

PCT Patent Title : **AN IMPROVED PROCESS OF
FLORAL BOTANICAL COLLAGE DECOUPAGE**

FIELD OF INVENTION:

The present invention relates to an **Improved Process for Floral Botanical Collage Decoupage** .

PRIOR ART:

In the earlier art, process for preparing/decorating object with Pressed Dried Flower was already known. The said known process consists of mounting of Pressed Dried Flowers in artistic manner or any other desired manner on any object mostly paper.

The said known process has certain disadvantages which are given below:

1. Color, texture, shape, smooth contour of dried vegetation obtained were of very poor quality.
2. Additionally seeds, weeds, grass, bamboo, tendrils, Sola wood, Natural fibers and other dry botanicals elements which are essential to reduce the cost and induce better design with utility of botanicals of variable source to complete the definition of collage were not used.
3. The obtained product is very poor in hand craft technical aspect and of poor design, and therefore does not appeal to customers.
- 4) Use of Stencils to cut the botanicals was not used ever; hence decoupage of botanicals is a new invention.
4. Floral Botanical decoupage and collage not in existence.
5. Technique of drying and pressing of botanicals not used which can removes the disadvantages towards color retention and texture for longer period for dried botanicals almost 4 times .

According to present invention it has been surprisingly found that use of mixture of desiccants---Silica gel+ Silver sand +Non Iodized salt is a crux of present invention.

Both the Drying technique & Craft technology along with the concept of Floral Botanical Collage Decoupage is a new invention against Pressed Dry Flower craft as known Prior art .

Floral Resin laminate is an invention.

Thus by adopting the process of (Floral resin lamination) in the present invention, we stop the further *Deterioration* by arresting oxidation of color pigments as the dried botanical are permanently embedded in hardener resin, hence no excess of atmospheric air for it.

Where in Dried and Pressed flowers or Botanicals is hand crafted on any surface such as on paper with help of stencil to creates **Floral Decoupage** and without use of stencils but with combination of other botanicals like bamboo, grass, weeds, seeds, stem, tendrils, natural fibre , sola wood to

creates **Floral Collage**. The color, texture and shape of dried botanicals are of superior quality and more stable for a longer period. The Floral handicrafts created by above improved process of Floral Botanical Collage Decoupage is not of poor quality and appeals better to eye. These and other objects have been obtained by process of present invention.

5

SUMMARY OF THE INVENTION:

According to present invention there is provided an Improved process for Floral Botanical Collage Decoupage-(An Improved process of Pressed Dry Flower Craft) which comprises:

- (i) Cutting craft media (Dried Botanicals) by hand with card paper stencils and mounting the same on any surface of product with combination of other botanical elements like bamboo, grass, weeds, seeds, stem, tendrils, natural fibre, sola wood in any desired manner including artistic manner; along with better Drying and Pressing Technology which comprises reducing the oxidation and isomerization of Carotenoid and Anthocyanin and hence reducing color loss while drying and storage of vegetation and also during crafting of the vegetation ;
- (ii) Making stencil of cheapest material such as cardboard hard paper and hand cutting to make cutouts (motif);
- (iii) Shaping the petals in any desired shaped and synchronized pasting the same with known low pH alkaline adhesives; characterized is that Botanicals are dried prior to Floral Collage Decoupage by electric oven or micro oven drying with the use of mixture of desiccants—Silica gel + Silver sand + Non Iodized salts. (1:1:1 ratio)

Method for Drying flowers involves covering botanicals with something that draws moisture out, generally referred to as a *desiccant*. The drying is enhanced to reduce time to about one to two hours instead of 3 days for conventional electric oven and dried in Silica gel desiccant mixture, in micro oven for less than 24 hours and storing the same under in a cold, dry and dark place in a vacuum suctioned container.

The organic manure contains nitrogen, phosphorous and potassium as nutrients to give in built 20% low pH in uniform relative availability to the (Bio-Physiological) system and structured component of the plant for color stability and vegetation in dried botanicals ,which is most important for Floral Collage Decoupage.

