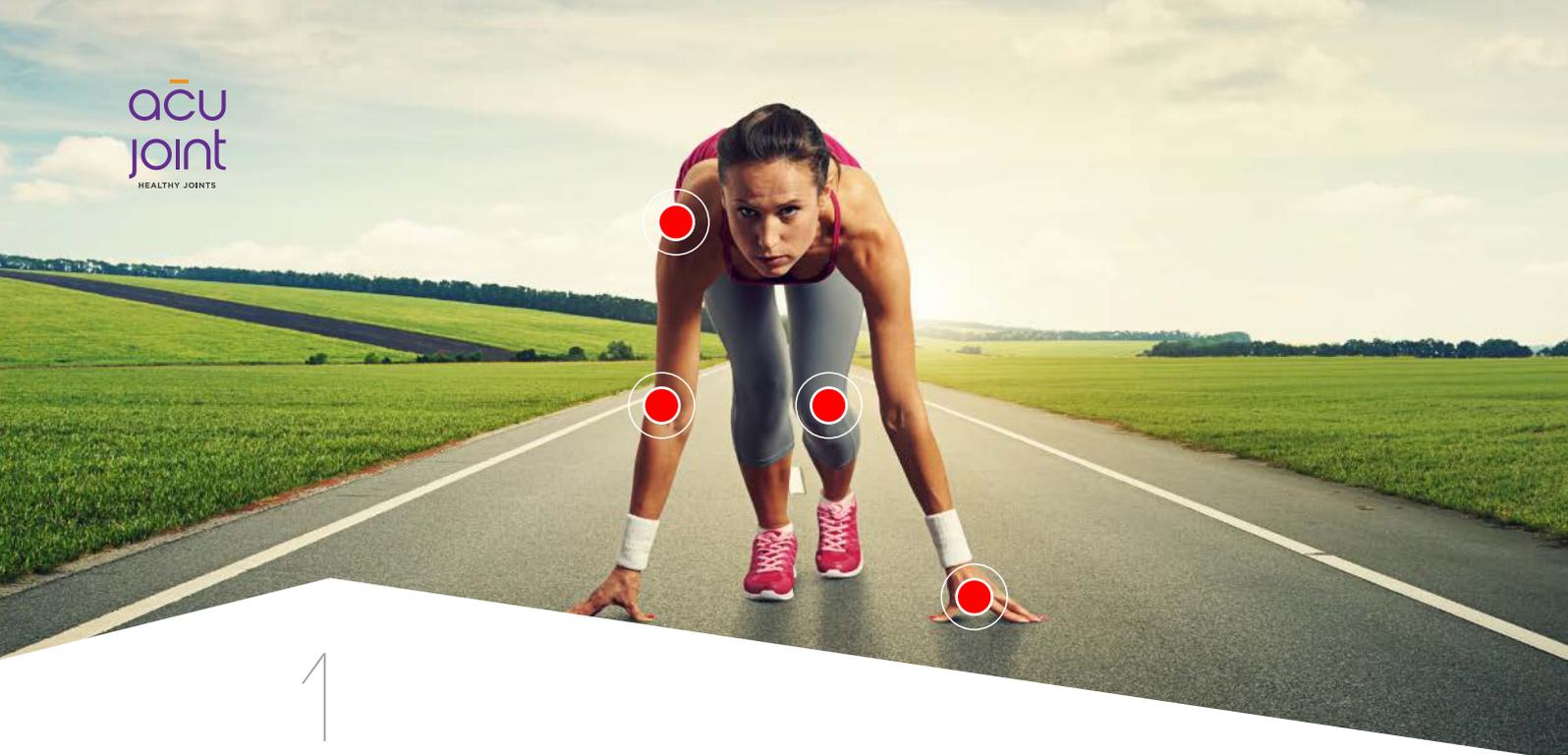
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TABLE of contents

Page	
2	Introduction
3	PNS Technology
4	Innovative ingredients in ACUJOINT™
7	ACUJOINT™ in Osteoarthritis Clinically comparing ACUJOINT™ vs Glucosamine + Chondroitin study
10	Other Health benefits



1

INTRODUCTION

The use of herbs and spices for the treatment of inflammation has been well documented in traditional Ayurvedic and Asian system of medicines. The human body gets exposed to many inflammatory conditions, thereby increasing the aggregation of chemicals and blood supply making that particular area swollen and rise in temperature. The basic signs of inflammation include pain, heat, redness, swelling and eventually loss of function of that body part.

