

Ethnomedicinal Significance of Some Plant against Wrinkles

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Abstract

Skin aging involves degradation of extracellular matrix (ECM) in both the epidermal and dermal layers, it leaves visible signs on the surface of skin and the physical properties of the skin are modified. The increasing use of traditional therapies demands more scientifically sound evidence for the principles behind therapies and for effectiveness of medicines. Natural products have the properties to rejuvenate and protect the skin from environmental pollution, chemicals, atmospheric temperature fluctuation, Ultraviolet A and Ultraviolet B radiation, wrinkling, hyper pigmentation and inflammations. They have been used since ancient times, and still playing a major role in modern cosmetics. Cosmetic formulations containing herbal components are more appropriate for hyper allergic skin because they are less irritant and more easily adjustable to skin. Recent trends in anti-aging research projected the use of natural products derived from ancient era after scientific validation. Present era of treating aging skin has become technologically more invasive; but herbal products including botanicals are still relevant and combining them with molecular techniques outlined throughout this review will help to maintain the desired anti-skin aging benefits and give outline to outline for nanoherbal anti aging formulation

Key Words: Aging, rejuvenate, ultraviolet radiation, medicine.

Introduction

For instance, habits like smoking and sunbathing dry out skin and cause wrinkles. Over time, skin begins to wrinkle. Things in the environment, like ultra- violet (UV) light from the sun, make the skin less elastic. Gravity can cause skin to sag and wrinkle.

Certain habits also can wrinkle your skin. Some of these habits are easier to change than others. You may not be able to change your facial expressions, but you can quit smoking. A lot of claims are made about how to make wrinkles go away. Not all of them work. Some can be painful or even dangerous, and many must be done by a doctor. There are several synthetic skincare cosmetics existing in the market to treat premature aging and the most common adverse reactions of those include allergic contact dermatitis, irritant contact dermatitis, phototoxic and photo-allergic reactions. Recent trends in anti-aging research projected the use of natural products derived from ancient era after scientific validation.

There are three main causes of fine facial lines and wrinkles, all of which may be present in combination in one person.

1. Muscle contractions.

Certain habits also can wrinkle your skin. Some of these habits are easier to change than others. Most facial lines and wrinkles are the result of excessive and repeated contractions of the muscles used for facial expression. Frequently this is a habit which the person is not aware of.

These lines commonly include vertical frown lines of the lower central forehead between the eyes (normally expressing worry or anger, but commonly caused by unconscious habitual frowning when the person is concentrating, and resulting in a fixed worried or angry expression – which is often inappropriate). Horizontal lines of the forehead (expressing surprise or questioning) are also common, as are lines which radiate out from the outer corners of the eyes (formed while squinting or smiling, and often called crow's feet).

2. Sleep.

These lines / wrinkles result from sleeping on the same side with the face in the same position on most nights, and are usually vertical lines between the forehead and the cheeks.

3. Tissue loss.

These lines / wrinkles result from progressive thinning and loss of tissue supporting the skin, producing loss of skin elasticity. This is associated with a combination of factors, including the aging process, sun damage, excessive alcohol intake, and smoking. In general terms, the skin sags in response to gravity. Children and young people tend to have rounded faces, and very rarely have wrinkles when their face is at rest. This is because their skin is healthy and elastic enough to return to its original position following facial expression. As time goes by, thinning of the skin and loss of elasticity causes the skin to become less pliable and crease, resulting in the appearance of wrinkles even when the face is at rest.