The said organic manure is used to reduce 20 % acidity of plant structure & its bio-physiological system and thereby reducing the Senescence process that is aging process to obtain best natural colored texture and hence dried vegetation grown in organic manure are better in texture and color and more stable for longer duration to form dried botanicals as craft ingredients of almost 4 times better.

The above conditions reduces the oxidation and isomerization of Carotenoid and Anthocyanin and other color pigments and hence reduced color loss while drying and storage of vegetation and also during crafting of the vegetation.

During storage exclusive of oxygen, light and humidity is facilitated to stop decomposition of dried botanicals and crafted product. Hence vacuum storage in dark, dry and cool place is most important.

Three different pigments - chlorophyll, flavonoids, and carotenoids -are mixed in different proportions, to give color and shade to flowers. Flavonoids are divided into two groups - pigmented Anthocyanins and colorless Co pigments.

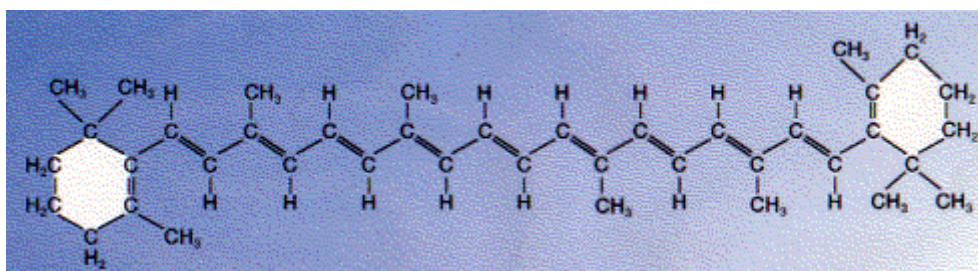
(i) Anthocyanin pigments take their color from the range of red, purple, or blue, depending on their pH. Anthocyanins are partly responsible for the red and purple colors.

(ii) The Carotenoids imparts yellow, purple and orange colors .There are 300 types of Carotenoids of which main one are lycopene ,b-carotene and a- tocopherol.

Among three, chlorophyll has a more stable molecular structure compared to Anthocyanin and Carotenoids. And among two, Caratenoids are still more sensitive in structure stability. Color changes depend upon the interplay of isomerization and oxidation. The main causes of color degradation of dried botanicals during processing are isomerization and oxidation (enzymatic and non enzymatic).This can be influenced by many factors. The presence of humidity accelerates destruction of all type of color pigments present in all vegetation in natural form . Both b-carotene and a-tocopherol are destroyed by **oxidation**. This reaction is accelerated by ultraviolet light and heat to becomes a photochemical process.

The destruction of b-carotene in forages is first an enzymatic process and is due to a lipoxygenase system. Lipoxygenases, a group of isoenzymes, are present at varying levels in a wide number of species of plants. Enzymatic destruction of carotene begins when the forage (vegetation) is chopped or heated while cooking or drying . Increased chopping and grinding also accelerates enzymatic destruction, as does raising ambient temperature and humidity .During drying, the losses of b-carotene and a-tocopherol can equally be due to isomerization and oxidation .

Degradation because of Isomerization of Carotenoids



5

Structure of B-Carotene

As a consequence, the two isomers *Cis* & *Trans* demonstrate substantial variations of their thermodynamic and kinetic constants and also color properties. A possible explanation for these characteristics is presented, making use of molecular modeling and taking into account the three-dimensional structures of the pigments. The figure above shows the structure of beta-carotene, one of the most abundant Carotenoids. The system of alternating single and double bonds that is in this molecule runs along the hydrocarbon chain that connects the two Benzene rings. The electrons of the double bonds actually migrate through the chain and also make this molecule an efficient absorber of light. The long system of alternating double and single bonds constitutes a conjugated system in which the π electrons are effectively delocalized over the entire length of the polyene chain. This feature is responsible for the molecular shape, chemical reactivity and light absorbing properties, and hence color of carotenoids (Britton, 1995). At least seven conjugated double bonds are needed for the carotenoid to impart color. Each double bond in the polyene chain of a Carotenoid can exist in two configurations, *Trans* or *Cis* geometrical isomers. Most Carotenoids occur in nature predominantly or entirely in the all *Trans* form (stable). The polyene chain is the cause of instability of Carotenoids including their susceptibility to oxidation and geometric isomerization.