Osteoarthritis (OA) is the most common form of arthritis, affecting many people irrespective of the age. It is often characterized by the breakdown of cartilage tissues thereby causing pain, stiffness, and loss of movement. Even though the exact cause of OA is unknown, scientific community has provided information on the mediators involved in the body changes and progression of the disease. The various pathophysiology of OA includes cartilage degradation from enzymes, cytokines, leukotrienes, and prostaglandins and thereby contributing to the responsible factors for pain and inflammation.

The existing treatment methods for inflammatory disorders include Analgesics, Steroids and Non-steroidal anti-inflammatory drugs (NSAIDs). Most of the NSAIDs may help in relieving pain, but do not give indications on the mobility, joint function and metabolic pathways that often lead to OA. Natural products are becoming relatively popular because of their low side effect and the efficacy. Use of Nutraceutical preparations with appropriately designed controlled studies has been explored in recent years. The increasing degree of confidence with the study design, outcomes and quality of the products has strengthened the area of research of natural products to treat inflammatory disorders.

We at Aurea Biolabs have developed a unique formulation - Acujoint™, comprising of *Curcuma Longa* extract, *Boswellia Serrata* extract, *Piper nigrum* oil, and *Kaempferia galanga* extract made by patent pending Polar-Nonpolar-Sandwiching (PNS) technology. The scientific superiority of Acujoint™ has been clinically studied in subjects with knee Osteo Arthritis (OA).

2

PNS TECHNOLOGY

Each herb/spice has got both polar and non-polar entities constituting their mother matrix. Aurea Biolabs have developed a unique patent-pending technology known as Polar-Nonpolar-Sandwiching (PNS) technology in which both the polar and nonpolar constituents sandwiches the active constituents to recreate the natural matrix. PNS technology is used to increase the bioefficacy and bioavailability of the products by preserving the natural matrix of the product and without any degradation of the active molecules. PNS technology also helps to deliver the active molecules at the specific target site thereby confirming the availability of the active molecule at the target site. The presence of PNS technology has been characterized and confirmed by SEM, NMR, IR, XRD, DSC and TGA analysis.



Acujoint™ is one of the product that incorporates PNS technology by complexing the curcuminoids and Bioavailable 3-o-acetyl-11-keto-beta-boswellic acid (AKBA) which is then sandwiched between the polar extracts of *Curcuma longa* and *Kaempferia Galanga* and the non-polar *piper nigrum* oil.



3

INNOVATIVE INGREDIENTS IN ACUJOINT™

- *Curcuma Longa* Extract
- Bioavailable *Boswellia Serrata* Extract
- *Piper Nigrum* Oil
- *Kaempferia Galanga* Extract