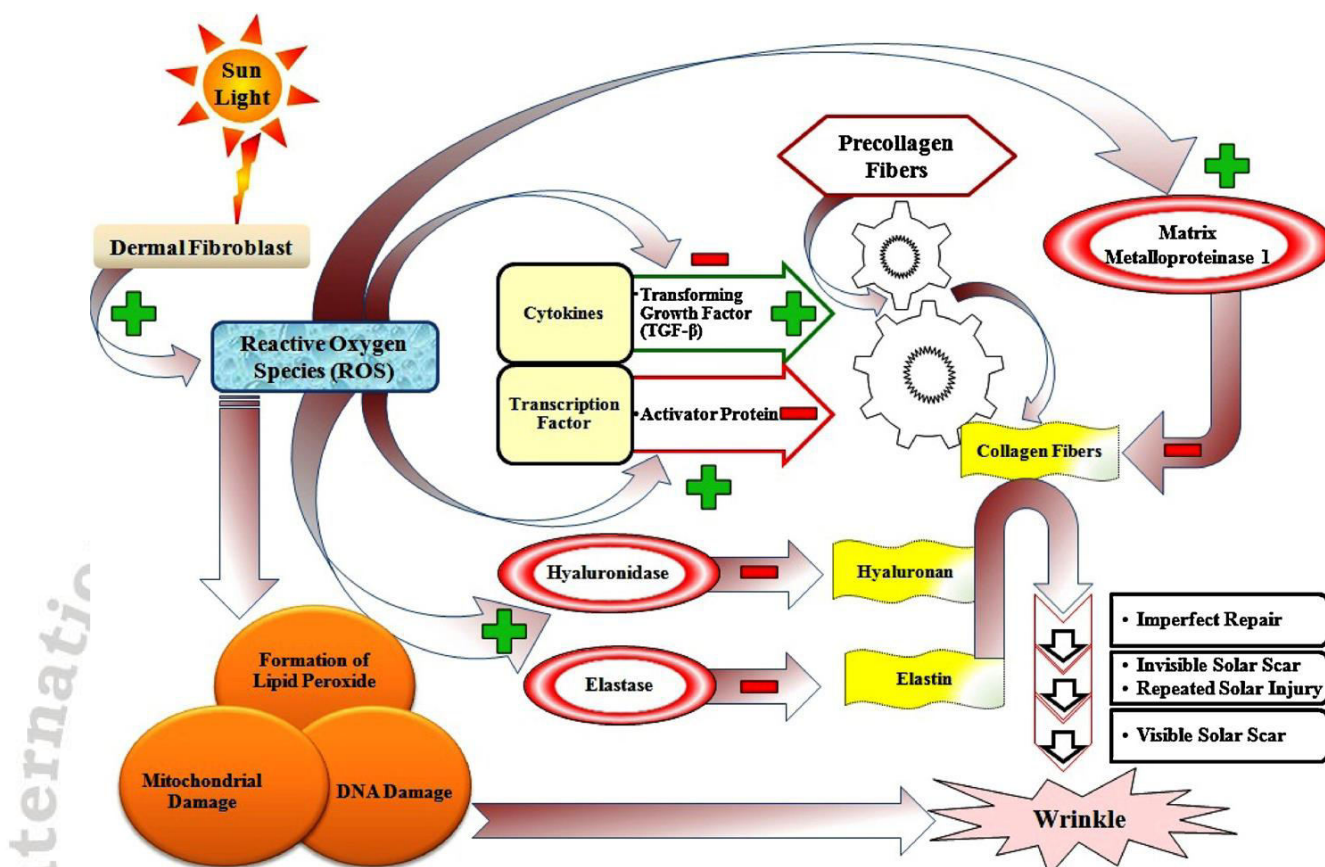
Fig1: Wrinkle present on face.

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Fig 2.: Pathway of premature skin aging [+, induction;- , inhibition].



There are essentially two types of wrinkles: those in the muscles and those in the skin. “Dynamic wrinkles” are caused by muscle contraction. When you’re younger, you can create wrinkles by doing things like smiling or furrowing your eyebrows. When you relax your face, the lines go away. Over time, though, just like a shirt lying on the ground will develop wrinkles, those facial lines tend to become more permanent.

“Static lines” are wrinkles associated with changes in the skin itself as it becomes wiser and more mature. Damage from things like the sun and cigarette smoke, along with unavoidable genetics and plain old aging, cause a few important wrinkle fighters to diminish over time, including collagen and elastin (proteins that provide strength and flexibility), hyaluronic acid (a gel that helps moisturize your skin) and that thin layer of fat directly beneath your skin. Add gravity into the mix, and you can see why skin really doesn’t have a choice but to wrinkle and sag.¹⁻⁵

Collagen is a natural substance (fibrous protein) in our body which decreases with age.

