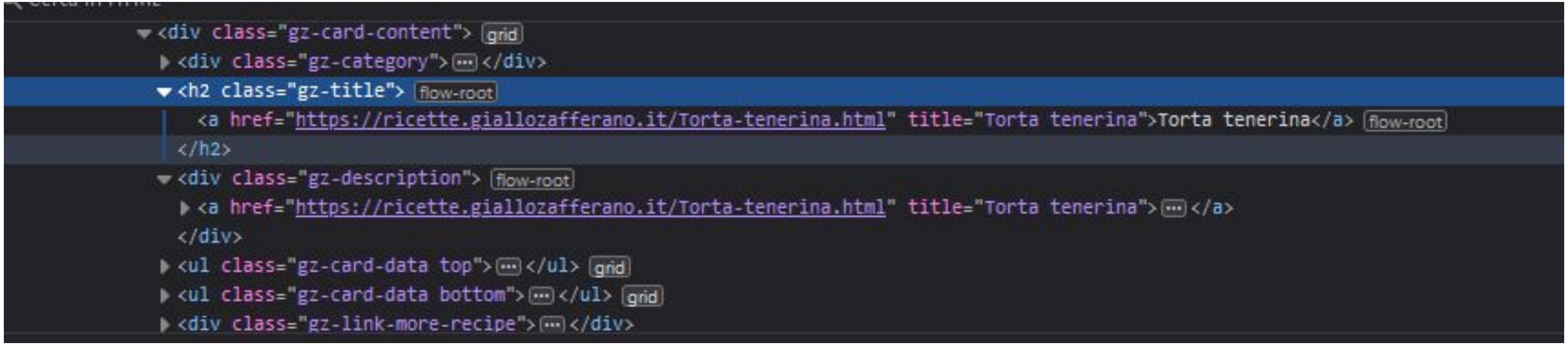
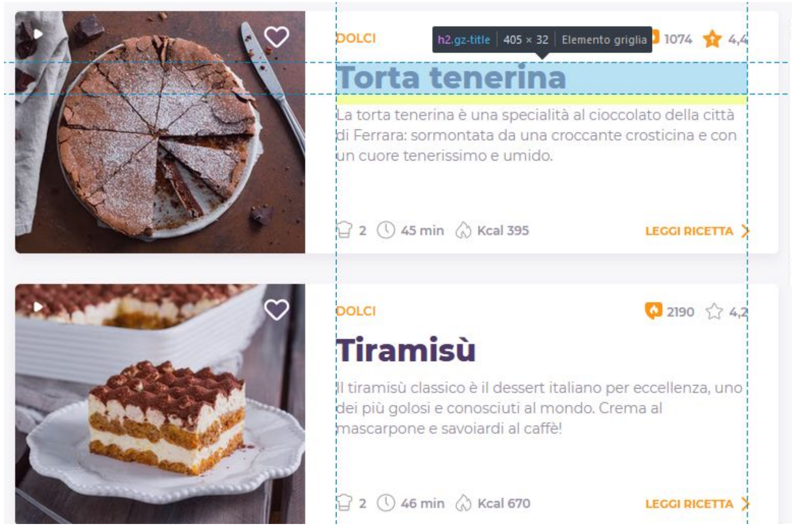
To my dearest food

Giallo Zafferano



```
▾ <div class="gz-card-content"> grid
  ▸ <div class="gz-category"> ··· </div>
  ▾ <h2 class="gz-title"> flow-root
      <a href="https://ricette.giallozafferano.it/Torta-tenerina.html" title="Torta tenerina">Torta tenerina</a> flow-root
    </h2>
  ▾ <div class="gz-description"> flow-root
    ▸ <a href="https://ricette.giallozafferano.it/Torta-tenerina.html" title="Torta tenerina"> ··· </a>
    </div>
  ▸ <ul class="gz-card-data top"> ··· </ul> grid
  ▸ <ul class="gz-card-data bottom"> ··· </ul> grid
  ▸ <div class="gz-link-more-recipe"> ··· </div>
```



DOLCI 1074 ★ 4,4

Torta tenerina

La torta tenerina è una specialità al cioccolato della città di Ferrara: sormontata da una croccante crosticina e con un cuore tenerissimo e umido.

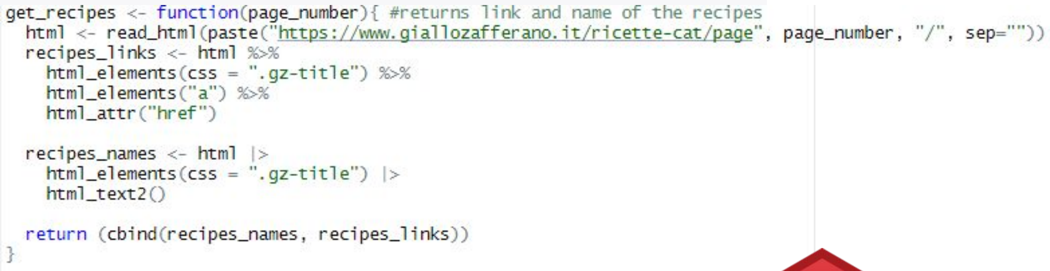
2 45 min Kcal 395 LEGGI RICETTA

DOLCI 2190 ☆ 4,2

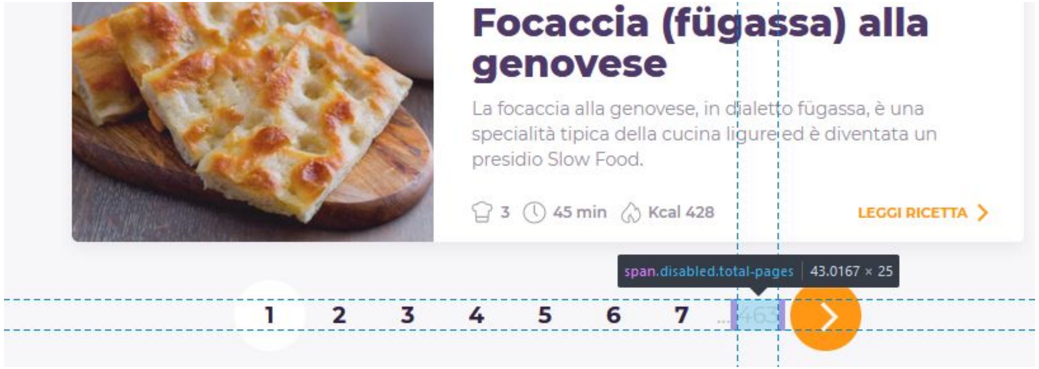
Tiramisù

Il tiramisù classico è il dessert italiano per eccellenza, uno dei più golosi e conosciuti al mondo. Crema al mascarpone e savoiardi al caffè!

2 46 min Kcal 670 LEGGI RICETTA

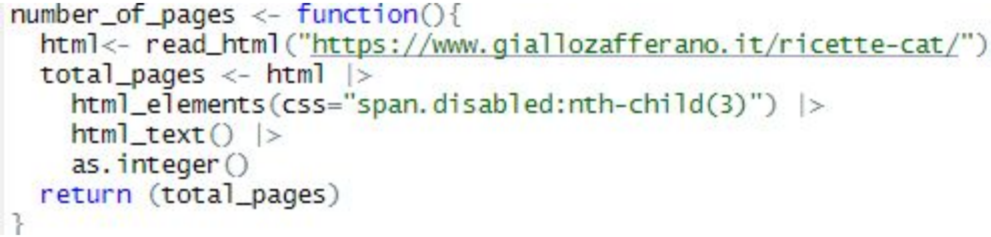


```r
get_recipes <- function(page_number){ #returns link and name of the recipes
  html <- read_html(paste("https://www.giallozafferano.it/ricette-cat/page", page_number, "/", sep=""))
  recipes_links <- html %>%
    html_elements(css = ".gz-title") %>%
    html_elements("a") %>%
    html_attr("href")

  recipes_names <- html |>
    html_elements(css = ".gz-title") |>
    html_text2()

  return (cbind(recipes_names, recipes_links))
}
```