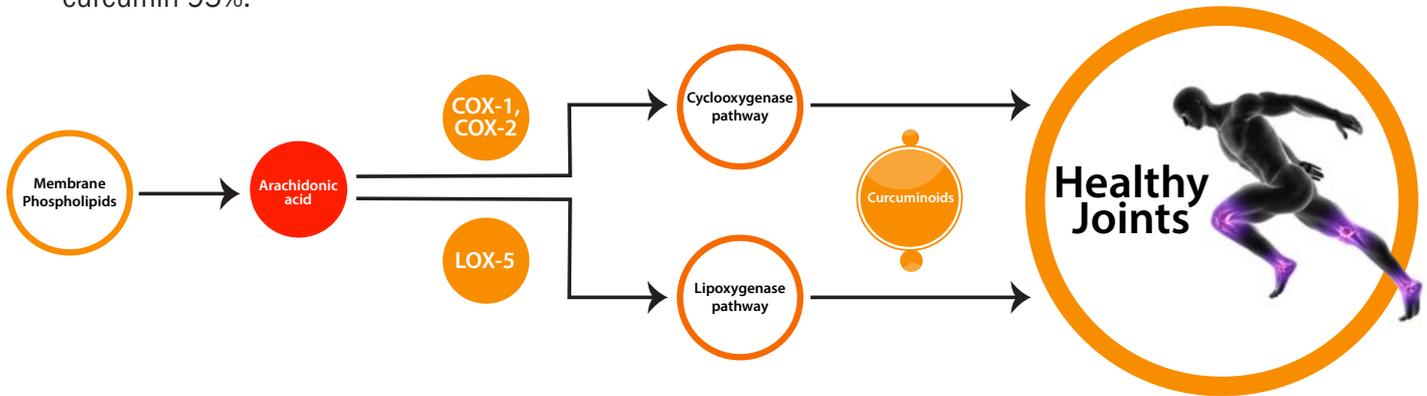
Curcuma Longa Extract: (Anti-inflammatory & Antioxidant)

Turmeric as the whole herb, as well as some of its constituents have been found to exert potential effects in supporting immune boosting, musculoskeletal health, cell protective effect, neuroprotective effect, etc. The active components responsible for the health benefits of turmeric are mainly curcuminoids, viz, Curcumin, Demethoxy curcumin and Bis Demethoxy curcumin. There are many mechanisms responsible for the anti-inflammatory activity of curcuminoids which include

- Downregulation of COX-2 and iNOS enzymes,
- Suppression of NF-kB activation,
- Inhibition of arachidonic acid metabolism via lipoxygenase and scavenging of free radicals generated in this pathway;
- Inhibition of production of inflammatory cytokines, TNF- α , IL-1, IL-2, IL-6, IL-8, IL-12.etc



The major drawback of Curcuminoids is the lack of bioavailability. To address the bioavailability Aurea Biolabs have developed a unique bioavailable curcumin formulation, which recreates the complete natural turmeric matrix (CNTM). The bioavailability of the formulation is 10 fold higher compared to normal curcumin 95%.



Boswellia Serrata Extract: (Anti Inflammatory & Analgesic)

Traditionally *Boswellia serrata* extract is used in the Indian Ayurvedic medicine for the treatment of inflammatory diseases. Boswellic acids, the main active ingredients of *Boswellia serrata* extracts has potent anti-inflammatory properties and represent promising therapeutic agents with no serious, long-term or irreversible adverse effect for controlling rheumatoid arthritis (RA), OA, chronic colitis, ulcerative colitis, bronchial asthma, inflammatory bowel disease. The pharmacological effects of *Boswellia serrata* extracts were attributed to the pentacyclic triterpenic boswellic acids, especially to 3-o-acetyl-11-keto- β -boswellic acid (AKBA). Boswellic acids were proposed to act as inhibitors of 5-lipoxygenase (5-LO), nuclear factor kappa-B (NF- κ B) pathway, human leukocyte elastase, and microsomal prostaglandin E2 synthase (m PGES)-1 in various pharmacological effects.

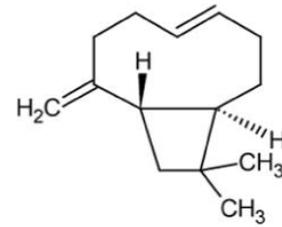


Kaempferia Galanga: (Anti-inflammatory & Anti-oxidant)

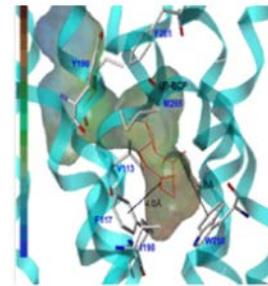
The *Kaempferia Galanga* rhizome extract is used traditionally for inflammatory disorders. *K. galanga* extracts are used for the treatment of swelling, cytotoxic, antihypertensive, hypolipidemic effect. A recent report demonstrated the acute anti-inflammatory effect of *K. galanga* rhizome extract plaster. Notably, the alcoholic extract obtained from *K. galanga* rhizome extract showed a significant anti-inflammatory effect against acute and sub-acute inflammation in studies.