Heat, light and acids promote isomerization of *trans*-carotenoids to the *cis*-form Beta-carotene. The conjugated system in which the π electrons are delocalized over the entire length of the polyene chain is responsible for the molecular shape, chemical and physical reactivity and the antioxidant properties of Carotenoids. It is sensitive to heat, light, alkaline pH value, oxygen. And duration of drying process, isomerization converts all-*trans* isomers to *cis*-isomers due to additional energy input and results in an unstable, energy-rich station. Heat induces isomerization of the all-*trans* to *cis* forms. The *cis*-isomers increase with temperature and processing time. A significant increase in the *cis*-isomers with a simultaneous decrease in the all-*trans* isomers can be observed in dehydrating botanicals samples using the different dehydration methods. Subsequent isomerization of Carotenoids leads to significant increase in the *cis*-isomers with a simultaneous

decrease in the all-*trans* isomers and hence into structural fragmentation results in a series of low molecular weight compounds which leads to discoloration of dried botanicals. During drying, the losses of β -carotene and α -tocopherol can equally be due to isomerization. Due to the structural configuration of these products, the removal of moisture must be accomplished in a manner that will be least deteriorating to the product's color quality.

In general, dehydrated Botanicals have poor lycopene stability also and hence they have to be carefully processed and promptly placed in a thermetically sealed containers and in inert & vacuum atmosphere for storage. Isomerization leads to decolorisation or fading of colors in decayed and dried botanicals. Oxidation of Carotenoids leads to degradation of colors.

The Second major cause of loss of Carotenoid is enzymatic and non enzymatic oxidation, which is dependent on availability of oxygen and structure of Carotenoids. This is the reason for decolorisation or decomposition which gives brown color to decomposed dried botanicals. Loss of color or browning (decomposition) in dried vegetation is result of structural fragmentation of Carotenoids. Subsequent fragmentation results in a series of unstable low molecular weight compounds which leads to color decay as at least seven conjugated double bonds are needed for the Carotenoids in its structure to impart color.

Chemical oxidation of Caratinoid is non enzymatic Oxidation, causing oxidative rancidity, loss of color leading to *Maillard reaction*, causing decolorization and change in texture. Here Reaction between carbony and amino groups leads to formation of intermediates known as Phenolic compounds or Melanoidins which leads to browning of color pigments which is non enzymatic. Hence dried botanicals darkens on exposure to air as a result of conversion of phenolic compounds to brown melanoidins with foul smell. It is generally accepted that the initial stage of oxidation involves epoxidation and formation of apocarotenals. Oxidation of Carotenoids leads to formation of epoxy carotenoids, apocarotenoids and hydroxy carotenoids which are Glycosylamines and Amadori products which are unstable low molecular structure leading to structural fragmentation. Glycosylamines and Amadori products are unstable intermediates formed during the course of the Maillard reaction.

□ The concentration of the intermediates depends upon the reaction conditions (pH, temperature and time). Low pH, low temp and lesser time is favorable, as it leads to lesser quantity of these intermediates.

□ In the pH range 4-7, Amadori products undergo further degradation to give 1- and 3-deoxydicarbonyl compounds. The % open chain form and rate of mutarotation increases with Temperature and pH. Acidic or high pH influences the ratio of intermediate unstable products formation.

- The rate of brown color (decay) formation can be reduced by decreasing the pH .

Enzyme oxidation of Carotenoid is because of Polyphenoloxidase, causing enzymic browning. Enzyme *Lipoxygenase* causes oxidative rancidity. Enzyme *Lipase* causes lipolytic rancidity. Enzyme *Protease* causes gelation, flavor, foul smell and brown color texture change. This is enhanced by presence of atmospheric humidity / oxygen, high pH value or acidic conditions and variation in temperature. Both the process leads to browning of dried vegetation and rancid foul smell from it, if proper storage is not implemented. Hence low temperature, low PH, dark and vacuum storage condition is very important for keeping dried botanical and finished crafted elements for prolonged storage.