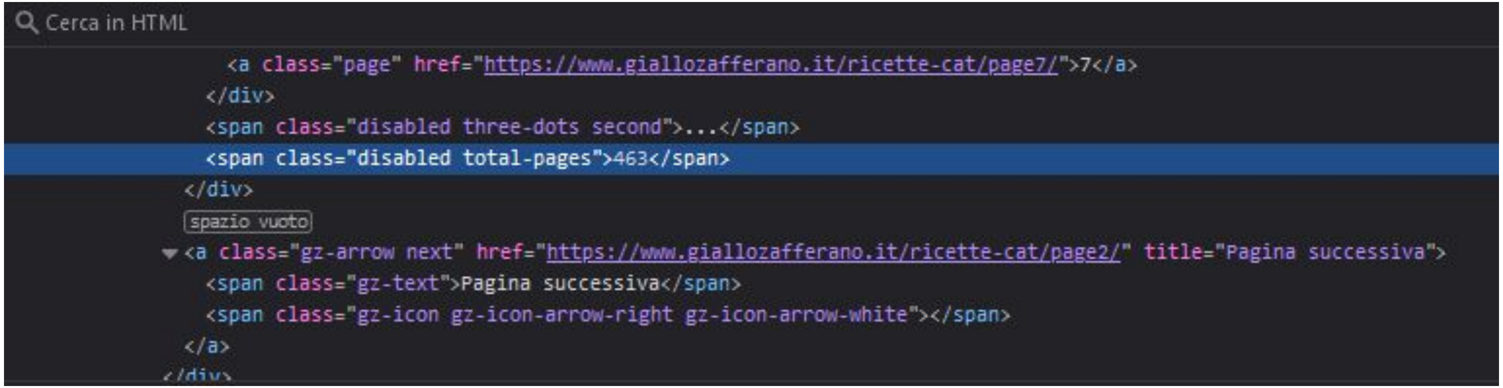


Focaccia (fügassa) alla genovese

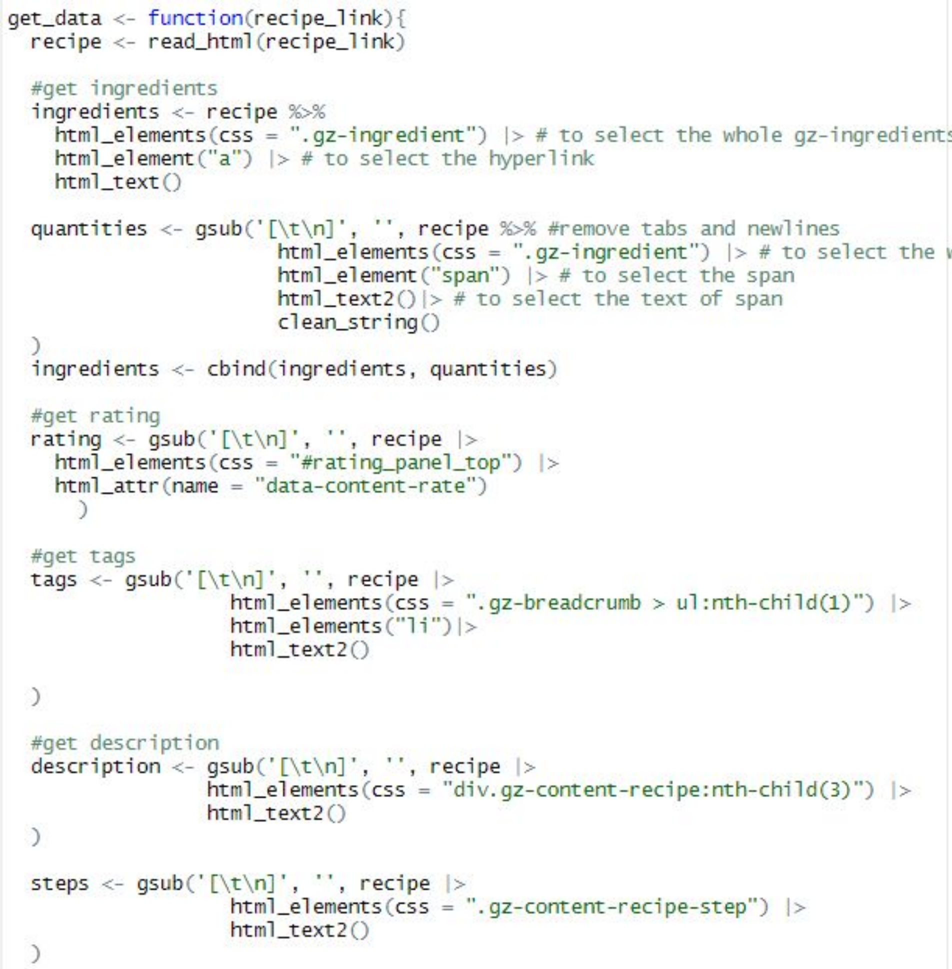
La focaccia alla genovese, in dialetto fügassa, è una specialità tipica della cucina ligure ed è diventata un presidio Slow Food.



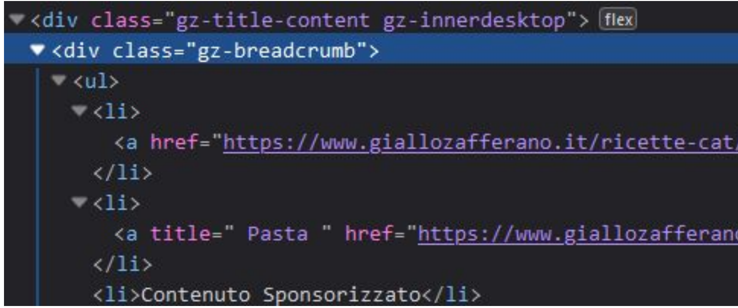
```
number_of_pages <- function(){
  html<- read_html("https://www.giallozafferano.it/ricette-cat/")
  total_pages <- html |>
    html_elements(css="span.disabled:nth-child(3)") |>
    html_text() |>
    as.integer()
  return (total_pages)
}
```



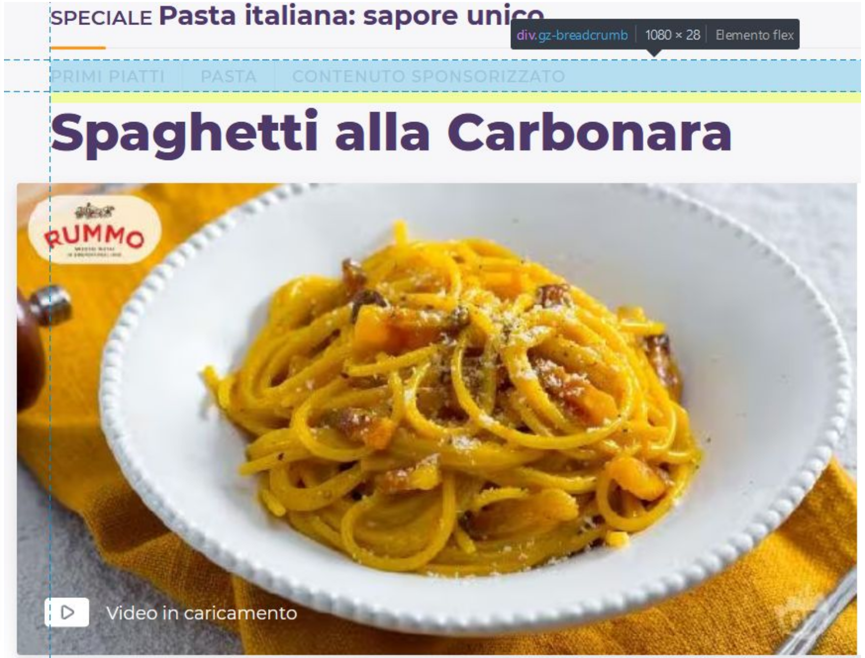
```
          <a class="page" href="https://www.giallozafferano.it/ricette-cat/page7/">7</a>
        </div>
        <span class="disabled three-dots second">...</span>
        <span class="disabled total-pages">463</span>
      </div>
      spazio vuoto
    ▾ <a class="gz-arrow next" href="https://www.giallozafferano.it/ricette-cat/page2/" title="Pagina successiva">
        <span class="gz-text">Pagina successiva</span>
        <span class="gz-icon gz-icon-arrow-right gz-icon-arrow-white"></span>
      </a>
    </div>
```