Moreover, collagen is a key element in the health of joints, cartilage, tendons, bones, and all connective human tissue. Collagen is one of the main building blocks of human skin. It is synthesized from its precursor molecules called procollagen which is derived from dermal fibroblasts regulated by transforming growth factor-β (TGF-β), a cytokine that promotes collagen production and activator protein-1 (AP-1), a transcription factor promotes collagen breakdown by up regulating enzymes called matrix metalloproteinases (MMPs) (Fig. 2).

UV radiation is absorbed by skin molecules and generates reactive oxygen species (ROS) causes “oxidative damage” to cellular components like cell walls, lipid membranes, mitochondria, and DNA. Each UV exposure induces a wound response with subsequent imperfect repair, leaving an invisible “solar scar,” repetitive UV exposure eventually lead to development of a visible “solar scar,” manifesting as a visible wrinkle over a lifetime⁶⁻⁷.

Treatments available for fine facial lines and wrinkles⁸⁻¹⁸:

1. Chemical peels.

Skin peeling (part of the normal process of skin exfoliation) is accelerated by the use of chemical agents. Peeling stimulates growth of new skin, which improves the appearance of the skin surface. Chemical peels (e.g. TCA or ICP) are useful to improve the appearance of very fine facial lines and some forms of sun damage or over pigmentation. A course of 3 – 5 peel applications is commonly needed to produce an improvement lasting up to 10 – 12 weeks. Hydroxy acids, classified into alpha hydroxy acids (AHAs) and beta hydroxy acids (BHAs) are also used in chemical peeling

2. Face Lifting By Radio-Frequency

The radiofrequency facelift assumes that the warming of the skin causes a reaction that stimulates the movement of fibroblasts, the connective tissue cells involved in the synthesis of collagen. The result is very significant: the fibers of collagen and elastin are reduced and new collagen is produced. These chain reactions are the source of tension in the skin that shows a new youth.

3. Injectable Dermal fillers.

Injectable fillers provide a plumping effect by increasing the volume of skin and subcutaneous tissues to correct wrinkles and deep folds, especially in the lower face. These include "nasolabial lines" (smile lines between the nose and the outer angles of the mouth), "smokers" lines of the lips, vertical "marionette" lines (sad lines from the outer angle of the mouth down vertically towards the chin), and horizontal melomental lines (horizontal lines between the chin and the mouth), etc.

Collagen has largely been replaced by newer synthetic „non animal stabilised hyaluronic acid“ (NASHA) fillers, of which there are currently more than 70 different types; the best known probably being Restylane®. NASHA fillers are safer and less likely to cause side effects than Collagen.

Administration of fillers can be painful unless dental blocks or local anaesthetics are used. The „plumping“ effect of one treatment usually lasts 4 – 6 months although more recently introduced compounds such as Calcium Hydroxylapatite have a longer lasting duration of up to 2 years. Side effects include: bleeding, bruising and swelling at the site of the injection, which are temporary but can take 10 – 14 days to heal completely.

4. Botox

This is a Botulinum Toxin "A" (BTA) from Clostridium botulinum has the stretching effects over wrinkle skin. Some facial lines, especially crow's feet, smile lines, and lines on the forehead and between the eyebrows, come from muscular contraction. No topical cream or lotion will affect the muscles. You need a specific agent that will relax them. To avoid giving you an expressionless face, a skilled dermatologist will use Botox to eliminate facial lines without relaxing other muscles of expression. The effect is always temporary, usually lasting 3 – 6 months in small facial muscles, but often longer in other areas. BTA temporarily prevents transmission of a biochemical (Acetyl Choline) from nerve endings to muscle fibres, thus reducing muscle activity at the site of injection.

Herbal Plant and fruits used for collagen production¹⁹⁻²⁴:

Soy products such as soy milk and cheese contain an element known as **genistein**. The presence of genistein gives soy products their collagen production qualities, as well as helping to block enzymes that tend to break down and age the skin. Just about any soy product contains enough genistein to be helpful, including soy products that have been developed as substitutes for meat products.

Dark green vegetables are also excellent examples of food containing collagen producing agents. Add dark green leafy veggies such as spinach, cabbage and kale to your diet every day. They are packed with an antioxidant called **lutein**. You need 10 mg to get results - which equates to about 4oz. of spinach or 2oz. of kale. Recent French research suggests this will boost skin hydration and elasticity, fighting wrinkles. Rich in **Vitamin C**, regular consumption of kale, spinach, collards, and asparagus help to strengthen the body's ability to manufacture collagen and to utilize the protein effectively.