Piper Nigrum Oil: (Anti-inflammatory & Analgesic)

Cannabinoid receptor 2 (CB2) plays a significant role in limiting the inflammatory response, oxidative / nitrative stress and consequent tissue injury and ultimately organ dysfunction. β -caryophyllene (CA) activates selectively and potentially the CB2 receptor, which is present in cells of the immune system and predominantly mediates anti-inflammatory effects. CA seems to be an excellent candidate as it is readily available as a natural compound found in the essential oils of many species and food plants particularly black pepper. Moreover black pepper oil is composed of terpenes which have been found to be β -caryophyllene, limonene, δ -3-carene and pinene). Beta caryophyllene also exerts analgesic effects. By incorporating CA in the formulation, the subjects with active OA would experience a reduction in pain due to the cannabinoid action.



Beta Caryophyllene
Beta - CB₂



Beta Caryophyllene
acting on the central
nervous receptor M265



The high bioefficacy of Acujoint™ can be attributed to the combined synergistic action of the above listed ingredients. Made by PNS technology, Acujoint™ ensures strong antioxidant activity, thereby increasing the immune activity against joint discomforts and inflammatory conditions. Acujoint™ is an Innovative solution for Joint Health as it helps in controlling both pain sensation and the inflammatory mediators responsible for Osteo Arthritis through combined analgesic, antioxidant and anti-inflammatory mechanisms of the innovative ingredients.