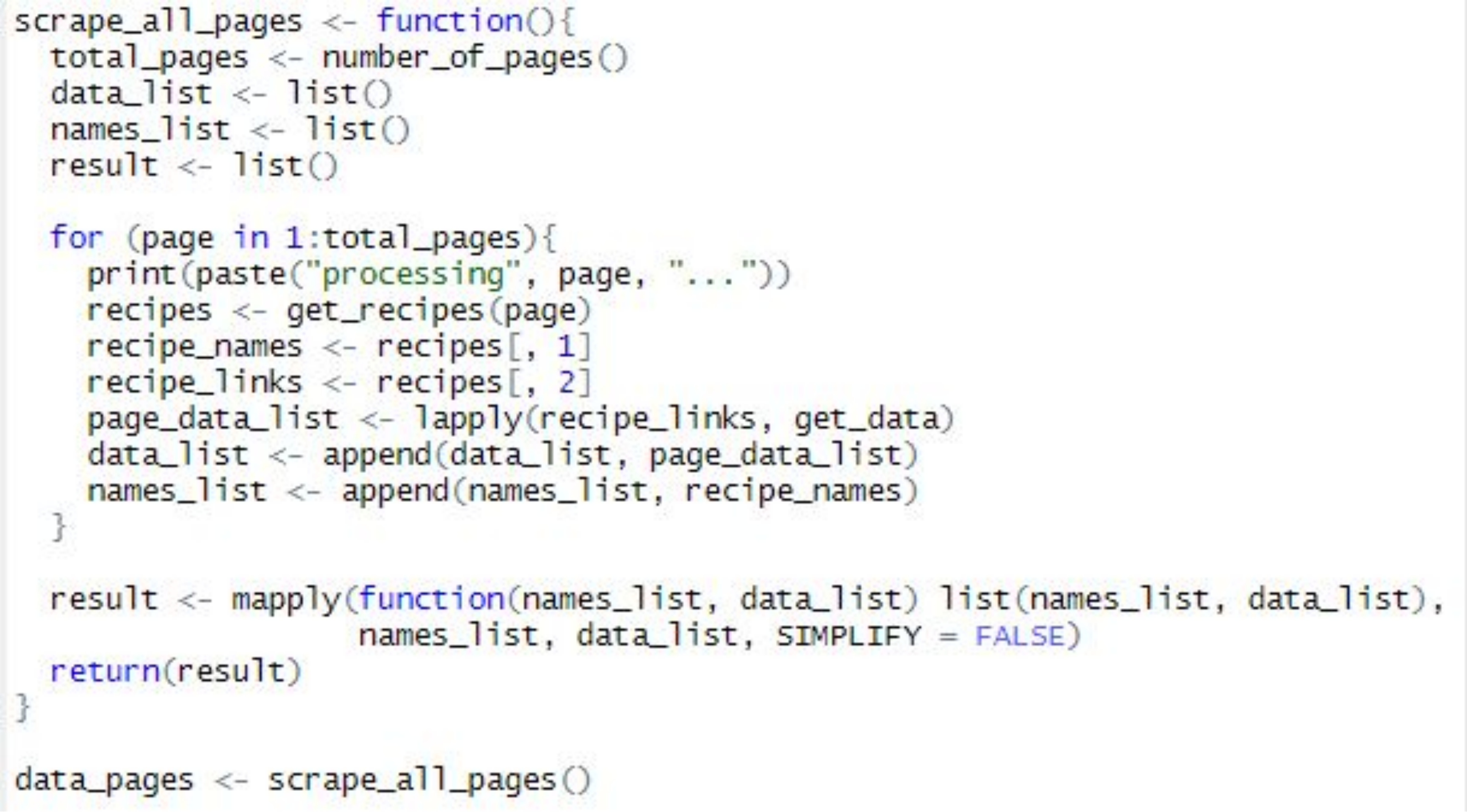


```
get_data <- function(recipe_link){
  recipe <- read_html(recipe_link)

  #get ingredients
  ingredients <- recipe %>%
    html_elements(css = ".gz-ingredient") |> # to select the whole gz-ingredients css class
    html_element("a") |> # to select the hyperlink
    html_text()

  quantities <- gsub('[\t\n]', '', recipe %>% #remove tabs and newlines
                       html_elements(css = ".gz-ingredient") |> # to select the whole gz-ingredients css class
                       html_element("span") |> # to select the span
                       html_text2()|> # to select the text of span
                       clean_string()
  )
  ingredients <- cbind(ingredients, quantities)

  #get rating
  rating <- gsub('[\t\n]', '', recipe |>
    html_elements(css = "#rating_panel_top") |>
    html_attr(name = "data-content-rate")
      )

  #get tags
  tags <- gsub('[\t\n]', '', recipe |>
                   html_elements(css = ".gz-breadcrumb > ul:nth-child(1)") |>
                   html_elements("li")|>
                   html_text2()

  )

  #get description
  description <- gsub('[\t\n]', '', recipe |>
                 html_elements(css = "div.gz-content-recipe:nth-child(3)") |>
                 html_text2()
  )

  steps <- gsub('[\t\n]', '', recipe |>
                   html_elements(css = ".gz-content-recipe-step") |>
                   html_text2()
  )
```



```
▼<div class="gz-title-content gz-innerdesktop"> flex
 ▼<div class="gz-breadcrumb">
  ▼<ul>
   ▼<li>
     <a href="https://www.giallozafferano.it/ricette-cat
    </li>
   ▼<li>
     <a title=" Pasta " href="https://www.giallozafferan
    </li>
    <li>Contenuto Sponsorizzato</li>
```





```r
scrape_all_pages <- function(){
  total_pages <- number_of_pages()
  data_list <- list()
  names_list <- list()
  result <- list()

  for (page in 1:total_pages){
    print(paste("processing", page, "..."))
    recipes <- get_recipes(page)
    recipe_names <- recipes[, 1]
    recipe_links <- recipes[, 2]
    page_data_list <- lapply(recipe_links, get_data)
    data_list <- append(data_list, page_data_list)
    names_list <- append(names_list, recipe_names)
  }

  result <- mapply(function(names_list, data_list) list(names_list, data_list),
                   names_list, data_list, SIMPLIFY = FALSE)
  return(result)
}

data_pages <- scrape_all_pages()
```

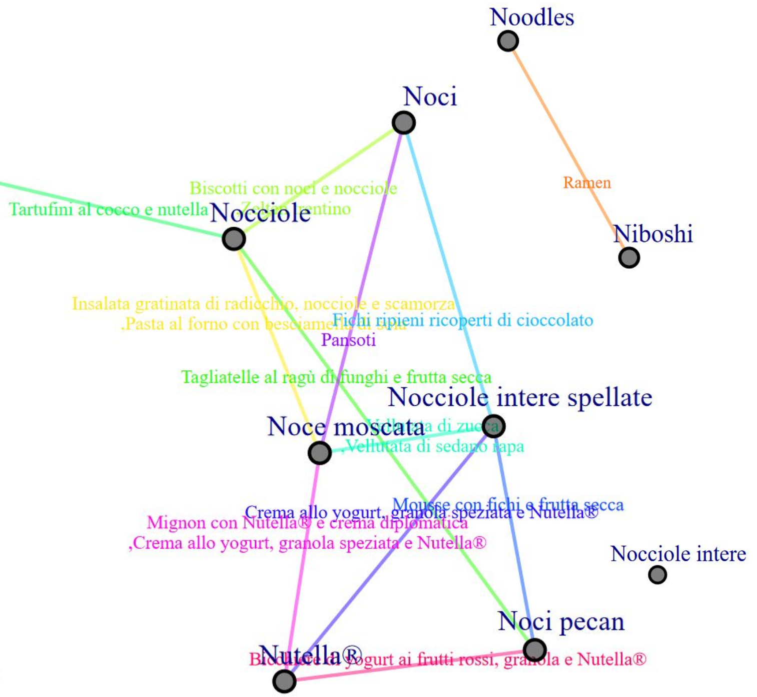
- ➔ Recipe name
- ➔ Ingredients
- ➔ Ingredients quantity
- ➔ Rating
- ➔ Description
- ➔ Cooking time
- ➔ Preparation time
- ➔ Cost
- ➔ Steps
- ➔ Conservation
- ➔ Difficulty
- ➔ Notes
- ➔ Link to image
- ➔ Quantity
- ➔ Tags

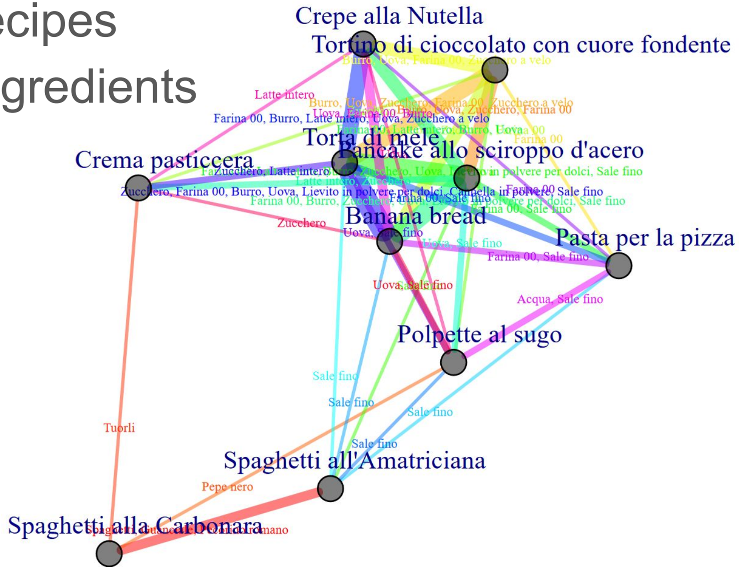
6938 Recipes

Two ways to represent the data:

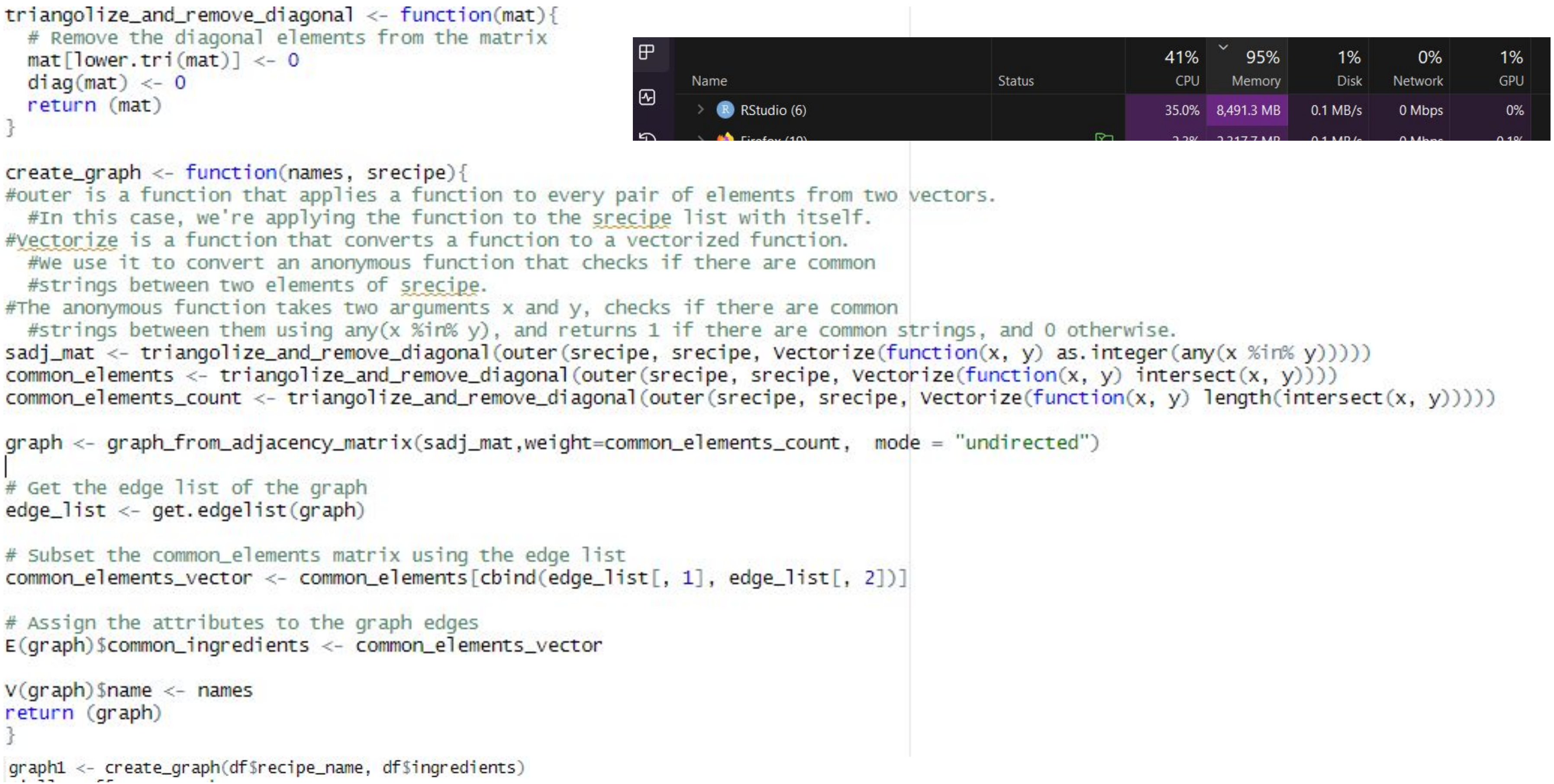
1. Vertex = ingredients
   Edges = recipes

2. Vertex = recipes
   Edges = ingredients


Noodles
Noci
Nutella
Ramen
Biscotti con noci e nocciole
Tartufini al cocco e nutella
Zelten trentino
Nocciole
Niboshi
Insalata gratinata di radicchio, nocciole e scamorza
,Pasta al forno con besciamella di soia
Fichi ripieni ricoperti di cioccolato
Pansoti
Tagliatelle al ragù di funghi e frutta secca
Nocciole intere spellate
Noce moscata
Vellutata di zucca
,Vellutata di sedano rapa
Mousse con fichi e frutta secca
Crema allo yogurt, granola speziata e Nutella®
Mignon con Nutella® e crema diplomatica
,Crema allo yogurt, granola speziata e Nutella®
Nocciole intere
Noci pecan
Nutella®
Bicchiere di yogurt ai frutti rossi, granola e Nutella®


Crepe alla Nutella
Tortino di cioccolato con cuore fondente
Burro, Uova, Farina 00, Zucchero a velo
Latte intero
Burro, Uova, Zucchero, Farina 00, Zucchero a velo
Uova, Farina 00, Burro
Burro, Uova, Zucchero, Farina 00
Farina 00, Burro, Latte intero, Uova, Zucchero a velo
Farina 00, Latte intero, Burro, Uova
Farina 00
Torta di mele
Pancake allo sciroppo d'acero
Crema pasticcera
Zucchero, Latte intero
Burro, Zucchero, Uova, Lievito in polvere per dolci, Sale fino
Latte intero, Zucchero
Zucchero, Farina 00, Burro, Uova, Lievito in polvere per dolci, Cannella in polvere, Sale fino
Farina 00, Sale fino
Farina 00, Burro, Zucchero, Uova, Lievito in polvere per dolci, Sale fino
Farina 00, Sale fino
Zucchero
Banana bread
Uova, Sale fino
Uova, Sale fino
Pasta per la pizza
Farina 00, Sale fino
Uova, Sale fino
Acqua, Sale fino
Polpette al sugo
Sale fino
Sale fino
Sale fino
Sale fino
Tuorli
Spaghetti all'Amatriciana
Pepe nero
Spaghetti alla Carbonara
Spaghetti, Guanciale, Pecorino romano