Beans help your body produce a vital anti-ageing substance called **hyaluronic acid**. Aim for at least two tablespoons of beans each day - broad or butter beans make a great substitute for mashed potatoes.

Red fruits and vegetables also are excellent sources to up the collagen content of foods in the diet. The presence of **lycopenes** in these types of foods helps to act as antioxidants, which in turn increases collagen production. Try adding red

peppers, beets, and fresh or stewed tomatoes to the diet. Also include sweet potatoes, carrots and more.

Vitamin C rich fruits and vegetables are natural sources of collagen production. You should try to include citrus fruits like oranges, lemons and strawberries into your daily diet.

One of the biggest causes of skin ageing is attack by substances called free radicals, that break down healthy skin tissues. Antioxidants help neutralise these free radicals before they can do any damage - and prunes are the fruit containing the absolute highest level of antioxidants. Blueberries are a close second. Eat five to six prunes, or a small basket of blueberries, daily to get a great health boost.

Omega Acids also help to create an ideal environment for collagen production. Fish such as salmon and tuna are excellent sources of omega fatty acids. Nuts such as cashews, pecans, almonds and Brazil nuts contain healthy amounts as well. **Flaxseed** is a major source of the healthy fat omega-3. Skin cells are surrounded by a fatty layer made from this and other fats so, the higher your omega-3 intake the stronger that layer is, and the plumper your skin cells are - which helps disguise lines and wrinkles. Mix it into smoothies or add it to balsamic vinegar and use it as a salad dressing, but try to have a tablespoon each day.

Foods that are rich in sulphur content are also important to collagen production. Among these are green and black olives, fresh cucumbers, and fresh stalks of celery. Working in conjunction with the sulphur, vegetables that are rich in **Vitamin A** also aid in keeping collagen levels high. Try adding raw carrots, fresh cantaloupe and baked sweet potatoes to the diet for an extra boost.

Turkey contains a vital skin-friendly protein called **carnosine** that slows down a process in the skin called cross-linking. When this happens, fibres grow into the collagen of the skin making it stiff and inelastic. This then stops it snapping back when you do things like smile, laugh or frown - and this is what causes smile lines or crows feet. Eat turkey two to three times a week.

Chocolate is really is good for your skin. In studies in Germany, it was found that after drinking a cocoa-packed drink, blood flow to the skin was boosted (meaning it gets higher levels of nutrients and moisture). It also seemed to be more protected against UV damage - the number-one skin ager. Only dark chocolate contains enough antioxidants to have effects, though.

Manuka Honey is a special honey from New Zealand with unique healing properties. It has been used in skin care for centuries by the Maori people of New Zealand and it's easy to understand why. When used topically, Active Manuka Honey can restore and rejuvenate your skin. It supports the skin cell renewal process and assists in the formation of stronger collagen protein. As an added benefit, active manuka honey is rich in antioxidants and helps to reduce blemishes.

Rose hips are one of the plants extract that can present a rich source of collagen. They contain a high level of vitamin C, which is good for the production of collagen.

If you want to know how to naturally produce collagen, you need to use face masks or creams that contain avocado oil. Avocado oil is deeply hydrating and highly compatible with the natural oils in your skin. Avocado oil is high in **plant**

steroids, which help to reduce blemishes and age spots. It also helps to regenerate and rejuvenate skin damaged by free radicals. Avocado oil is important because it is scientifically proven to stimulate collagen production and it increases the proportion of soluble collagen in the dermis of your skin. And don't forget to include fresh avocados in your favourite salad and soup recipes!

One of the key points to keep in mind is that it is possible to provide everything your body needs to produce collagen by eating a balanced diet. By including some of the foods mentioned here, you will soon begin to see a difference in the quality of your skin tone, as well as have an improved sense of overall health. So toss those "collagen" creams out and start shopping for foods that will actually help you re-grow the collagen you have lost.