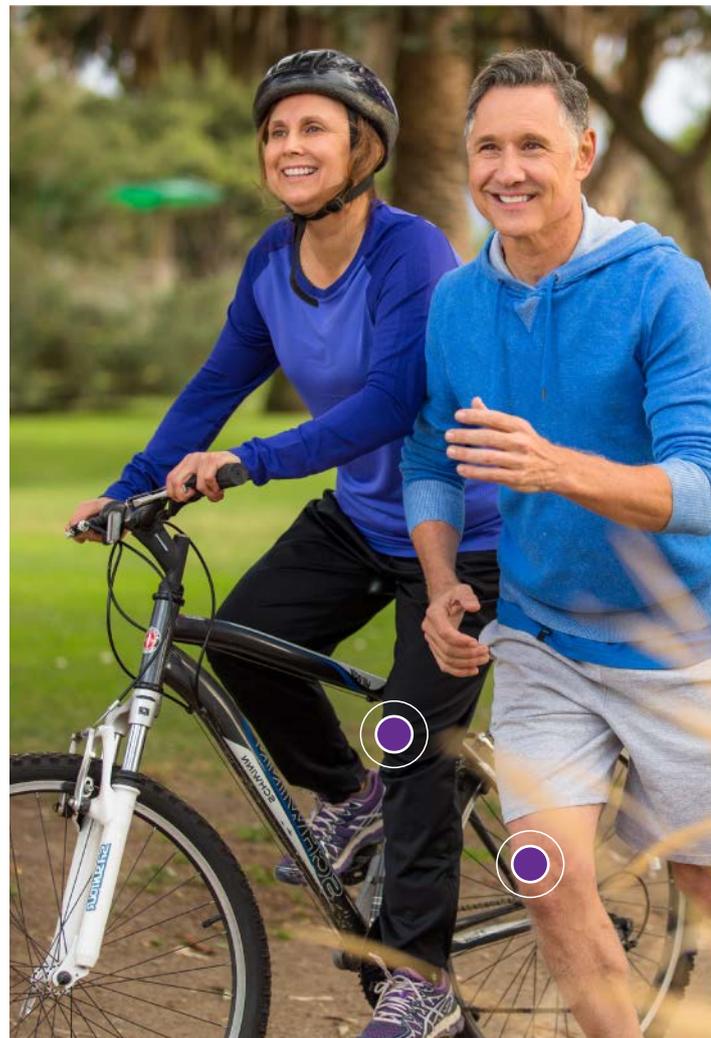
4

ACUJOINT™ IN OSTEOARTHRITIS

CLINICALLY COMPARING ACUJOINT™ vs
GLUCOSAMINE + CHONDROITIN STUDY

A randomized, double-blind, active-controlled and mono centric clinical study during 90 days of treatment compared with glucosamine and chondroitin formulation. Active Osteoarthritis (OA) subjects, who received Acujoint™ for a period of 90 days, reported statistically significant changes/ reduction in their clinical symptoms.

The product Acujoint™ started showing its beneficial effects from the first month of supplementation and was highly significant at the end of the study. Inflammation is the main cause of stiffness in arthritis, health supplement 'Acujoint™' containing curcumin, AKBA, β -caryophyllene and K. galanga extract jointly may improve stiffness by supporting in the reduction of inflammation factors. On the other hand, since the pain and stiffness have a substantial impact on physical function in OA subjects, the observed improvement in physical function may be due to the positive effects of Acujoint™ containing natural phytonutrients on pain and stiffness.