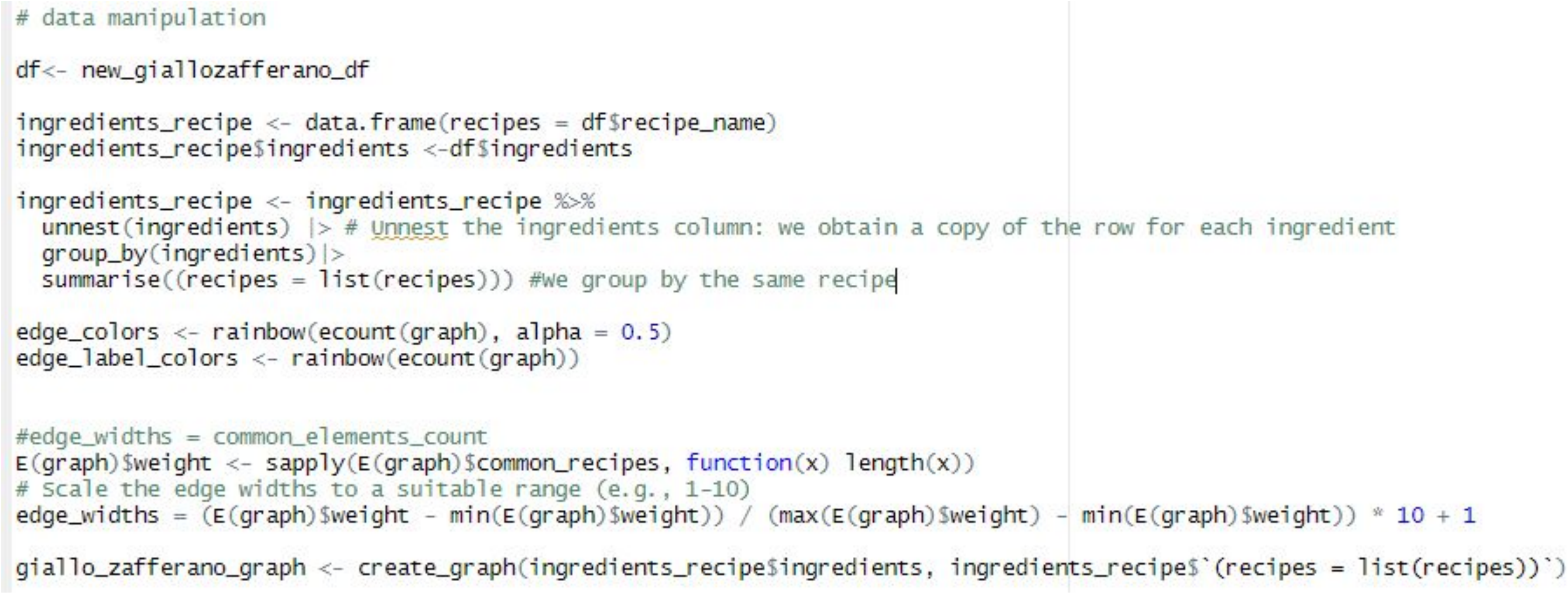
This is how i got the vertex = recipes



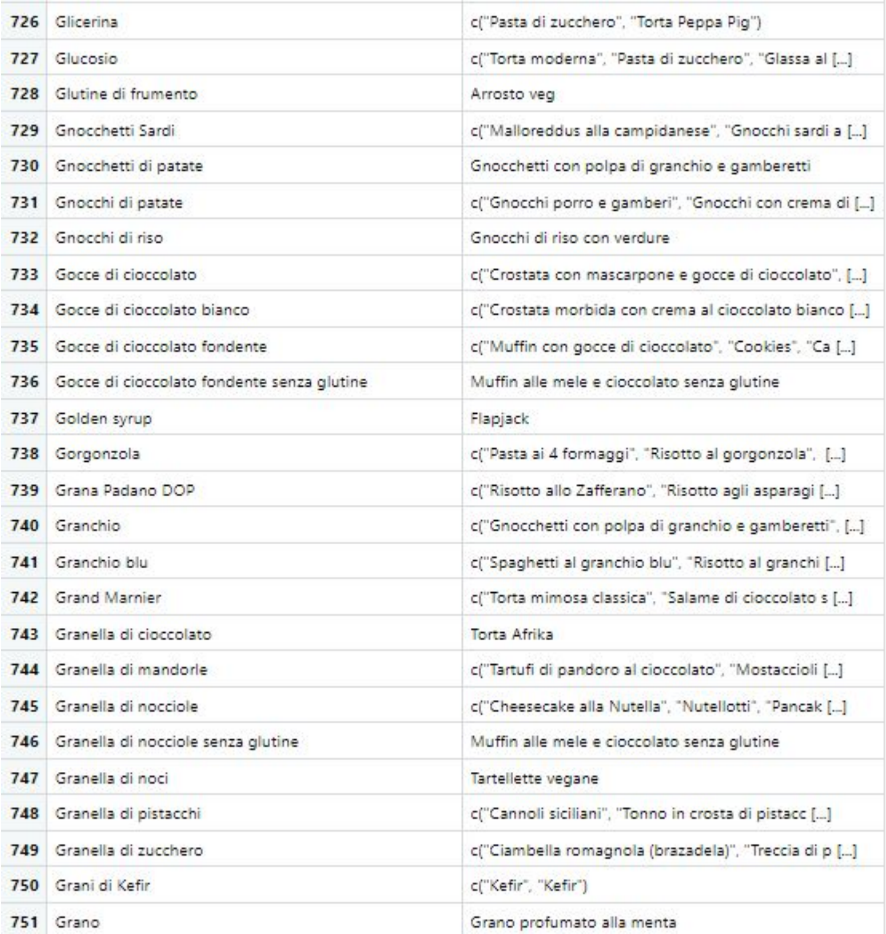
```r
triangolize_and_remove_diagonal <- function(mat){
  # Remove the diagonal elements from the matrix
  mat[lower.tri(mat)] <- 0
  diag(mat) <- 0
  return (mat)
}

create_graph <- function(names, srecipe){
#outer is a function that applies a function to every pair of elements from two vectors.
  #In this case, we're applying the function to the srecipe list with itself.
#Vectorize is a function that converts a function to a vectorized function.
  #We use it to convert an anonymous function that checks if there are common
  #strings between two elements of srecipe.
#The anonymous function takes two arguments x and y, checks if there are common
  #strings between them using any(x %in% y), and returns 1 if there are common strings, and 0 otherwise.
sadj_mat <- triangolize_and_remove_diagonal(outer(srecipe, srecipe, Vectorize(function(x, y) as.integer(any(x %in% y)))))
common_elements <- triangolize_and_remove_diagonal(outer(srecipe, srecipe, Vectorize(function(x, y) intersect(x, y))))
common_elements_count <- triangolize_and_remove_diagonal(outer(srecipe, srecipe, Vectorize(function(x, y) length(intersect(x, y)))))

graph <- graph_from_adjacency_matrix(sadj_mat,weight=common_elements_count,  mode = "undirected")

# Get the edge list of the graph
edge_list <- get.edgelist(graph)

# Subset the common_elements matrix using the edge list
common_elements_vector <- common_elements[cbind(edge_list[, 1], edge_list[, 2])]

# Assign the attributes to the graph edges
E(graph)$common_ingredients <- common_elements_vector

V(graph)$name <- names
return (graph)
}
graph1 <- create_graph(df$recipe_name, df$ingredients)
```

Name	Status	41% CPU	95% Memory	1% Disk	0% Network	1% GPU
RStudio (6)		35.0%	8,491.3 MB	0.1 MB/s	0 Mbps	0%

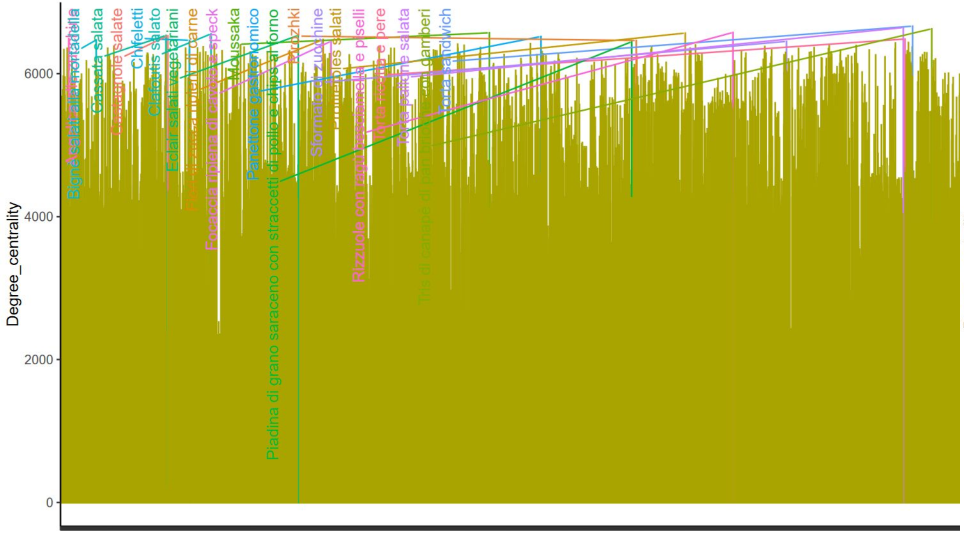
The vertex = ingredients the same way but with some data tuning



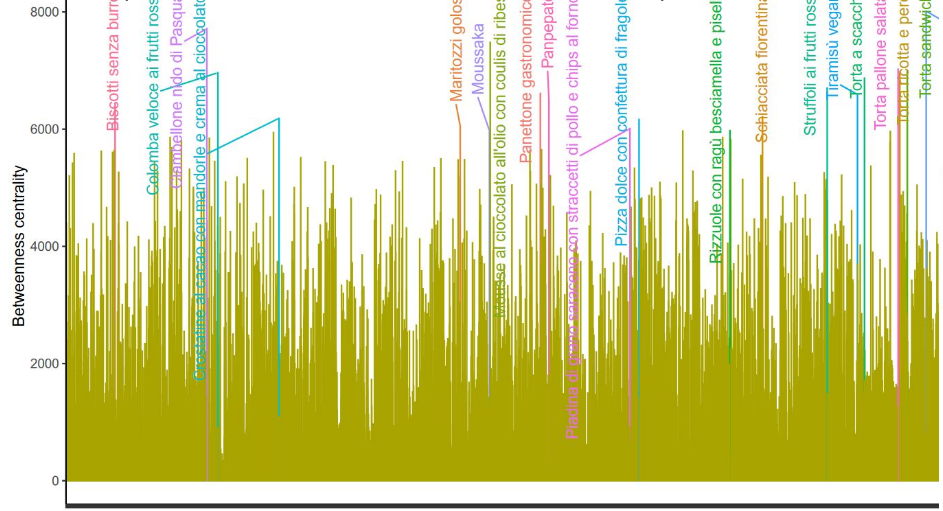
```
# data manipulation

df<- new_giallozafferano_df

ingredients_recipe <- data.frame(recipes = df$recipe_name)
ingredients_recipe$ingredients <-df$ingredients

ingredients_recipe <- ingredients_recipe %>%
  unnest(ingredients) |> # Unnest the ingredients column: we obtain a copy of the row for each ingredient
  group_by(ingredients)|>
  summarise((recipes = list(recipes))) #we group by the same recipe

edge_colors <- rainbow(ecount(graph), alpha = 0.5)
edge_label_colors <- rainbow(ecount(graph))


#edge_widths = common_elements_count
E(graph)$weight <- sapply(E(graph)$common_recipes, function(x) length(x))
# Scale the edge widths to a suitable range (e.g., 1-10)
edge_widths = (E(graph)$weight - min(E(graph)$weight)) / (max(E(graph)$weight) - min(E(graph)$weight)) * 10 + 1

giallo_zafferano_graph <- create_graph(ingredients_recipe$ingredients, ingredients_recipe$`(recipes = list(recipes))`)
```