Aloe vera L. (Family: Liliaceae)

Aloin A (1) and B have been shown to inhibit *Clostridium histolyticum* collagenase reversibly and non-competitively. Both aloe gel and aloin are also effective inhibitors of stimulated granulocyte MMPs. Aloesin [2-acetyl-8-beta-D-glucopyranosyl-7-hydroxy-5-methylchromone] isolated from the *A. vera* have been reported to modulate melanogenesis via competitive inhibition of tyrosinase. Tyrosine hydroxylase and 3,4-dihydroxyphenylalanine oxidase activities of tyrosinase from normal human melanocyte cell lysates were inhibited by aloesin in a dose dependent manner.

Curcuma longa L. (Family: Zingiberaceae) The effect of a *C. longa* extract have been found to do potential changes in skin thickness, increased elasticity, decreased pigmentation and wrinkling caused by long-term, low-dose UV-B irradiation in melanin-possessing hairless mice. It prevents the formation of wrinkles and melanin as well as increases in the diameter and length of skin blood vessels and decrease expression of matrix metalloproteinase-2 (MMP-2). Therefore, skin wrinkling can be minimized by curcumin.

Citrus sinensis L. (Family: Rutaceae) have accounted that phenolic compounds such as anthocyanins, flavanones, hydroxycinnamic acids (7) and ascorbic acid is responsible for the anti-photoaging activity of three different varieties of *C. sinensis* in modulating cellular responses such as NF- κ B and AP-1 translocation and procaspase-3 cleavage to UV-B in human keratinocytes (HaCaT). Thus, *C. sinensis* has been proposed as a useful natural standardised extract in skin photoprotection with promising applications in the field of dermatology.

Glycine max L. Merr (Family: Fabaceae) Anthocyanin (13) isolated from black soybean [*G. max* (L.) Merr] seed responsible for down regulation of in vitro and in vivo UVB induced reactive oxygen species levels and apoptotic cell death through the prevention of caspase-3 pathway activation and reduction of proapoptotic Bax protein levels. This finding highlights that anthocyanin from the seed coat of black soybean is useful compounds to modulate UVB-induced photoaging.

Tagetes erecta L. (Family: Asteraceae) Small bushy plants widely cultivated in India, Mexico and Central America. The flowers are popularly known as Marigold contains provitamin A ' β -carotene' (20) responsible for photoprotection. Methanol extract of flower has been found to possess in vitro inhibition of hyaluronidase and elastase and MMP-1, which suggested the potential of this plant as anti-wrinkle.

Panax ginseng L. (Family: Araliaceae) Bioactive constituents, ginsenoside (17) believed to have anti-skin aging activities. A randomized, double-blind, placebocontrolled study revealed that

red ginseng extract improved type-I procollagen gene and protein expression, prevent MMP-9 gene induction and elongated the fibrillin-1 fiber length, thereby reduces facial wrinkles.

Marketed anti wrinkles formulation with Nanotechnology:

Nanotechnology represents one of the most capable technologies of the 21st century. Recently Nanotechnology is emerging in the field of cosmetics and dermal preparations as it offers a revolutionize treatment of several skin diseases. It is proved effective in attaining Safe and targeted delivery of active medicaments as well cosmetic ingredients. Use of carrier system in nanotechnology has added advantage of improved skin penetration, depot effect with sustained release drug action.

New Anti-Wrinkle Face Care Creams with Saponin and Hyaluronic Acid : Eucerin® Hyaluron Filler Day and Eucerin® Hyaluron Filler Night are based on O/W emulsions and contain soy saponin and hyaluronic acid as active ingredients.

Liposomal Hydrolyzed Collagen iposomes assembled by *Lipomize*® are formulated with natural phospholipids extracted from soy lecithin. Low Energy Methods are used for processing, protecting the integrity and stability of the nano-vesicles and hyaluronic acid. Lipomize has availability of best raw materials for its homogeneous size, controlled lamellar liposomes, natural soy lecithin and low molecular weight hyaluronic acid. *Hidramize*® liposomes possess high resistance to the action of surfactants and high structural and physicochemical stability, fulfilling its⁹