There is two type of color degradation firstly fading of colors because of isomerisation and secondly oxidation both enzymatic and non enzymatic leading to browning of color & texture along with decay and foul smell in dried vegetation.

Hence technical improvement in the present technology with reasons for Drying and Pressing of dried botanicals are as followings :

1. Salt treatment reduces the humidity of vegetation by absorption (in desiccant mix with silica gel); reduce carotenoid degradation, because it facilitates fast drying in lesser time at low temperature of 45 to 47 degree.
2. Minimum oxygen exposure to avoid oxidation of Carotenoid is important , hence vacuum storage, in cool temperature and non humid condition is most important for Raw material preservation.
3. Low temperature and quick drying between 45 to 47 degree is best for color retention .
4. Low pH for glue, blotting paper for drying and storage condition is most important .
5. Dark condition while drying and storage is most important as photochemical process in presence of light and oxygen leads to degradation in structure of Carotenoids and hence loss of color. All the color pigment of Carotenoid and Anthocyanin has Light absorbing property as it plays an active role in Photosynthesis along with chlorophyll in presence of sunlight.
- 6) Organically grown vegetation which has 20% less acidity in its Bio-Physiological system and structure of the plant.

This is the second portion of the claim towards the technological crafting methodology of Floral Botanical Collage Decoupage with improved craft ingredients of colorful and good textured dried botanicals obtained by present dried and pressed process.

Decoupage is the technique of decorating a surface with pasting of cut outs .Collage is an artistic composition of variable materials and objects pasted over a surface, often with unedifying

lines and color of different botanical origins. We can have only floral decoupage or only floral collage or as third option a combination of both in design processing as application of the innovative craft in the technical nomenclature Floral Botanical Collage Decoupage .

Floral Decoupage is the art of cutting(with stencils) a craft media(dry botanicals) and mounting it on any surface or product as object and when with a combination of other special botanical elements like bamboo, grass, weeds, seeds, stem, tendrils, fiber, solawood. Etc it formulates into Floral Collage.

For the very first time we are coming up with Floral Botanical Collage Decoupage .Here we are cutting (as cutouts)Dried Pressed floral petals, leaves, sola wood, leaf skeleton, Natural fibers and mounting them in an artistic combinations and along with bamboo, grass, weeds, tendrils , seeds , stem and other botanicals in dried form as special effect to make a collage and both in combination forms : Floral Botanical Collage Decoupage.

FLORAL BOTANICAL DECOUPAGE: The main technique in craft of floral decoupage is nothing more than stencil cutting and pasting of dried botanicals in an artistic manner. We use stencil to make repeated similar cut-outs of dried botanicals specially petals, leaves. Natural fibres, Sola wood, Leaf skeleton,etc. The cheapest material is card board hard paper , but if you're going to use the stencil several times, make sure original drawing is duplicated as multiple stencil, as after a few uses, it will probably become damaged and no longer capable of reproducing exactly the same design.

Below is the process to make the stencil :

- Draw or trace a design on your sheet (cardboard hard paper).
- Then, cut out the inside carefully with a new craft scissor, or blade.
- Tools needed to create the shapes used in decoupage projects include a pair of sharp, pointed scissors. Often the curved tips of nail scissors, along with their sharpness, are selected for intricate work.
- Good light and good vision are also needed to precisely cut the shapes without distortion or loss of shape and details.
- Cut out motifs & Shape the Petals in the form of drop, heart, spindle, oval, circular or any other desirable shape as accurately as possible for decoupage. When doing the actual cutting of dried botanicals (flowers & leaves) the scissors should be tilted somewhat towards the right to obtain a slightly better edge. Scissors, razor blades or stencil knives, all sharp cutting tools, should be held at a slanted angle as you cut.
- Pasting is important because the even application of an adhesive will insure the item will lie flat, without bubbles or puckers. Ideally, the cut-out would be placed reversed on a sheet of clean paper or plastic and the adhesive lightly applied with needle over the entire

reversed surface. Every point, tip and edge should be covered so that it will lie down perfectly. Play with the positions of the images so you get a desired look at the end when the entire pasting is done.