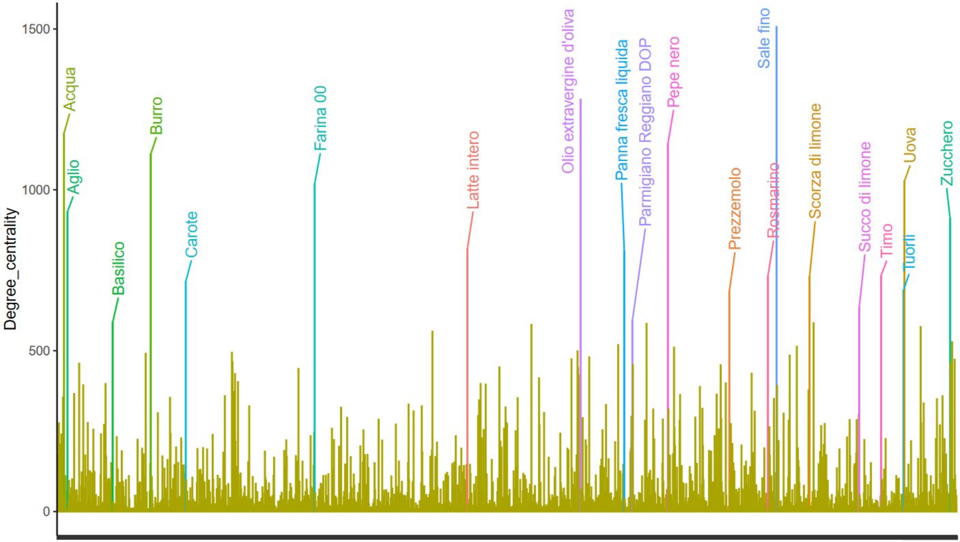


726	Glicerina	c("Pasta di zucchero", "Torta Peppa Pig")
727	Glucosio	c("Torta moderna", "Pasta di zucchero", "Glassa al [...]
728	Glutine di frumento	Arrosto veg
729	Gnocchetti Sardi	c("Malloreddus alla campidanese", "Gnocchi sardi a [...]
730	Gnocchetti di patate	Gnocchetti con polpa di granchio e gamberetti
731	Gnocchi di patate	c("Gnocchi porro e gamberi", "Gnocchi con crema di [...]
732	Gnocchi di riso	Gnocchi di riso con verdure
733	Gocce di cioccolato	c("Crostata con mascarpone e gocce di cioccolato", [...]
734	Gocce di cioccolato bianco	c("Crostata morbida con crema al cioccolato bianco [...]
735	Gocce di cioccolato fondente	c("Muffin con gocce di cioccolato", "Cookies", "Ca [...]
736	Gocce di cioccolato fondente senza glutine	Muffin alle mele e cioccolato senza glutine
737	Golden syrup	Flapjack
738	Gorgonzola	c("Pasta ai 4 formaggi", "Risotto al gorgonzola", [...]
739	Grana Padano DOP	c("Risotto allo Zafferano", "Risotto agli asparagi [...]
740	Granchio	c("Gnocchetti con polpa di granchio e gamberetti", [...]
741	Granchio blu	c("Spaghetti al granchio blu", "Risotto al granchi [...]
742	Grand Marnier	c("Torta mimosa classica", "Salame di cioccolato s [...]
743	Granella di cioccolato	Torta Afrika
744	Granella di mandorle	c("Tartufi di pandoro al cioccolato", "Mostaccioli [...]
745	Granella di nocciole	c("Cheesecake alla Nutella", "Nutellotti", "Pancak [...]
746	Granella di nocciole senza glutine	Muffin alle mele e cioccolato senza glutine
747	Granella di noci	Tartellette vegane
748	Granella di pistacchi	c("Cannoli siciliani", "Tonno in crosta di pistacc [...]
749	Granella di zucchero	c("Ciambella romagnola (brazadela)", "Treccia di p [...]
750	Grani di Kefir	c("Kefir", "Kefir")
751	Grano	Grano profumato alla menta

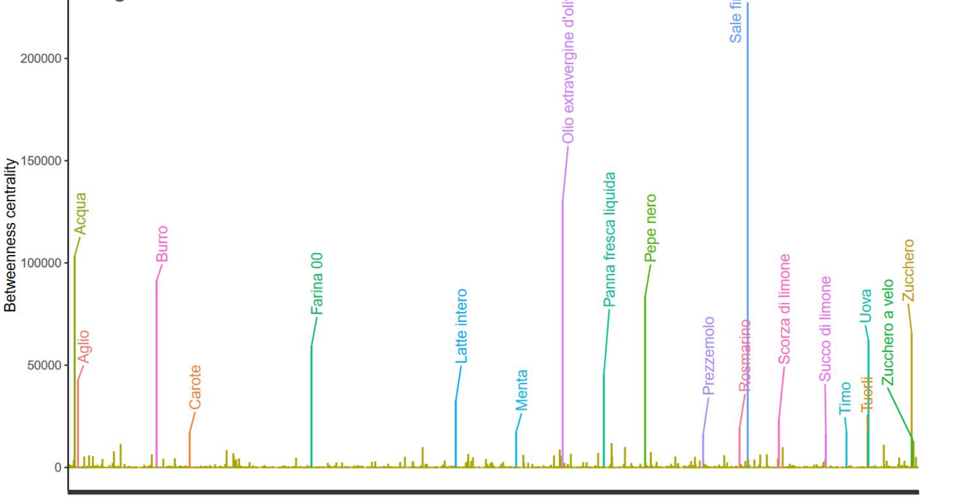


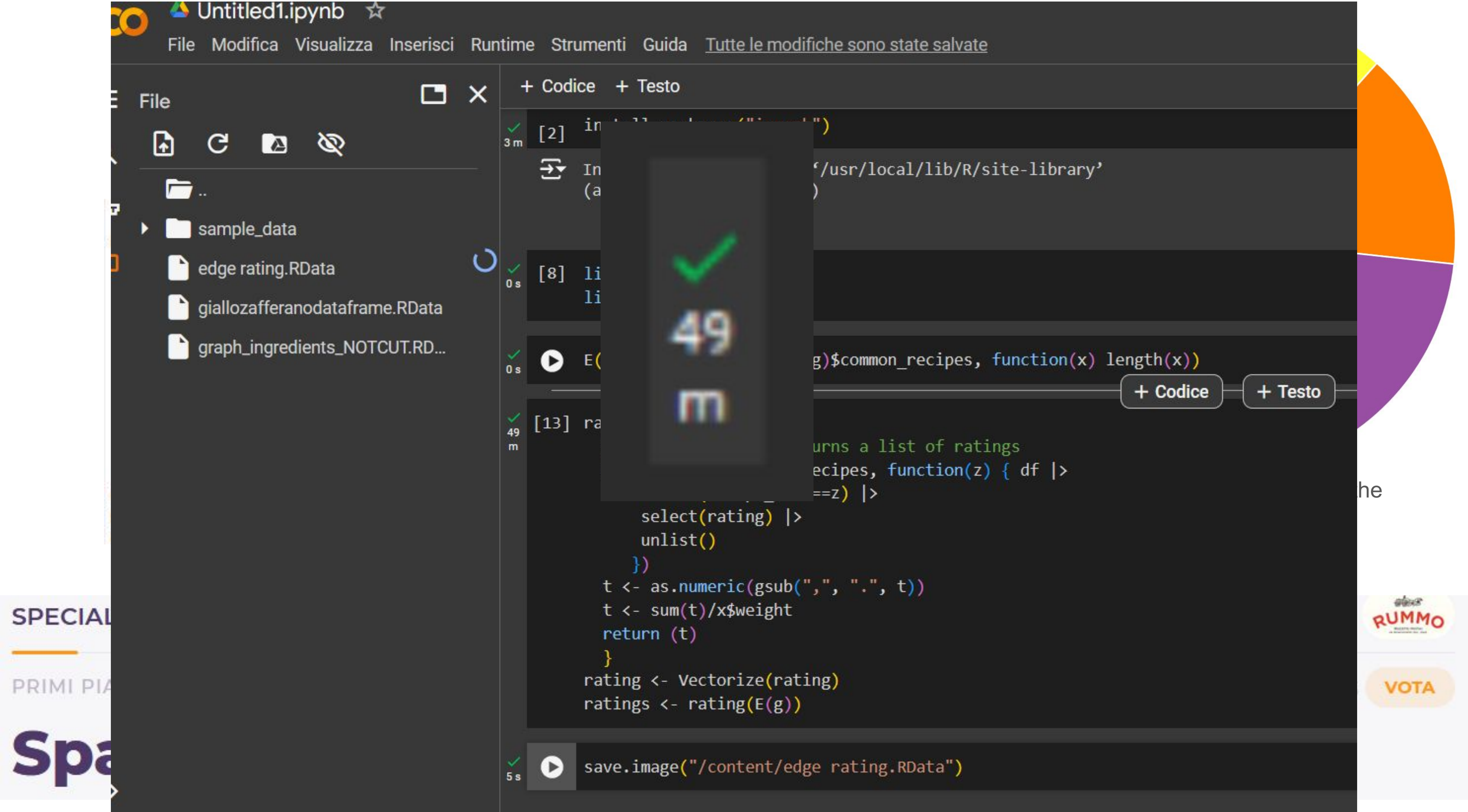
Recipes as vertex. Without water and salt. Almost a clique.





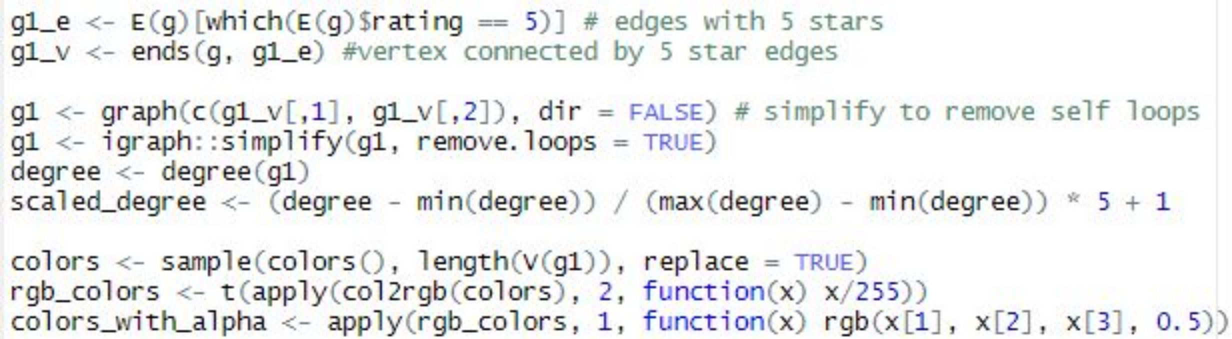
Ingredients as vertex.



