# PROCESS FOR THE PRODUCTION OF GRANULES

The present invention relates to a process for the production of granules which can find application particularly for fragrance, cosmetic, foodstuff or dietetic usages.

In this field, there is already known from WO 97/04861, a process for the production of solid granules including aromatic, food, dietetic or cosmetic substances.

This prior process consists: in forming a core serving as a support, constituted by excipients associated or not with active substances, covering the core in three steps with at least one layer, these three steps being carried out for each successive layer by:

- cladding the core with active substances associated or not with excipients,
- drying the layer,
- screening the covered core.

The granules obtained by this type of process are particularly advantageous and can constitute granules to be chewed, sucked, swallowed or dissolved and can contain vegetable extracts and essential oils (or the like).

Although giving good results, the process according to WO 97/04861 can be improved, because it lacks productivity.

The principal problem posed by this prior reference is the time of production of the granules, which is much too long.

Thus, the time of screening and drying are long. The saving of time takes place by decreasing the number of screenings, in the absence of turbine - drying screen transfers and in dynamic drying of the granules much more rapidly.

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Moreover, the step of drying requires a transfer of the granules into an oven which corresponds to a supplemental step which adds transfer time to the overall time of production.

The present invention permits overcoming the drawbacks of the present techniques and provides to this end an improved process.

In the first place, this process permits considerably shortening the time of production of the granules.

To do this, the invention has the advantage of omitting the step of transferring to an oven to carry out drying, as well as most of the screenings.

To this end, the drying takes place in the same medium as the cladding of the core, in a turbine.

Moreover, the process here proposed has the advantage of using different successive steps for drying and which permits optimizing it.

In particular, complete drying begins when the cladding of the core has been carried out and this at a moderate temperature.

Once this fundamental drying has been carried out, a stronger drying is carried out and then a drop in temperature for a third drying, beneath a heated flow at moderate temperature.

The use of such drying steps has the advantage of producing a progressive temperature increase of the granules, which permits avoiding any thermal shock and thus substantially improving the quality of production.

Another advantage of the invention is that the drying is carried out in a turbine, which prolongs the cycle of rotating the granules.

In this way, there is realized an even better sphericity and granulometric homogeneity of the granules obtained, and the number of screenings required is reduced.

Other objects and advantages will become apparent from the description which follows.

The present invention relates to a process for the production of granules, particularly for aromatic, cosmetics, foodstuff or dietetic use, consisting in cladding in a turbine a core of at least one cladding layer constituted by at least one solution, then drying the covered core, after each new cladding, characterized by the fact that the drying takes place in the turbine in operation and comprises the following phases:

- gentle drying by projection of a warm gas flow corresponding to a temperature between 25°C and 35°C;
- strong drying by projection of a hot gas flow corresponding to a temperature between 40°C and 50°C;
- terminal drying by projection of a warm gas flow corresponding to a temperature between 25°C and 35°C.

This process will comprise, according to preferred modifications of the invention, the following steps:

- it comprises, after drying, a cooling phase to ambient temperature;
- the gaseous flow is a flow of purified and filtered air;
- there is used to constitute each cladding layer:
    - a binding solution,
    - a micronized powder;

for each cladding layer, the binding solution is sprayed on the core and there is carried out a pause permitting impregnation of the core, before depositing the micronized powder;

there is carried out a screening of the granules only at the end of the operation;

- the core and/or the cladding layers comprise at least one active substance.

The type of granules obtained by the process according to the invention is not limited and reference can be had to patent application WO 97/04861 as to several examples of embodiment and of particular composition.

Generally speaking, the process consists, starting from a basic core, in providing different superposed cladding layers.

At least one layer is required, but several layers are generally provided.

As already exists in the prior art, the cladding according to the invention uses at least one solution.

Once the core is impregnated by the solution, the deposited layer of solution can be dried in a drying step.

After drying, there can be carried out if necessary a fresh cladding by a new deposit of the solution on the periphery of the core.

According to the invention, the drying that is used is carried out in a turbine which is the same as the turbine that served to clad the core.

Moreover, the turbine is held in rotation so as to continue the movement of the granules, which optimizes greatly the circulation of the gaseous flow serving for drying.