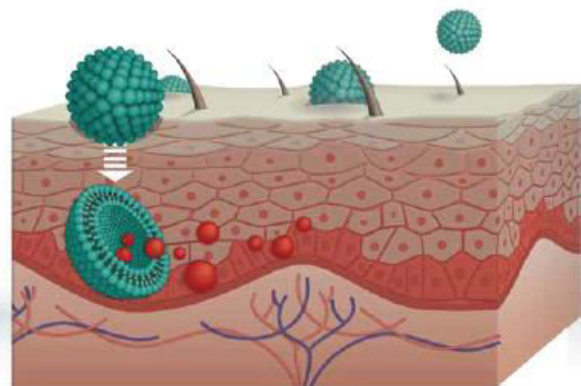


Fig 3. Liposome, vesicle used in nanotechnology

Conclusion

Nanotechnology in cosmetic preparation like anti wrinkle formulation by using herbal plant as a pharmacological or active agent are increase now because herbal formulation are safe and effective. Wrinkles can control by protection use skin and by using fruits and herbs with are describe in this article. In future the demand of natural anti wrinkle formulation will increase by using nanotechnology.

Table No:1, list of Anti ageing plant used

S. no.	Name of the plants and family	Part used	Possible mechanism of action
1.	<i>Aesculus hippocastanum</i> L. (Hippocastanaceae)	Leaves	Generate contraction forces
2.	<i>Aloe vera</i> (Liliaceae)	Gel	Inhibit stimulated granulocyte MMPs Inhibit tyrosine hydroxylase and 3,4-dihydroxyphenylalanine oxidase
3.	<i>Astragalus membranaceus</i> (Fisch.) Bunge (Fabaceae)	Leaves	Increase the content of hyaluronic acid Increase the cellular expression of telomerase reverse transcriptase
4.	<i>Berberis aristata</i> DC. (Berberidaceae)	Berries	Inhibited expression of MMP-9 and suppressed TPA-induced IL-6 expression Type-I procollagen expression increased
5.	<i>Calendula officinalis</i> L. (Asteraceae)	Flower	Control the activity/secretion of MMP-2 and MMP-9
6.	<i>Camellia japonica</i> L. (Theaceae)	Oil	Induce type-1 procollagen synthesis and inhibit MMP-1 activity
7.	<i>Camellia sinensis</i> L. (Theaceae)	Leaves	Suppress UV irradiation induced cutaneous erythema, thickening of the epidermis, overexpression of CK5/6, CK16, MMP-2, MMP-9
8.	<i>Centella asiatica</i> L. Urban. (Umbelliferae)	Whole plant	Improvement of the clinical score for deep and superficial wrinkles, suppleness, firmness, roughness and skin hydration Induce type-I collagen synthesis
9.	<i>Citrus sinensis</i> L. (Rutaceae)	Fruit	NF- κ B and AP-1 translocation and procaspase-3 cleavage
10.	<i>Curculigo orchiooides</i> G. (Hypoxidaceae)	Rhizome	Inhibited MMP-1 expression
11.	<i>Curcuma longa</i> L. (Zingiberaceae)	Rhizome	Inhibited MMP-2 expression
12.	<i>Curcuma xanthorrhiza</i> Roxb. (Zingiberaceae)	Rhizome	Inhibited MMP-1 expression
13.	<i>Dioscorea composita</i> or <i>Dioscorea villosa</i> L. (Dioscoreaceae)		Increased bromodeoxyuridine uptake and intracellular cAMP level in keratinocytes
14.	<i>Emblica officinalis</i> L. (Euphorbiaceae)	Fruit	Inhibited type-I collagen collagenase, increase TIMP-1 level
15.	<i>Fraxinus chinensis</i> Roxb. (Oleaceae)		Decreased the MMP-1 mRNA expression
16.	<i>Glycine max</i> L. Merr. (Fabaceae)	Seeds	Inhibit melanosome phagocytosis Prevented the activation of caspase-3 pathway
17.	<i>Kaempferia pandurata</i> Roxb. (Zingiberaceae)	Rhizomes	Inhibition of UV induced phosphorylations of mitogen activated protein kinases
18.	<i>Labisia pumila</i> (Blume) (Myrsinaceae)	Root	Inhibition of TNF- α , COX-2, MMP-1 and MMP-9 expression
19.	<i>Machilus thunbergii</i> Sieb and Zucc (Lauraceae)	Stem bark	Strong inhibition of MMP-1
20.	<i>Magnolia ovovata</i> Thunb. (Magnoliaceae)		Inhibit the NF- κ B-mediated gene expression
21.	<i>Melothria heterophylla</i> (Lour.) Cogn. (Cucurbitaceae)		Inhibited MMP-1 activity
22.	<i>Panax ginseng</i> L. (Araliaceae)	Roots	Type-I procollagen gene and protein expression, prevent MMP-9 gene induction, and elongated the fibrillin-1 fiber length Increase of expression of procollagen type I and decrease MMP-1
23.	<i>Piper betel</i> L. (Piperaceae)	Leaves	Protect photosensitization-mediated lipid peroxidation (LPO)
24.	<i>Prunus dulcis</i> Mill. (Rosaceae)	Nut	Antioxidant and free radical scavenging potential
25.	<i>Tagetes erecta</i> L. (Asteraceae)	Flowers	Photoprotection
26.	<i>Terminalia chebula</i> Retz. (Combretaceae)	Fruits	Tyrosinase and MMP-2 inhibition Elastase, hyaluronidase, MMP-2 enzyme inhibition