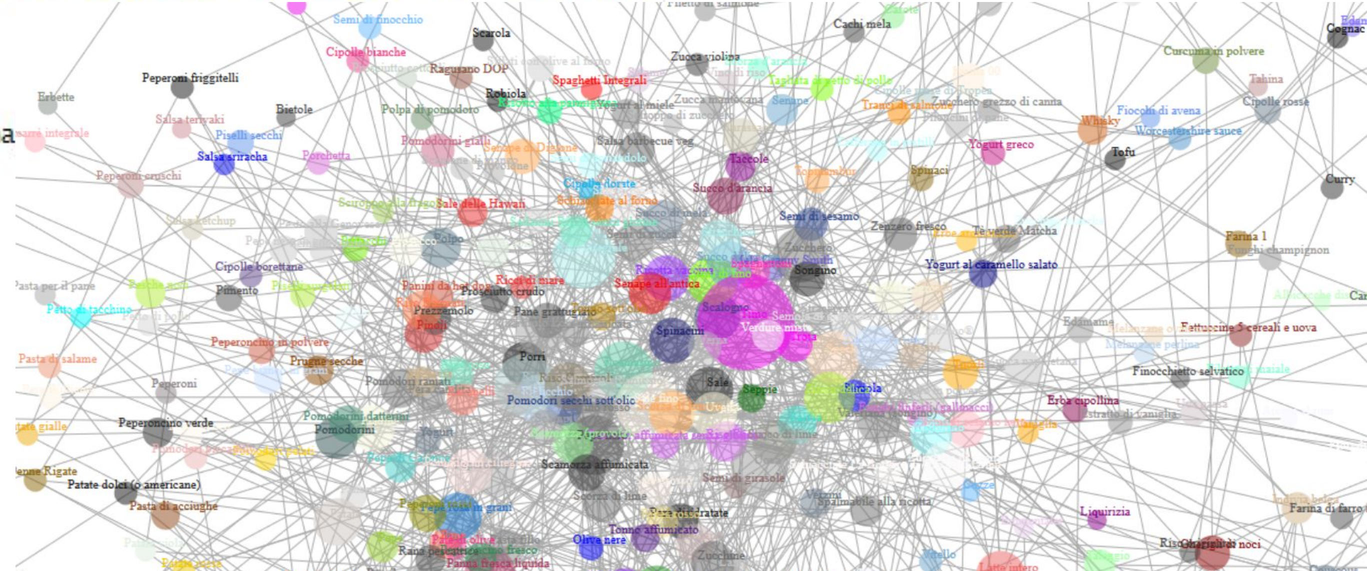

Untitled1.ipynb
File Modifica Visualizza Inserisci Runtime Strumenti Guida
Tutte le modifiche sono state salvate
+ Codice + Testo
File
..
sample_data
edge rating.RData
giallozafferanodataframe.RData
graph_ingredients_NOTCUT.RD...
3 m
0 s
0 s
49 m
5 s
49
m
SPECIAL
PRIMI PI
Spa
he
RUMMO
VOTA

```
[2] in                              ")
    In                              '/usr/local/lib/R/site-library'
    (a                              )

[8] li
    li

    E(                              g)$common_recipes, function(x) length(x))

[13] ra
                                    urns a list of ratings
                                    ecipes, function(z) { df |>
                                    ==z) |>
          select(rating) |>
          unlist()
        })
      t <- as.numeric(gsub(",", ".", t))
      t <- sum(t)/x$weight
      return (t)
      }
    rating <- Vectorize(rating)
    ratings <- rating(E(g))

    save.image("/content/edge rating.RData")
```

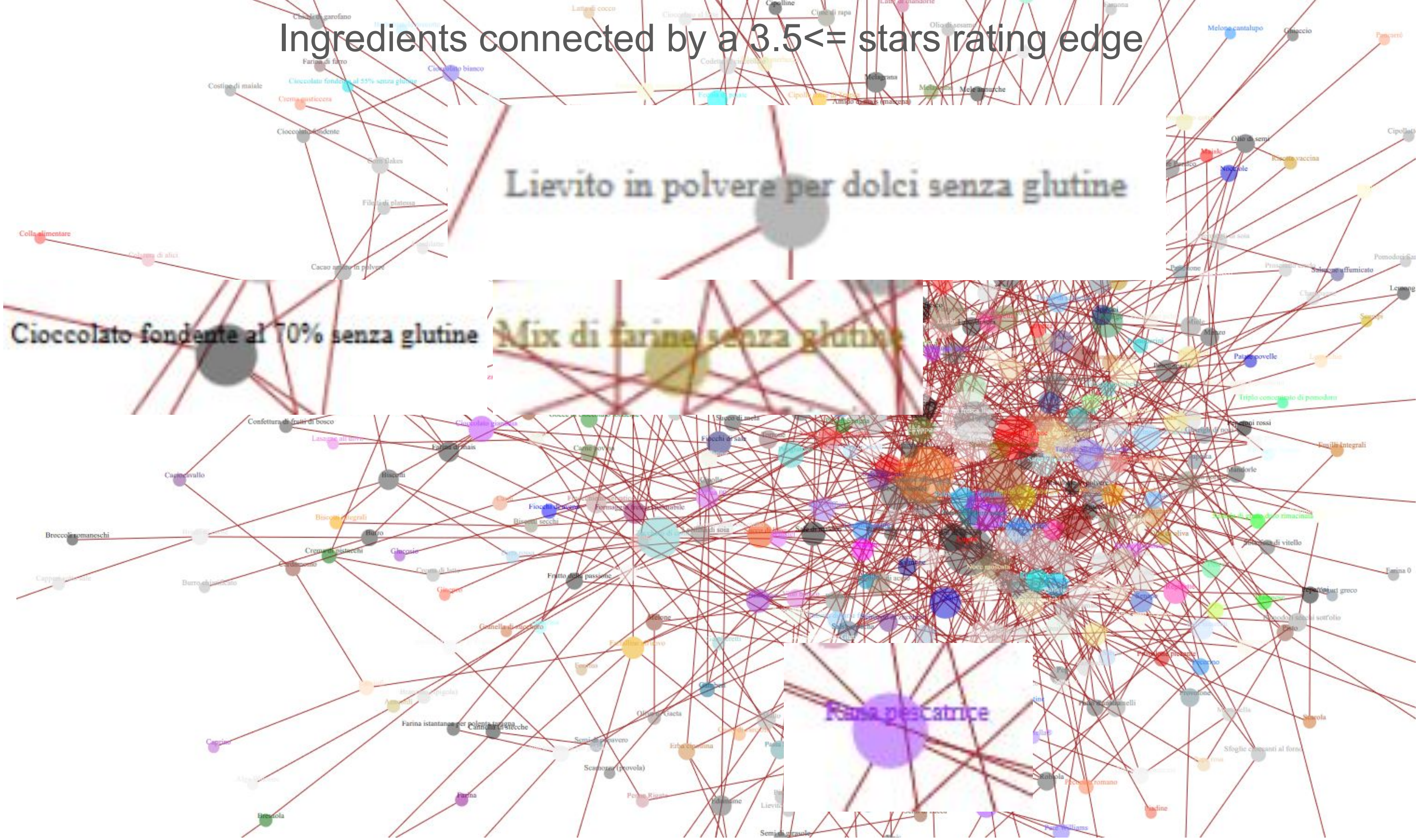
Ingredients connected by a 5 stars rating edge