PAIN SCORE



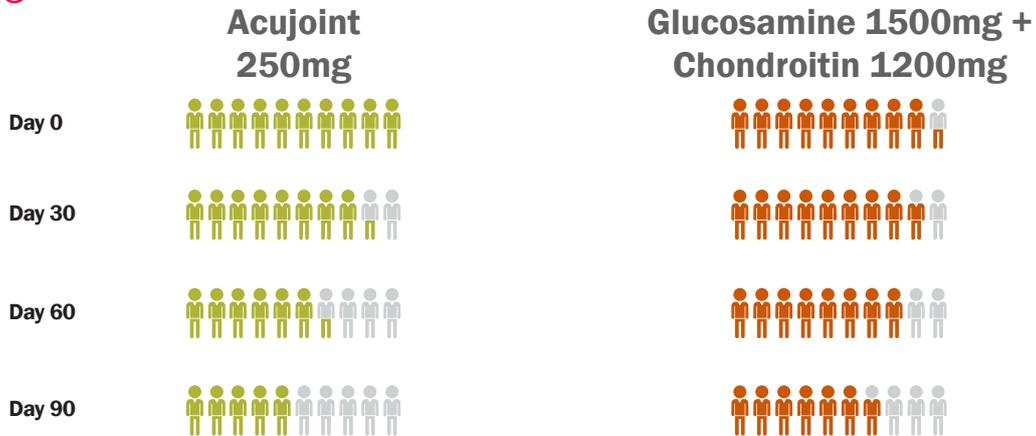
STIFFNESS SCORE



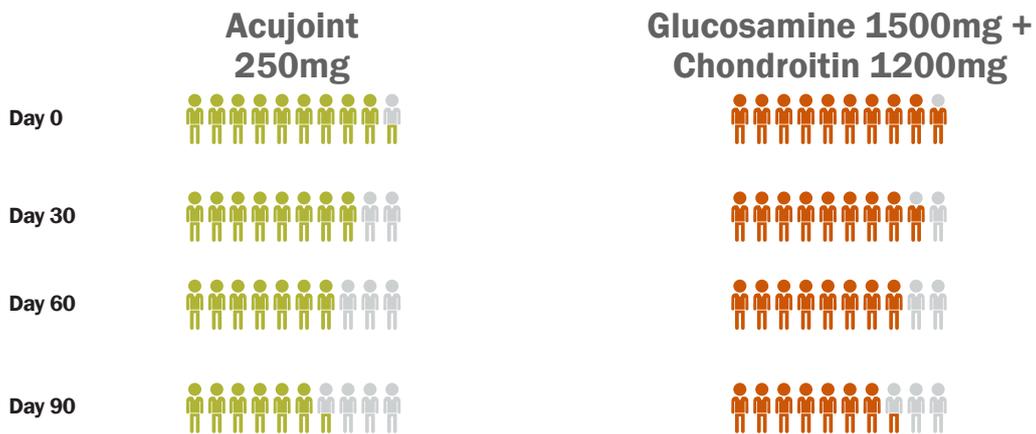
FUNCTION SCORE



VAS



LEQUESNE SCORE



BIOMARKERS - HS-CRP (MG/L)



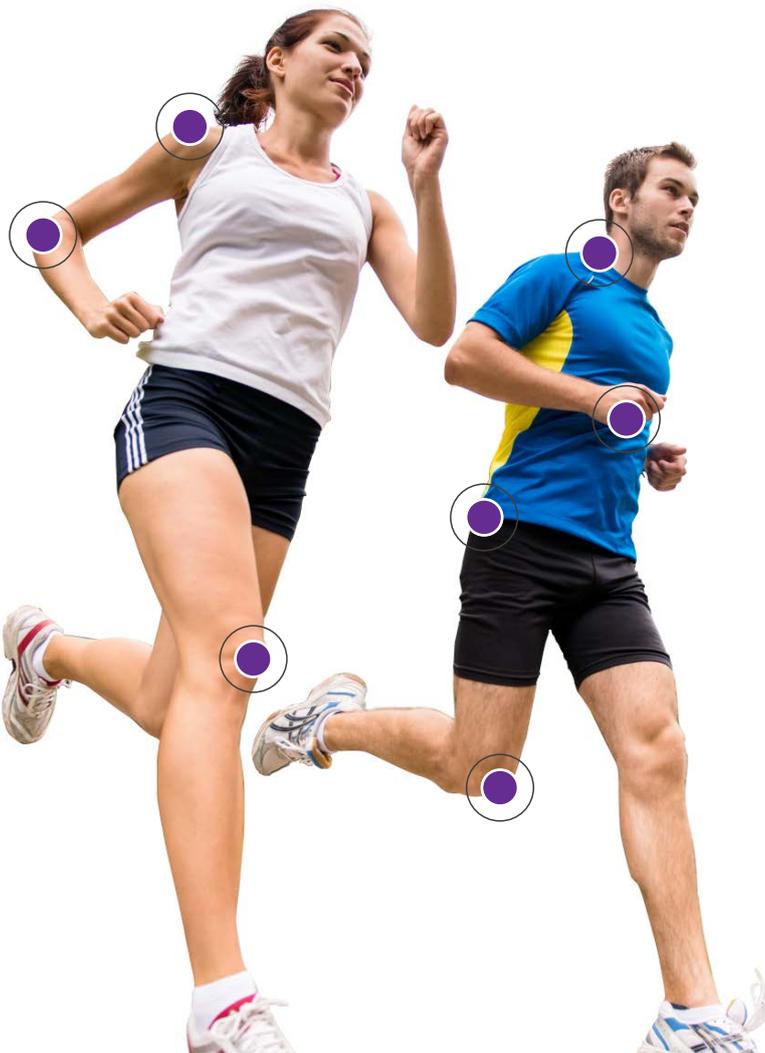
Conclusion:

Acujoint™, the natural solution for joint health made by unique PNS technology, is found to be highly efficient in controlling Osteo arthritis. This was evident from changes in the total WOMAC score, pain score, functional ability score, VAS score and LF index values.



5

OTHER HEALTH BENEFITS



- Supports immune health
- Supports in maintaining musculoskeletal health
- Helps in controlling pain, stiffness and inflammation
- Supports the structural integrity and motility of joint cartilage
- Rejuvenates joint cartilage by inhibiting 5-lipoxygenase activity
- Supports flexibility of joints

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