- Tool for pasting and placement of botanicals on the surface is by six inch long needles holding it like pen in the right hand. Paste the glued cut out botanicals on the surface to recreate the desired floral patterns. Trim & cut all individual cut petals before attaching them as a flower ...one petal at a time.

Cut dry flower petals each individually and paste petals joined from the centre into desired patterns of flowers: To make phenomenon of Botanical Decoupage. Bamboo, Twigs, leaves and other natural items are often important additions to the equation, too: To make phenomenon of Botanical Collage. It is very important to use neutral pH resin glue for pasting of flowers to avoid decolouration of dried botanicals at any stage of crafting.

FLORAL BOTANICAL COLLAGE:

Same technique of pasting is used in this case but cutting of petals or flowers are not required and they are used as in its original shape and size. (Stencils are not required). Then they are technically a floral collage . Just slight trimming or adjustments are required not reshaping . In addition seeds, weeds, grass, bamboo, tendrils, and other dry botanicals elements are used A botanical collage, is defined where many different botanicals as ingredients may be combined to create a textural and visually interesting arrangement on a surface or object. As there is versatility in the species of flowers regarding to shapes and colors , they not only look original but beautiful and graceful too.

By using process to present invention :

FLORAL LAMINATES may be made on surface of glass, fiber glass, acrylic, wood, ceramics, and veneers, etc .

1. Work On flat surfaces (180*) Surface should be smooth, dry, clean and oil free.
2. Paste the dry flowers and other botanicals as directed in patterns or designs. On the surface Pasting should be very firm or else in resin it will tear off or get displaced to spoil the design in permanency.
3. Avoid making floral laminates in Rainy seasons, as results are not good.
4. Design the dry flowers by pasting them on surface with good finish.

5. With hair dryer, blow the surface of the laminate after flower pasting, in order to dry the surface, remove any unwanted particles, repaste the flowers and other elements in case any of them is not properly glued.(Repair)
6. Keep the floral laminates for one hour in direct sunlight, in order to remove last trace of moisture in flower, glue or of laminates itself.
7. Place the laminate floral with the stretched thick cellophane on top of it, about 4 inch oversized to the laminate to facilitate it procedure .Keep weight at four corners of the Cellophane so that the laminate is safe and dry up. Remove the cellophane and proceed.
8. Mix 2g of hardener MEK (peroxide hardener) into the 200g pre-mixed resin (epoxy resin), mix thoroughly. Blow away any bubbles that may have formed on the mixture. The bubbles should be removed or they will produce holes on the laminate . Resin is a clear polyester medium that mixes with hardner together as a liquid and dries hard and clear.

The resin used is pre accelerated polyester resin dissolved in styrene monomer. The polymerization is completed with the addition of hardener to the resin, either acetyl acetone peroxide or methyl ethyl. The amount of hardener needed is 1% to Resin.

For floral laminates only one percent is add to preserve the color of the flowers as ,if more than one percent is added, it generates heat during the lamination process while reacting with resin chemically , leading to fading of floral colors.(due to heat generation ,isomerization of color pigments leads to discoloration of flowers).It will take few 3-4 extra hours in drying but with better results.

9. Pour the resin mixture in the center of the floral panel. Cover with cellophane .
10. Use squeegee with hand pressure and fast to spread the resin evenly and make sure no bubbles are present. Spreading should be from the center going out. Any air bubbles need to be removed before the coat dries up .Even pressure should be used to spread the resin and to compress .Allow to cure in 15-30 minutes.
11. Put equal weight on the corners of the laminate to ensure that the cellophane does not lift during the resin curing process. Leave overnight until the resin sets completely. Usually, resin will set dry and cellophane, will easily peel off, after the laminate dries up, Trim the corner lines in case the resin has over flown the laminates to give good finish.
12. Once the resin dries, you will have a clear view of the dry flower, and the flower will not be able to decay, as it has no access to oxygen.
13. Work in a well-ventilated area. Wear a protective mask to prevent the inhalation of excess fumes from the epoxy resin. Put on rubber gloves to protect your skin from coming in

contact with the resin. Open all the windows in the room and turn on a fan on - to exhaust air from the room. If you have a breathing mask, put it on. Resin is toxic, so the less you breathe in, the better .