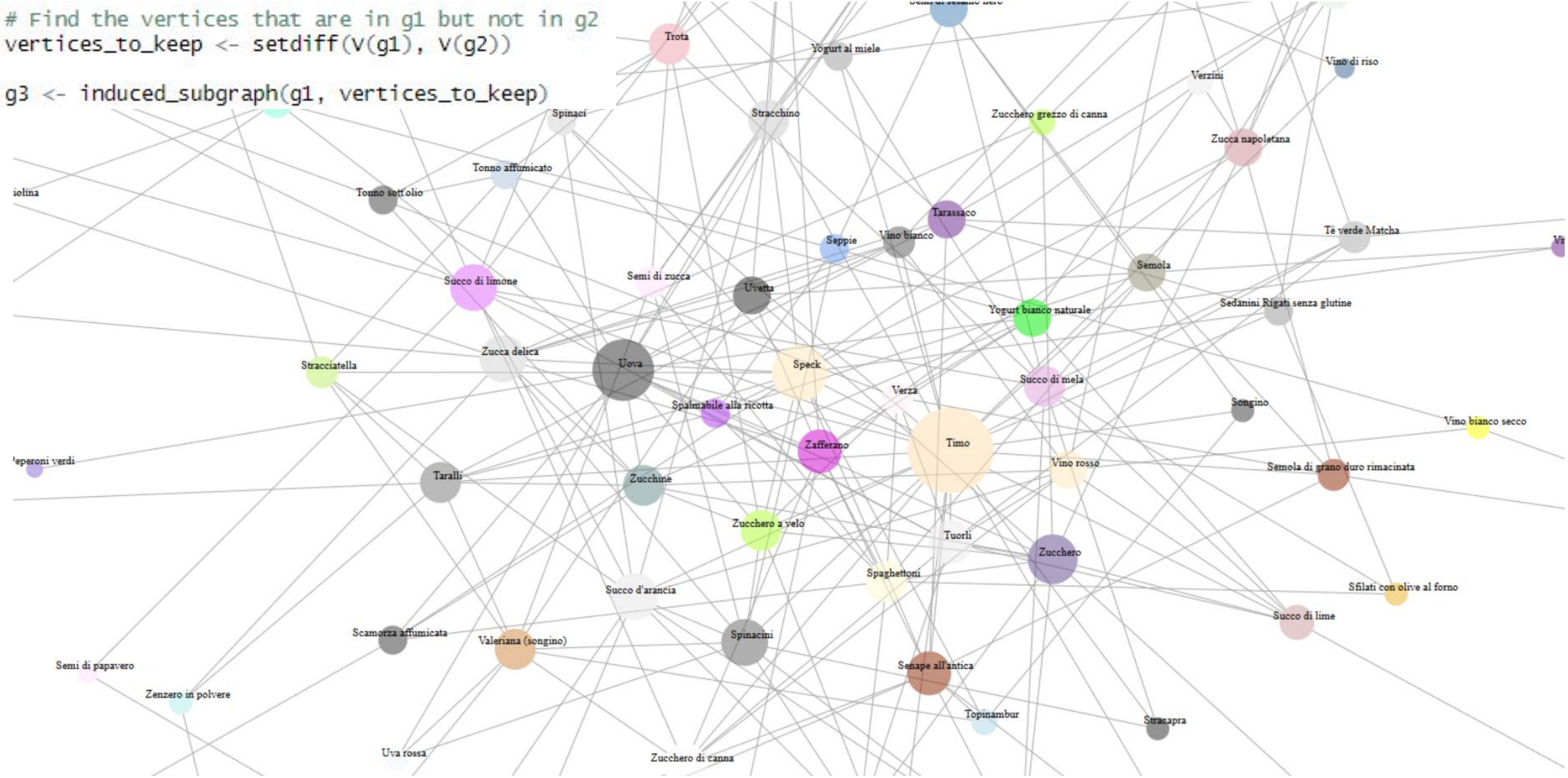
```
g1_e <- E(g)[which(E(g)$rating == 5)] # edges with 5 stars
g1_v <- ends(g, g1_e) #vertex connected by 5 star edges

g1 <- graph(c(g1_v[,1], g1_v[,2]), dir = FALSE) # simplify to remove self loops
g1 <- igraph::simplify(g1, remove.loops = TRUE)
degree <- degree(g1)
scaled_degree <- (degree - min(degree)) / (max(degree) - min(degree)) * 5 + 1

colors <- sample(colors(), length(V(g1)), replace = TRUE)
rgb_colors <- t(apply(col2rgb(colors), 2, function(x) x/255))
colors_with_alpha <- apply(rgb_colors, 1, function(x) rgb(x[1], x[2], x[3], 0.5))

plot(g1,
     vertex.size = scaled_degree,
     vertex.label = V(g1)$name,
     vertex.color = colors_with_alpha,
     vertex.frame.color = NA,
     vertex.label.color = colors,
     vertex.label.cex = 0.1,
     vertex.label.border = "black",
     vertex.label.dist = 0.1,
     edge.arrow.size = 0.1,
     edge.width = 0.1,
     margin = -0.1)
```



Ingredients connected by a 3.5<= stars rating edge



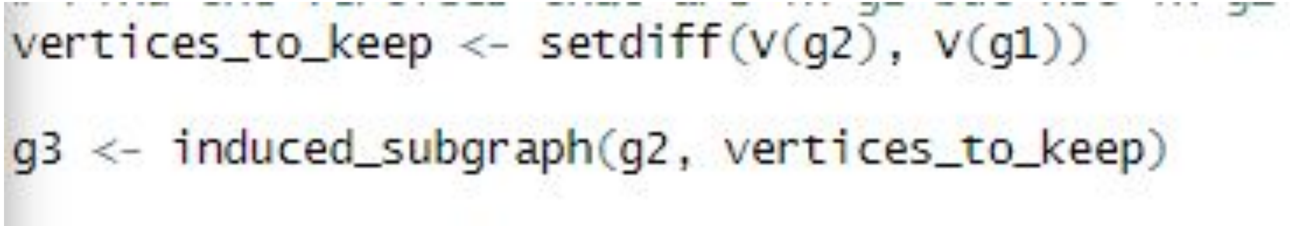
```
# Find the vertices that are in g1 but not in g2
vertices_to_keep <- setdiff(V(g1), V(g2))

g3 <- induced_subgraph(g1, vertices_to_keep)
```



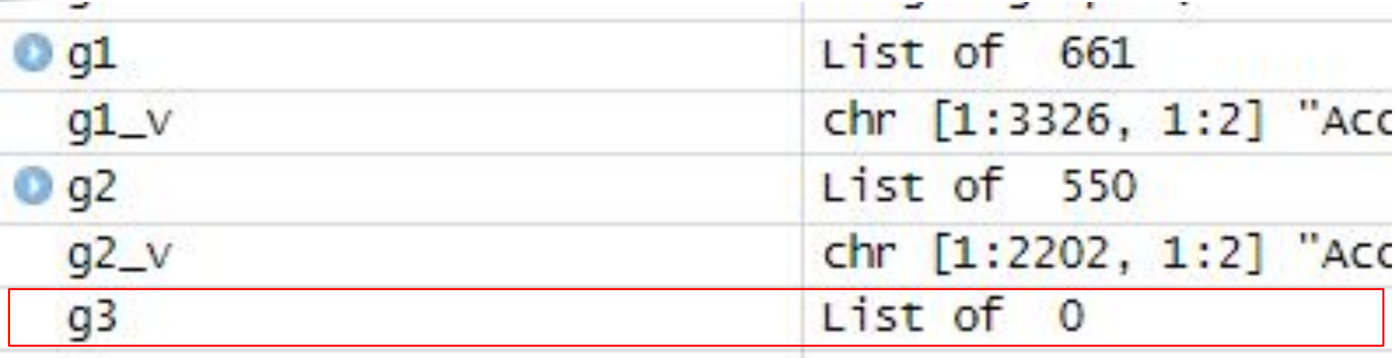
So, these are the most preferred ingredients by the community of GialloZafferano:

```
[1] "Semi di papavero"                "Semi di sesamo"                   "Semi di sesamo nero"
  [4] "Semi di zucca"                   "Semola"                           "Semola di grano duro rimacinata"
  [7] "Senape all'antica"               "Senape di Digione"                "Seppie"
 [10] "Sfilati con olive al forno"      "Spaghettoni"                      "Spalmabile alla ricotta"
 [13] "Speck"                           "Spinaci"                          "Spinacini"
 [16] "Stracapra"                       "Stracciatella"                    "Succo d'arancia"
 [19] "Succo di lime"                   "Succo di limone"                  "Succo di mela"
 [22] "Tabasco®"                        "Taccole"                          "Tahina"
 [25] "Taralli"                         "Tarassaco"                        "Timo"
 [28] "Tonno affumicato"                "Trota"                            "Tuorli"
 [31] "Tè verde Matcha"                 "Uova"                             "Uvetta"
 [34] "Valeriana (songino)"             "Vino bianco"                      "Wasabi"
 [37] "Whisky"                          "Worcestershire sauce"             "Yogurt al caramello salato"
 [40] "Yogurt magro"                    "Zafferano in pistilli"            "Zucca delica"
 [43] "Zucca violina"                   "Paccheri"                         "Zenzero in polvere"
 [46] "Verza"                           "Peperoni verdi"                   "Squacquerone"
 [49] "Tonno sott'olio"                 "Zucchine"                         "Vino rosso"
 [52] "Zucca napoletana"                "Zafferano"                        "Sciroppo di latte di mandorla"
 [55] "Yogurt al miele"                 "Uva rossa"                        "Zucchero"
 [58] "Uva passa"                       "Scamorza affumicata"              "Zucchine bianche"
 [61] "Granella di zucchero"            "Zenzero fresco"                   "Salmone"
 [64] "Songino"                         "Stracchino"                       "Sedanini Rigati senza glutine"
 [67] "Scorza d'arancia"                "Zucchero a velo"                  "Spaghetti"
 [70] "Tranci di salmone"               "Yogurt"                           "Vino bianco secco"
 [73] "Tofu"                            "Zucchero di canna"                "Senape"
 [76] "Spaghetti Integrali"             "Verdure miste"                    "Scarola"
 [79] "Topinambur"                      "Taleggio"                         "Vongole"
 [82] "Sedano rapa"                     "Yogurt bianco naturale"           "Prosciutto crudo"
 [85] "Yogurt greco"                    "Tagliata di petto di pollo"       "Vino di riso"
 [88] "Sciroppo di zucchero"            "Fagioli borlotti"                 "Pomodori piccadilly"
 [91] "Verzini"                         "Vaniglia"                         "Tonno"
 [94] "Riso per sushi"                  "Zucca"                            "Zuccherini"
 [97] "Mele"                            "Zucca butternut"                  "Mortadella"
[100] "Panettone"                       "Vitello"                          "Lasagne all'uovo"
[103] "Marmellata di arance"            "Toma piemontese"                  "Sciroppo di amarene"
[106] "Riso Arborio"                    "Timo limonato"                    "Zucchero muscovado"
[109] "Nutella"                         "Zucca mantovana"                  "Zucchero grezzo di canna"
```

Interesting Fact:
In GialloZafferano, do not exist worst ingredients



```
vertices_to_keep <- setdiff(V(g2), V(g1))

g3 <- induced_subgraph(g2, vertices_to_keep)
```



g1	List of 661
g1_v	chr [1:3326, 1:2] "Acc
g2	List of 550
g2_v	chr [1:2202, 1:2] "Acc
g3	List of 0

What did we learn?

NEVER say: Che schifo!
Bleah

You risk to make someone angry

ALWAYS say:
(if it’s the truth)

YUMMY!!