Table -2, Marketed Anti Wrinkle Formulation

Manufacturers(Anti Wrinkle Cream)	Products
Komal Health Care Pvt. Ltd, Thane, Maharashtra	Skin creams, anti wrinkle cream, facial creams, facial scrubs, aloe Vera creams, and aloe Vera anti wrinkle cream, face packs, and herbal face wash.
Ban Labs Ltd.,	Youthful beauty creams, youthful beauty creams and anti aging beauty creams along with bath salts
Vedic Bio Labs, , Bangalore, Karnataka - 560 076, India	Natural beauty creams, skin beauty creams, face beauty creams, youthful beauty creams, youthful beauty creams and anti aging beauty creams along with bath salts, body oils, massage oils, moisturizing gels etc.
Roy & Company, Mumbai, Maharashtra	Anti aging beauty creams along with bath salts, body oils, massage oils, moisturizing gels etc.

Table No-3, Nanotechnology used in Anti ageing formulation

Active ingredients/delivery system	Trade name	Manufacturer	Use
Ascorbyl palmitate, Tocopherol , retinol/ liposomes	Rovisome ACE Plus	Rovi Cosmetics International GmbH	Anti-ageing, wrinkle reduction.
Vitamin E/Nanotopes	Tinoderm E	Ciba Specialty Chemicals	Anti-inflammatory, anti-ageing.
Coenzyme Q10,Niacinamide/Liposomes	Ageless Facelift cream	I-Wen Naturals	Anti-ageing, anti-oxidative, wrinkle reduction.
Micro-encapsulated VitaminC (5%)	Ultimate Anti-Ageing Cream	Provin Cosmeceuticals	Anti-ageing, wrinkle reduction.
CoenzymeQ10,Vitamin E acetate/Nanoemulsion	Nano-Lipobelle H-EQ10 cream	Mibelle Biochemistry,Switzerland	Anti-ageing, anti - inflammatory.
Pro-Retinol A/Nanoparticles	Revitalift	L'Oreal	Anti-wrinkle, anti-ageing.
CoenzymeQ10/Nanostructured lipid carriers	Cutanova Nano Repair Q10 Cream	Dr.Rimpler GmbH	Revitalising , anti-ageing
Black current seed oil/Nanostructured lipid carriers	Nanolipid Restore CLR	CLR Chemisches Laboratorium Dr.Kurt Richter GmbH	Revitalising,anti-ageing
Vitamins A,E,C/Nanoemulsion	Nano-Lipobelle H-AECL	Mibelle Biochemistry, Switzerland.	Anti-wrinkle, antiageing.
VitaminE,Panthenol/Nanocapsules	Lancôme Soleil Soft-Touch Anti-Wrinkle Sun Cream SPF 15	L'Oreal	Revitalising, anti-ageing.
Grape seed extract, Vitamin E,Green tea extract/ Fullerenes	Sircuit Addict Firming Antioxidant Serum	Sircuit Skin Cosmeceuticals Inc.	Revitalising, anti-ageing.

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Fig 4, Anti Wrinkle herbal formulation: by Ban. Labs Ltd.