As to this, the drying that is used comprises several varying steps, particularly according to the temperature of the gas flow which is projected on the granules.

In a first instance, a gentle drying is carried out by projection of a warm gas flow.

There is meant by the term "warm", a temperature comprised between 25°C and 35°C.

This gentle drying step permits drying throughout the core of the granule thus coated and ensures progressive increase of the temperature of the granule.

In a second step, a stronger drying is carried out by projection of a hot gas flow.

The term "hot" means a temperature of the gaseous flow comprised between 40°C and 50°C.

This step at higher temperature increases the rapidity of the drying of the granule.

In particular, the layer of deposited solution will be more rapidly fixed in this step.

In a third step, a terminal drying is carried out by projecting again a warm gas flow, which is to say of a temperature comprised between 25°C and 35°C.

For reasons of simplicity, there can be used a flow at the same temperature as that used for the preliminary gentle drying.

The terminal drying permits progressively lowering the temperature of the granules preferably before a cooling step to ambient temperature.

This cooling step can be carried out under a flow of air at ambient temperature, which is to say substantially about 20°C.

Preferably, the gaseous flows projected on the granules are air flows.

When cooling has been achieved, the steps of cladding and drying can be repeated as often as necessary.

The screening of the granules is no longer necessary after each cladding. Only several screenings, or even a

single screening at the end of the operation, is carried out.

Preferably, the cladding layer used in the present production process is composed of two components in different phases.

Thus, in addition to the solution that is employed which, according to this modification, will be a solution with binding properties, there is used a micronized powder.

The micronized powder has a supplemental function which is to give quickly a large volume to the granules.

The micronized powder coacts with the binding solution by being fixed on this latter.

Thus, in each cladding layer, the binding solution can be sprayed on the core, then after a possible pause, carry out the deposit of the micronized powder.

By way of example, the process of production in this case can be practiced by using a core based on maltitol or else a mixture of sodium bicarbonate and citrate. It could also be a matter of pollen grains.

Again by way of example, the binding solution according to the invention could comprise essential oils, emulgin as well as Luviskol (trademark of BASF). Citric acid could also be present.

As to the micronized powder, it could also be maltitol.

Generally speaking, but according to the uses, the core and/or the layers of cladding (at the level of the micronized powder or the binding solution) will comprise one or several active substances.

They could be fluid extracts or essential oils, for example.

As to the time of drying, the following sample shows the rapidity of the cycle, for production of 5 kg of granules in a test turbine:

- gentle drying: 1 minute at 30°C
- strong drying: 2 minutes at 45°C
- terminal drying: 1 minute at 30°C.

Then, a cooling to ambient temperature of 5 minutes was carried out.

The deposition of the cladding layer by impregnation itself took a time of 5 minutes, after drying.

In total, the cladding with one layer took 15 minutes instead of about 2 hours 30 minutes according to the prior art.

## CLAIMS

1. Process for the production of granules particularly for fragrance, cosmetic, foodstuff or dietetic use, consisting in cladding in a turbine a core with at least one cladding layer constituted at least by a solution, then drying the covered core, after each new cladding, characterized by the fact

that the drying takes place in the turbine in operation and comprises the following phases:

- gentle drying by projection of a warm gas flow corresponding to a temperature between 25°C and 35°C;
- strong drying by projection of a hot gas flow corresponding to a temperature between 40°C and 50°C;
- terminal drying by projection of a warm gas flow corresponding to a temperature between 25°C and 35°C.

2. Process for the production of granules according to claim 1 characterized by the fact

that it comprises, after drying, a phase of cooling to ambient temperature.

3. Process for the production of granules according to anyone of claims 1 or 2 characterized by the fact

that the gas flow is a flow of purified and filtered air.

4. Process for the production of granules according to any one of claims 1 to 3, characterized by the fact

that there is used to constitute each cladding layer:

- a binding solution;
- a micronized powder.

5. Process for the production of granules according to claim 4, characterized by the fact

that for each cladding layer, the binding solution is sprayed on the core and there is carried out a pause permitting the impregnation of the core, before the deposit of micronized powder.

6. Process for the production of granules according to any one of claims 1 to 5, characterized by the fact

that the core and/or the cladding layers comprise at least one active substance.