Preservation of Dried Flowers as floral laminates With Clear Resin .

The problem with saving dried flowers is that as the flower dries out; it becomes increasingly fragile and delicate, which makes handling or touching the flowers nearly impossible. This also means that displayed flowers become dusty over time, and they cannot be cleaned without destroying them. One solution is the floral laminates in polyresin. Flowers are one of life's greatest pleasures. Unfortunately, their lives are fleeting after they are cut. Through drying, it is possible to hold on to cut flowers for years. Dried flowers are quite long lasting, but like their fresh counterparts, they, too, are vulnerable to the passage of time. Their colors fade, and their leaves and petals crumble. By treating or embedding dried flowers(as laminates) in resin, however, it is possible to protect and preserve them even longer, and floral Laminates can be done on any surface of wood, veneer, fiber glass, acrylic, ceramics , bamboo, textiles or any natural surface.

RESIN FLORAL LAMINATES : We Mix 2g of hardener MEK (peroxide hardener) into the 200g pre-mixed resin (epoxy resin). Usually in common method about 2% or little more of hardener is added to the resin mix. But it leads to good amount of heat generation in the chemical processing of it, which leads to decay of color.

We reduce the amount of hardener by 1%, allowing it to take comparatively extra few couple of hours to harden the transparent resin, but facilitating very less heat generation in the process to avoid isomerization of color pigments. Secondly the oxidation process is arrested in permanency because the flowers are forever embedded under the dried resin hence no more access to oxygen. Thus by resin lamination we reduce both isomerization and oxidation of color pigments and hence better color retention of dried botanicals in resin laminated floral sheets.

WHAT CLAIMED IS:

1. An improved process for **Floral Botanical Collage Decoupage** using organic manure
5 which comprises:

(i) Cutting craft media (dry botanicals with stencils) and mounting the same on any surface of product with combination of other botanical elements like bamboo, grass, weeds, seeds, stem, tendrils, fibre, sola wood in desired artistic manner by reducing the oxidation and isomerization of Carotenoid and Anthocyanin thereby reducing color loss while drying, storage of
10 vegetation and crafting of the vegetation ;

(ii) Making stencils of material like cardboard, paper and/or cutting out motifs;

(iii) Shaping the petals in desired shape by pasting the same with adhesives, and using mixture of desiccant mix with—Silica gel + Silver sand + Non Iodized salt(1:1:1 ratio) wherein the botanicals are dried prior to floral collage decoupage by drying; and

15 iv) obtaining **Floral Decoupage** or only **Floral Collage** or a combination of both in design processing as application of the craft.

2. Process as claimed in claim 1, wherein drying is effected in Silica gel mixture, in Micro Oven for less than 24 hours and storing the same under vacuum.

20 3. Process as claimed in claim 1 or claim 2, where in organic manure includes nitrogen, phosphorous and potassium as nutrient to give in built 20% low pH in uniform relative availability to the structured component of the plant for color stability and vegetation.

4. Process as claimed in claim 3, where in said organic manure reduces 20 % acidity of plant structure and thereby reducing the senescence process that is aging process to obtain best natural
25 color texture and hence dried vegetation grown in organic manure are better in texture and color and more stable in longer duration of time almost 4 times more.

5. Process as claimed in claim 4 where in the organic manure reduces the oxidation and Isomerization of Carotenoid and Anthocyanin and hence reduced color loss while drying and vacuum storage of vegetation and also during crafting of the vegetation.

30 6. Process as claimed in claim 5 wherein the storage in absence of oxygen, light and humidity stops decomposition of product.

7. Process as claimed in claim 1 wherein in order to reduce heat and isomerization of color pigments and oxidation by permanent embedment of flowers in the harden resins the use percentage of peroxide hardener is reduced to 1% during floral resin lamination.